Re-hydrating the Earth in Arid Lands (REAL)

Systems research on small groundwater retaining structures under local management in arid and semi-arid areas of East Africa.

EC-Fifth Framework Programme
ICA4-2001-10191

Proposal Submission Forms

16 September 2001

TUDelft

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Proposal submission forms for financial support from the EC for shared-cost RTD actions: research and technological development projects, demonstration projects, and combined projects

If possible, these forms should be prepared using the Proposal Preparation Tool (ProTool), which is available via the Commission Internet site http://www.cordis.lu/fp5/protool or on CD-ROM. Use of the Proposal Preparation Tool is preferred by the Commission. However applicants may also use the forms in the Guide for Proposers. Using the ProTool, forms may be submitted electronically, or printed out and returned on paper.

Information on the Proposal [1]

Proposal Full Name	Systems Research on Small Groundwater Retaining Structures under Local Management in Arid and Semi-arid Areas of East Africa			
Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]		
Call Identifier [3]	ICFP501A4PRO3			
Research Programme(s) [2]	INCO-1999			
Thematic priorities [2]	INCO-1999-1.4.			

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Post stamp ☐☐ / ☐☐ / ☐☐☐☐

Reception date ☐☐ / ☐☐ / ☐☐☐☐

Shared Cost RTD Proposal Form – Form A1

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A1. Proposal Administrative Overview [1]

Thematic priorities [2]	INCO-1999-1.4.			
Type of Action [4]	RS			
Proposal Full Name	Systems Research on Small Groundwater Retaining Structures under Local Management in Arid and Semi-arid Areas of East Africa			

Contact person for the proposal(s) [7]

Title (Dr, Prof., ...)	Drs	Gender [8]	F	X	M	
Family Name	Twickler					
First Name	Theresia					
Organisation Legal Name [9]	Delft University of Technology					
Department / Institute Name [10]	Cicat					
PO Box [11]	5048					
Street Name and Number	Stevinweg 1					
Post Code [12]	2600 GA	Cedex [13]				
Town/City	Delft					
Country Code [14]	NL	Country Name [14]	Netherlands			
Telephone No [15]	(31-15)2782127	Fax No [15]	(31-15)2781179			
E-mail	t.twickler@cicat.tudelft.nl					

Proposal abstract (maximum 1000 characters) [16]

The research focuses on the (semi-)arid areas in Kenya and Tanzania. Within a setting of demanding natural circumstances, growing pressure on natural resources and difficult economic conditions including rural-urban migration, there is a urgent need to improve the rural and semi-urban local conditions. In Eastern Kenya, in the Kitui and Tsavo regions, several successful groundwater structures were built the last 6 years. The project will investigate the different parameters for success of the Kenyan systems with respect to technological possibilities sustained by social, economic, organisational and managerial factors of the communities and local government. The outcome is tested parallel in the Tanzanian area. Results in both areas will lead to the production of a manual for design, operation and maintenance of small water retainign structures, with focus on local management and community participation.

Duration (in Months) [17]	36	Total Eligible Cost (in euro) [18]	531366	EC Contribution requested (in euro) [19]	401076
Keywords [20]	b-ii-2,c.iv, a.iv	ACP			

Have you or any of your partners, previously or currently, submitted this proposal or one similar in content to any Community Programme? If yes, please give details of the proposal [21]			Y		N X
Programme Name		Year		Proposal No	

Duly authorised by the consortium partners to send this proposal to the Commission, I certify that the description of this proposal and the information on forms A1, A2, A3 and A4 is accurate and agreed to by the consortium partners and that the consortium collectively agrees to carry out a project as described herein.

Date (DD/MM/YYYY)	16/09/2001
Signature of person authorised to submit a proposal in the co-ordinating organisation	

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A2. Proposal Summary [22]

Objectives (maximum 1000 characters)

To clarify the relations between local practices and theoretical approaches, by focussing on the design, management and performance of small groundwater retaining structures on a communal level in semi-arid regions in two African countries, Kenya and Tanzania, linking both the individual and the community as theory and practice, resulting in guidelines for participatory design of small water retaining structures in semi-arid regions around the globe.specific objectives are:
1) clarification and further implmentation of the participatory design. construction and management approach for small water retaining structures in the research areas;
2) clarification of the performance of small water retaining structures;

Description of the work (maximum 2000 characters)

The project focuses on an existing participatory approach for the cosntruction of small water structures, mostly groundwater dams in combination with shallow wells. A study into the performance of groundwater dams focuses on the cosntructued dams in Kitui area, formulates recommendations for dam and water management and supports the implementation of these recommendatiosn. Throughout the whole project, participating members will meet three times. A final conference, during which the deign manual is presented and discussed, will conclude the project. PhD- and MSc students from participating universities are encouraged to take part within the project within their formal education and training programme. Next to documenting existing practice in an extensive performance work package, the project will use an action oriented research approach by organising and studying the implementation processes of new water structures in 3 other areas (2 in Kenya and 1 in Tanzania).On these three sites new dams will be constructed based on the Kitui approach but improved and extended with the first results of the performance analysis and the specific expertise of the different partners in the project and its work packages. All areas are located in the semi-arid zone. The project is divided into 4 work packages:

WP	name	Goals
1	Integration	monitoring of progress administration of the project integration of scientific output
2	Performance	evaluate management and use of dams and recomendations

Milestones and expected results (maximum 500 characters)

Main Milestones are the 4 central workshops (kick-start, 2 progress- and 1 final conference) and the 3 in-between meetings needed for monitoring of progress and tuning and scheduling of tasks.The main deliverable after 3 years is the Manual for Participatiry Design of Small Water Retainign Structures. Each work package will deliver a final report which is a building stone for the end product.

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [7]

Legal information on the participating organisation

Participant Role [24]	CO	Participant No [25]	1	Assistant to Contractor No [26]			
Registration No with the European Commission's Research Programmes [27]							
Organisation Legal Name [28]	Technische Universiteit Delft						
Short Name [29]	TUD			Legal Registration No [30]	see annex		
Activity Type [31]	HES	Legal Status [32]	GOV	If 'PRC', Specify [33]			
Business Area [34] (NACE)	80	User/Supplier [35] (U / S)	S	Cost Basis [36] (FC / FF / AC)			FF

Organisation details [37]

Annual turnover [38]	NA	Annual Balance Sheet Total [39]	NA	Number of employees [40]	S7		
Is Your Organisation independent [41]?					Y X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]							
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?					Y	N X	
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]						I	
						I	
						I	

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	Cicat		
PO Box [11]	5048		
Street Name and Number	Stevinweg 1		
Post Code [12]	2600 GA	Cedex [13]	
Town/City	Delft		
Country Code [14]	NL	Country Name [14]	Netherlands

Authorised person [46]

Title (Dr, Prof., ...)	Drs Ing.	Gender [8]	F	M X	
Family Name	Loos				
First Name	Andre				
Telephone No [15]	(31-15)2785200	Fax No [15]	(31-15)2783100		
E-mail	a.l.loos@bsc.tudelft.nl				

I certify that the above information is accurate and that my organisation is invited to participate in this proposal.

Date (DD/MM/YYYY)	16/09/2001
Signature of authorised person	

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	CR	Participant No [25]	3	Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	Katholieke Universiteit Leuven				
Short Name [29]	KUL			Legal Registration No [30]	
Activity Type [31]	HES	Legal Status [32]	GOV	If 'PRC', Specify [33]	
Business Area [34] (NACE)	80	User/Supplier [35] (U / S)	S	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	NA	Annual Balance Sheet Total [39]	NA	Number of employees [40]	S7

Is Your Organisation independent [41]?	Y	X	N		
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X	
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]				I	
				I	
				I	

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	Katholieke Universiteit Leuven, Institute for Earth Sciences, Spatial Applications Division Leuven (SADL)		
PO Box [11]			
Street Name and Number	Vital Decosterstraat 102		
Post Code [12]	B3000	Cedex [13]	
Town/City	Leuven		
Country Code [14]	B	Country Name [14]	Belgium

Authorised person [46]

Title (Dr, Prof., ...)	Dr. ir.			Gender [8]	F		M	X
Family Name	Oosterlinck							
First Name	Andre							
Telephone No [15]	(32-16)325067		Fax No [15]	(32-16)324000				
E-mail	andre.oosterlinck@rec.kuleuven.ac.be							

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [5]	RTE	Proposal No [6]	

A3 Participant Profile/Information on the participating organisation

Legal information on the participating organisation

Participant Role [24]	CR	Participant No [23]		Assistant to Contractor No [25]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [29]	KATHOLIEKE UNIVERSITEIT LEUVEN				
Short Name [28]	KU LEUVEN		Legal Registration No [30]		
Activity Type [31]	HES	Legal Status [32]	PNP	If 'PRC', Specify [33]	
Business Area [34] (NACE)	80	User/Supplier [35] (U/S)	S	Cost Basis [36] (FC/FF/AC)	AC

Organisation details

Annual turnover [38]		Annual Balance Sheet Total [39]		Number of employees [40]	S7

Is Your Organisation independent [41]?	Y [X]	N [ ]
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]		
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y [ ]	N [X]
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D/I) [44]		

Address of the main department carrying out the work

Department/ Institute Name [10]	SPATIAL APPLICATIONS DIVISION LEUVEN (SADL)		
PO Box [11]			
Street Name and Number	VITAL DECOSTERSTRAAT 102		
Post Code [12]	B3000	Cedex [13]	
Town/City	LEUVEN		
Country Code [14]	B	Country Name [14]	BELGIUM

Authorised person

Title (Dr, Prof., ...)	Dr. ir. Rector		Gender [9]	F [ ]	M [X]
Family Name	Oosterlinck				
First Name	André				
Telephone No [15]	00 32 016 325067	Fax No [18]	00 32 016 324000		
E-mail	Andre.Oosterlinck@rec.kuleuven.ac.be				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	11/09/2001
Signature of authorised person	

KATHOLIEKE UNIVERSITEIT LEUVEN
ONDERZOEKSCOÖRDINATIE
Universiteitshal, Naamsestraat 22
B-3000 LEUVEN (BELGIUM)

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	CR	Participant No [25]	4	Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	Sahelian Solutions Foundation				
Short Name [29]	SASOL		Legal Registration No [30]	C.50265	
Activity Type [31]	REC	Legal Status [32]	PNP	If 'PRC', Specify [33]	
Business Area [34] (NACE)	73	User/Supplier [35] (U / S)	S	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	T1	Annual Balance Sheet Total [39]	B1	Number of employees [40]	S3

Is Your Organisation independent [41]?	Y	X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]				
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]				I
				I
				I

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	Sahelian Solutions Foundation		
PO Box [11]	14333		
Street Name and Number	Isukuuni Place 1		
Post Code [12]		Cedex [13]	
Town/City	Nairobi		
Country Code [14]	KE	Country Name [14]	Kenya

Authorised person [46]

Title (Dr, Prof., ...)	Prof.		Gender [8]	F		M	X
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First Name	Gideon-Cyrus Makan					
Telephone No [15]	(254-2)860772	Fax No [15]	(254-2)860771			
E-mail	muticon@wananchi.com					

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [1]		Proposal No [4]	

Participant Identification

Participant Role [24]		Participant No [25]		Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	SASOL FOUNDATION				
Short Name [29]	SASOL		Legal Registration No [30]	C.50266	
Activity Type [31]		Legal Status [32]		If 'PRC', Specify [33]	
Business Area [34] (NACE)		User/Supplier [35] (U / S)		Cost Basis [36] (PC / PF / AC)	
Annual turnover [37]	Ksh 3/=	Annual Balance Sheet Total [38]	-	Number of employees [40]	
Is Your Organisation independent [41]?				Y ✓	N
If No, please indicate legal name(s) of owner(s) who own 26 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?				Y ✓	N
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (P/F) [44]		TU DELFT			
		UNESCO CHAIR - UNIVERSITY OF NAIROBI			

Author Identification

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PO Box [11]	14333		
Street Name and Number	ISUKUNI PLACE No 1		
Post Code [13]	Box 14333	Cedex [12]	
Town/City	NAIROBI. KENYA		
Country Code [14]		Country Name [14]	
Title (Dr, Prof., ...)	Prof.	Gender [5] F	M ✓
Family Name	Mutiso		
First Name	Gideon-Cyrus Makau		
Telephone No [15]	2-254-860771	Fax No [16]	860771
E-mail	Mutiso@wananchi.com		

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	10/08/01
Signature of authorised person	

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	CR	Participant No [25]	5	Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	University of Dar es Salaam				
Short Name [29]	UDSM			Legal Registration No [30]	Act. 12 of 1970
Activity Type [31]	HES	Legal Status [32]	GOV	If 'PRC', Specify [33]	
Business Area [34] (NACE)	80	User/Supplier [35] (U / S)	U	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	NA	Annual Balance Sheet Total [39]	NA	Number of employees [40]	S7

Is Your Organisation independent [41]?	Y	X	N		
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X	
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]				I	
				I	
				I	

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	University of Dar es Salaam, Institute of Resource Assessment (IRA)		
PO Box [11]	35097		
Street Name and Number			
Post Code [12]		Cedex [13]	
Town/City	Dar Es Salaam		
Country Code [14]	TZ	Country Name [14]	Tanzania

Authorised person [46]

Title (Dr, Prof., ...)	Dr.		Gender [8]	F		M	X
Family Name	Sosovele					
First Name	Hussein					
Telephone No [15]	(255-22)2410144	Fax No [15]	(255-22)2410393			
E-mail	ira@udsm.ac.tz or sosvele@udsm.ac.tz					

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [4]	rehydrating the earth RDAL	Proposal No [5]	

A3 Participant Profile/Information (1 form per participant) [6]

Legal information on the participating organisation

Participant Role [24]	CR	Participant No [25]	5	Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [29]	University of Dar es Salaam				
Short Name [28]	UDSM		Legal Registration No [30]	Act. 12 of 1970	
Activity Type [31]	HES	Legal Status [32]	GOV	If 'PRC', Specify [33]	
Business Area [34] (NACE)	80	User/Supplier [35] (U/S)	U	Cost Basis [36] (FC/FF/AC)	AC

Organisation details

Annual Turnover [38]	NA	Annual Balance Sheet Total [39]	NA	Number of employees [40]	87

Is Your Organisation independent [41]?	Y	X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]				
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D/I) [44]			I	
			I	
			I	

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	University of Dar es Salaam, Institute of Resource Assessment (IRA)		
PO Box [11]	35097		
Street Name and Number			
Post Code [12]		Cedex [13]	
Town/City	Dar Es Salaam		
Country Code [14]	TZ	Country Name [14]	Tanzania

Author/Person to be contacted [46]

Title (Dr, Prof., ...)	Dr.	Gender [8]	F		M X
Family Name	Sosovele				
First Name	Hussein				
Telephone No [15]	(255-22)2410144	Fax No [15]	(255-22)2410393		
E-mail	ira@udsm.ac.tz or sosvolo@udsm.ac.tz				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

INSTITUTE OF RESOURCE ASSESSMENT
UNIVERSITY OF DAR ES SALAAM
P.O. BOX 35097
Dar es Salaam
Tanzania

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	CR	Participant No [25]	2	Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	IRC International Water and Sanitation Centre				
Short Name [29]	IRC		Legal Registration No [30]	K.v.K. 151952	
Activity Type [31]	REC	Legal Status [32]	INO	If 'PRC', Specify [33]	
Business Area [34] (NACE)	73	User/Supplier [35] (U / S)	S	Cost Basis [36] (FC / FF / AC)	FC

Organisation details [37]

Annual turnover [38]	T1	Annual Balance Sheet Total [39]	B2	Number of employees [40]	S3

Is Your Organisation independent [41]?	Y	X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]				
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]				I
				I
				I

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	IRC International Water and Sanitation Centre		
PO Box [11]	2869		
Street Name and Number	Westvest 7		
Post Code [12]	2601 CW	Cedex [13]	
Town/City	Delft		
Country Code [14]	NL	Country Name [14]	Netherlands

Authorised person [46]

Title (Dr, Prof., ...)			Gender [8]	F		M	X
Family Name	Visscher						
First Name	Jan Teun						
Telephone No [15]	(31-15)2192977	Fax No [15]	(31-15)2190955				
E-mail	wijk@irc.nl						

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [3]		Proposal No [6]	

PARTICIPANT IDENTIFICATION

Participant Role [24]	Mb	Participant No [29]		Assistant to Contractor No [25]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [32]	IRC International Water and Sanitation Centre				
Short Name [31]	IRC		Legal Registration No [38]	KvK 151952	
Activity Type [21]	REC	Legal Status [22]	NO	If 'PRC', Specify [23]	
Business Area [34] (NACE)	73	User/Supplier [35] (U/S)	S	Cost Basis [36] (FC/FF/AC)	
Annual turnover [37]	T1	Annual Balance Sheet Total [39]	B1	Number of employees [40]	S3

Is Your Organisation Independent [41]?	Y [X]	N [ ]
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]		
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y [ ]	N [X]
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D/I) [44]		

ADDRESS

Department/ Institute Name [10]	Research and Development Section		
PO Box [11]	2869		
Street Name and Number	West vest 7		
Post Code [12]	2601 CW	Cedex [13]	
Town/City	DELFT		
Country Code [14]	NL	Country Name [14]	NETHERLANDS

CONTACT PERSON

Title (Dr, Prof., ...)		Gender [8]	F [ ] M [X]
Family Name	Visscher		
First Name	Jan Teun		
Telephone No [15]	31 (0) 15 2192771	Fax No [16]	31 (0) 15 2190955
E-mail			

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	4-09-01
Signature of authorised person	

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	AC	Participant No [25]	6	Assistant to Contractor No [26]	5
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	University of Amsterdam				
Short Name [29]	UvA		Legal Registration No [30]	BRIMNo 21PK	
Activity Type [31]	HES	Legal Status [32]	GOV	If 'PRC', Specify [33]	
Business Area [34] (NACE)	80	User/Supplier [35] (U / S)	S	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	NA	Annual Balance Sheet Total [39]	NA	Number of employees [40]	S7

Is Your Organisation independent [41]?	Y	X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]				
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X

If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]			I
			I
			I

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	University of Amsterdam		
PO Box [11]			
Street Name and Number	Nieuwe Achtergracht 166		
Post Code [12]	1018 WV	Cedex [13]	
Town/City	Amsterdam		
Country Code [14]	NL	Country Name [14]	Netherlands

Authorised person [46]

Title (Dr, Prof., ...)	Dr.		Gender [8]	F	M X
Family Name	Van Zonneveld				
First Name	Hans				
Telephone No [15]	(31-20)5256234	Fax No [15]	(31-20)6258843		
E-mail	jzonneve@science.uva.nl				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [3]		Proposal No [4]	

Participant Role [24]		Participant No [25]		Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	University of Amsterdam				
Short Name [29]	-			Legal Registration No [30]	ERIN/0 21 PK
Activity Type [31]		Legal Status [32]		If 'PRC', Specify [33]	
Business Area [34] (NACE)		User/Supplier [35] (U / S)		Cost Basis [36] (FC / FF / AC)	
Annual turnover [38]	980,2	Annual Balance Sheet Total [39]	33,2	Number of employees [40]	4766
Is Your Organisation Independent [41]?				Y [X]	N [ ]
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?				Y [ ]	N [X]
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]					

Department/ Institute Name [10]	ECDO				
PO Box [11]					
Street Name and Number	NIEUWE ACHTERGRACHT 166				
Post Code [12]	1018 WV	Cedex [13]			
Town/City	AMSTERDAM				
Country Code [14]		Country Name [14]	THE NETHERLANDS		
Title (Dr, Prof., ...)	DR			Gender [8]	F [ ] M [X]
Family Name	VAN ZONNEVELD				
First Name	HANS				
Telephone No [15]	0031 205256234	Fax No [18]	0031 20 6258843		
E-mail	JZONNEVE@SCIENCE.UVA.NL				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	6 SEPT 2001
Signature of authorised person	

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A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	AC	Participant No [25]	7	Assistant to Contractor No [26]	5
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	Stichting Westerveld Conservation Trust				
Short Name [29]	WCT			Legal Registration No [30]	41217177
Activity Type [31]	OTH	Legal Status [32]	PNP	If 'PRC', Specify [33]	
Business Area [34] (NACE)	93	User/Supplier [35] (U / S)	U	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	T2	Annual Balance Sheet Total [39]	B1	Number of employees [40]	S1

Is Your Organisation independent [41]?	Y	X	N	
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X

If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]			
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]			

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	Stichting Westerveld Conservation Trust		
PO Box [11]			
Street Name and Number	Flevolaan 34		
Post Code [12]	1399 HG	Cedex [13]	
Town/City	Muiderberg		
Country Code [14]	NL	Country Name [14]	Netherlands

Authorised person [46]

Title (Dr, Prof., ...)	Master in Law		Gender [8]	F X	M
Family Name	van Westerop				
First Name	Marianne Gerarda				
Telephone No [15]	(31-294)261457	Fax No [15]	(31-294)262080		
E-mail	mg.vanwesterop@ncd.nl				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [6]		Proposal No [6]	

A3: Participant Profile/Information (from one participant) [7]

Legal information on the participating organisation

Participant Role [24]		Participant No [25]		Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	Stichting Westerveld Conservation Trust				
Short Name [29]			Legal Registration No [30]	41217177	
Activity Type [31]		Legal Status [32]		If 'PRC', Specify [33]	
Business Area [34] (NACE)		User/Supplier [35] (U / S)		Cost Basis [36] (FC / FF / AC)	AC

Organisation details

Annual turnover [38]	F50.000	Annual Balance Sheet Total [39]	F30.000	Number of employees [40]	0
Is Your Organisation independent [41]?				Y [X]	N [ ]
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?				Y [ ]	N [X]
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]					

Address of the main department carrying out the work [11]

Department/ Institute Name [10]	Stichting Westerveld Conservation Trust		
PO Box [11]			
Street Name and Number	Flevolaan 34		
Post Code [12]	1399 HG	Cedex [13]	
Town/City	Muiderberg		
Country Code [14]		Country Name [14]	The Netherlands

Authorised person [9]

Title (Dr, Prof., ...)	M.G. van Westerop, Master in Law	Gender [8]	F [X] M [ ]
Family Name	Marianne Gerarda van Westerop		
First Name	Marianne Gerarda		
Telephone No [16]	31.294.261457	Fax No [15] 262080	
E-mail	mg.vanwesterop@hcd.nl		

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	06.09.2001
Signature of authorised person	Mvwesterop

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A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	AC	Participant No [25]	8	Assistant to Contractor No [26]	5
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	Projectgroep voor technische Ontwikkelingssamenwerking vzw				
Short Name [29]	PROTOS			Legal Registration No [30]	5914/77
Activity Type [31]	OTH	Legal Status [32]	PNP	If 'PRC', Specify [33]	
Business Area [34] (NACE)	93	User/Supplier [35] (U / S)	U	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	T1	Annual Balance Sheet Total [39]	B1	Number of employees [40]	S3

Is Your Organisation independent [41]?	Y	X	N		
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X	
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]				I	
				I	
				I	

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	Projectgroep voor technische Ontwikkelingssamenwerking vzw		
PO Box [11]			
Street Name and Number	Limburgstraat 62		
Post Code [12]	9000	Cedex [13]	
Town/City	Gent		
Country Code [14]	B	Country Name [14]	Belgium

Authorised person [46]

Title (Dr, Prof., ...)	ir.	Gender [8]	F		M	X
Family Name	Lambrecht					
First Name	Stephan					
Telephone No [15]	(32-9)2252793	Fax No [15]	(32-9)2256607			
E-mail	protosbe@xs4all.be					

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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Proposal Acronym [5]		Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]		Participant No [25]		Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	Projectgroep voor Technische Ontwikkelingssamenwerking vzw				
Short Name [29]	PROTOS			Legal Registration No [30]	5914/77
Activity Type [31]		Legal Status [32]		If 'PRC', Specify [33]	
Business Area [34] (NACE)		User/Supplier [35] (U/S)		Cost Basis [36] (FC / FF / AC)	

Organisation details [37]

Annual turnover [38]		Annual Balance Sheet Total [39]		Number of employees [40]	

Is Your Organisation Independent [41]?	Y	X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]				
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X

If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D/I) [44]		

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	PROTOS-Zuiddienst		
PO Box [11]			
Street Name and Number	Limburgstraat 62		
Post Code [12]	9000	Cedex [13]	
Town/City	GENT		
Country Code [14]		Country Name [14]	BELGIUM

Authorised person [46]

Title (Dr, Prof., ...)	Engineer		Gender [8]	F	M X
Family Name	Lambrecht				
First Name	Stephan				
Telephone No [15]	(+32) 9 225 27 93	Fax No [15]	(+32) 9 225 66 07		
E-mail	protosbe@xs4all				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	23 - 08 - 01
Signature of authorised person	

PROTOS vzw
Projectgroep voor Technische Ontwikkelingssamenwerking
B-9000 GENT
(09) 225.27.93

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A3. Participant Profile/Information (1 form per participant) [23]

Legal information on the participating organisation

Participant Role [24]	AC	Participant No [25]	9	Assistant to Contractor No [26]	5
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	University of Nairobi				
Short Name [29]	UoN- Unesco Chair			Legal Registration No [30]	CAP210-1972
Activity Type [31]	HES	Legal Status [32]	GOV	If 'PRC', Specify [33]	
Business Area [34] (NACE)	80	User/Supplier [35] (U / S)	U	Cost Basis [36] (FC / FF / AC)	AC

Organisation details [37]

Annual turnover [38]	NA	Annual Balance Sheet Total [39]	NA	Number of employees [40]	S6

Is Your Organisation independent [41]?	Y	X	N	
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]				
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?	Y		N	X

If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D / I) [44]			
			I
			I
			I

Address of the main department carrying out the work [45]

Department/ Institute Name [10]	University of Nairobi -Unesco Chair		
PO Box [11]	30197		
Street Name and Number	Harry Thuku Road, 4th floor, Gandhi Wing		
Post Code [12]		Cedex [13]	
Town/City	Nairobi		
Country Code [14]	KE	Country Name [14]	Kenya

Authorised person [46]

Title (Dr, Prof., ...)	Prof.		Gender [8]	F X	M
Family Name	Bahemuka				
First Name	Judith Mbula				
Telephone No [15]	(254-2)245898	Fax No [15]	(254-2)245898		
E-mail	uonunesco@icomnet.co.ke				

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	03/09/2001
Signature of authorised person	

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RESEARCH DIRECTORATES
GENERAL
SHARED COST
RTD PROPOSAL FORMS

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Proposal Acronym [5]		Proposal No [6]	

Participant Identification

Participant Role [24]		Participant No [25]		Assistant to Contractor No [26]	
Registration No with the European Commission's Research Programmes [27]					
Organisation Legal Name [28]	UNIVERSITY OF NAIROBI - UNESCO CHAIR				
Short Name [29]	UON		Legal Registration No [30]		
Activity Type [31]		Legal Status [32]		If 'PRC', Specify [33]	
Business Area [34] (NACE)		User/Supplier [35] (U / S)		Cost Basis [36] (PC / PF / AC)	

Organisation Profile

Annual turnover [38]		Annual Balance Sheet Total [39]		Number of employees [40]	
Is Your Organisation independent [41]?				Y ✓	N
If No, please indicate legal name(s) of owner(s) who own 25 % or more [42]					
Is Your Organisation affiliated to any other participant(s) in the proposal [43]?				Y	N ✓
If Yes, please indicate Participant No, Short Name(s) and character of affiliations(s) (D/S) [44]					

Organisation Address - Contact

Department/ Institute Name [10]	UNESCO/UNITWIN CHAIR		
PO Box [11]	30197 NAIROBI		
Street Name and Number	HARRY THUKU ROAD 4TH FLOOR GANDHI WING		
Post Code [12]	Box 30197	Cedex [13]	
Town/City	NAIROBI		
Country Code [14]		Country Name [14]	KENYA

Author Coordinator

Title (Dr, Prof., ...)	PROFESSOR	Gender [5]	F ✓	M
Family Name	BAHEMUKA			
First Name	JUDITH MBULA			
Telephone No [15]	254-2-245898	Fax No [16] 890087	254-2-245898	
E-mail	(uonunesco@iconnect.co.ke)			

I certify that the above information is accurate and that my organisation has agreed to participate in this proposal.

Date (DD/MM/YYYY)	13th August 2001	Judith Mbula Bahemuka.
Signature of authorised person		

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A4. Cost Summary in euro [47] (part 2/2)

Participant Role [24]	Participant No [25]	Assistant to Contractor No [26]	Participant Short Name [51]	Subtotal of part 1/2 [59]	Other Specific project Costs [60]	Protection of knowledge [61]	Overhead Costs [62]	Total Costs [63]	Costs Basis : FC/FF/AC [37]	% Requested from the Community [64]	Requested Contribution from the Community [65]
CO	1	[48]	TUD	63936	20000	0	26972	110908			55454
CO	1	[49]	Co-ordination	49251	0	0	27599	76850			38425
CO	1	[50]	Total co-ordinator costs	113187	20000	0	54571	187758	FF	50	93879
CR	2		IRC	72822	0	0	0	72822	FC	50	36411
CR	3		KUL	42601	0	0	0	42601	AC	100	42601
CR	4		SASOL	47964	0	0	0	42964	AC	100	42964
CR	5		UDSM	50000	0	0	0	33000	AC	100	33000
AC	6	3	UvA	31725	0	0	0	31725	AC	100	31725
AC	7	1	WCT	58600	0	0	0	58600	AC	100	58600
AC	8	3	PROTOS	48496	0	0	0	36496	AC	100	36496
AC	9	4	UoN- Unesco Chair	26334	0	0	1066	25400	AC	100	25400
TOTAL [66]				491729	20000	0	55637	531366			401076

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Proposal Acronym [5]	rehydrating the earth-REAL	Proposal No [6]	

A4. Cost Summary in euro [47] (part 1/2)

Participant Role [24]	Participant No [25]	Assistant to Contractor No [26]	Participant Short Name [51]	Number of person/months [52]	Personnel Costs [53]	Durable Equipment [54]	Consumables [55]	Travel and Subsistence [56]	Computing [57]	Subcontracting [58]	Subtotal part 1/2 [59]
CO	1	[48]	TUD	7	33720	0	2500	19716	0	8000	63936
CO	1	[49]	Co-ordination	6	34502	0	5000	9749	0		49251
CO	1	[50]	Total co-ordinator costs	13	68222	0	7500	29465	0	8000	113187
CR	2		IRC	5	43205	0	11000	18617	0	0	72822
CR	3		KUL	2	24200	0	8000	10401	0	0	42601
CR	4		SASOL	8	22964	5000	10000	10000	0	0	47964
CR	5		UDSM	4	23000	5000	5000	5000	0	12000	50000
AC	6	2	UvA	3	22200	0	0	9525	0	0	31725
AC	7	1	WCT	4	27255	0	10000	21345	0	0	58600
AC	8	3	PROTOS	5	25700	0	1500	9296	0	12000	48496
AC	9	4	UoN- Unesco Chair	4	19404	3000	2000	1930	0	0	26334
TOTAL [66]				48	276150	13000	55000	115579	0	32000	491729

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Part B Description of the research work (anonymous)

Rehydrating the Earth in Arid Lands

Systems research on small groundwater retaining structures under local management in arid and semi-arid areas of East Africa

Proposal acronym	**REAL**
Region (please use codes as described in section IV.3.3 "Keywords" of the Guide for Proposers, part 2).	**ACP**
Research area: a combination of	**b.ii-2, a.i, c.iv**

B2. Objectives

Introduction

Soil and water conservation is a high priority in sub-Saharan Africa, especially in the drier areas. Storage of water from the rainy season to the dry season, or even from wet years to dry years, is highly important. Surface reservoir storage has drawbacks, such as high evaporation, contamination danger and taking valuable land out of production. Using the sub-surface to store water is another option. Through the application of groundwater dams, which obstruct the flow of groundwater and store water below the ground surface, existing aquifers can be repleted or new, shallow aquifers can be created. Many projects and policies have been implemented to improve the conditions of land and water in the areas, but much failed because they did not recognise the location specificity of conservation problems and solutions in sub-Saharan Africa and the inapplicability of imported methods without adaptation. In response to this failure, approaches that do try to take into account local conditions (material and immaterial) have come to the front, under the umbrella concept of participatory design. Some successful examples are available, but in general the approaches have been limited to the level of individual farms (focusing on cultivation), using communities as medium for exchange, or the theoretical level, giving ample debates on how to do it, without actual results in the field.

General objective of the research

The general objective of the research project is

> to clarify the relations between local practices and theoretical approaches, by focusing on the design, management and performance of small groundwater retaining structures on a communal level in semi-arid regions in two African countries, Kenya and Tanzania, linking both the individual and the community as theory and practice, resulting in guidelines for participatory design of small water retaining structures in semi-arid regions world-wide.

The project will investigate the different parameters for success of the Kenyan systems, with respect to technological possibilities sustained by social, economic, organisational and managerial factors of the communities and local government. The outcome is tested parallel in other Kenyan and Tanzanian areas. Results in all areas will lead to the production of a manual for design, operation and maintenance of small water retaining structures, with focus on local management and community participation. Attention points for spin off and diffusion, applicable to (semi-) arid areas stimulate implementation on a wider scale.

Specific scientific and technological objectives

1. Clarification and further implementation of the participatory design, construction and management approach for small water retaining structures in the research areas;

2. Clarification of the performance of small water retaining structures, including aspects concerning hydraulics, hydrology, water use and health;

3. Development of a systems' perspective on design, management and performance of small water retaining structures in semi-arid areas;

4. Development of a participatory design approach applicable in other regions for comparable small water retaining structures;

5. Education and training of staff, students and local communities involved through exchanges in workshops, field visits, formal education and networks;

6. Dissemination of the project results through a manual (scientific book), a number of scientific papers and conference proceedings.

B3. Contribution to the programme objectives

Deliverables

The research aims to contribute to at least three of the formulated deliverables in the call:

- Improved systems of renewable natural resources use in rural and urban areas and improved health systems;
- Cost-effective tools for improved health, agricultural and agro-industrial production and water management;
- Strengthened research base in Europe and Developing Countries, including training and institutional development.

The research project focuses on the (semi-)arid areas in Eastern Kenya and Northern Tanzania. In these regions urban, rural and pastoral activities intertwine with nature conservation, providing complex interactions and competition between users of natural resources involved, especially land and water. Within a setting of demanding natural circumstances (semi-aridity and drought), growing pressure on natural resources (competing and growing demands for scarce water, water pollution) and difficult economic conditions (including rural-urban labor migration), there is a urgent need to improve the rural and semi-urban local conditions. The research builds on experience gained in local development activities, both from partner organisations and other sources, and will extend these experiences in new areas to confirm and establish the approach. The learning process in developing and organising water related activities is accelerated by establishing networks to strengthen and/or create links between partner organisations. Networks will be employed on four levels:

- networks within local communities;
- regional networks, involving representatives of partner organisations;
- national networks, usually involving representatives of many partner organisations;
- international networks, involving representatives of partners of different countries.

Within the group of partner organisations in the research project, potential networking activities and representatives on all levels are present. Many partners are involved at different levels, and thus provide the necessary links between these levels of networking.

Levels of research

The EU-call for proposals envisages an integrated scheme of three levels of research:

a) Policy research to determine the conditions for sustainable development, including gender issues involving the state, market forces and civil society;
b) Systems research on complex issues involving many interacting components, such as, rehabilitation and management of renewable natural resources or health care; and
c) Research on specific scientific and technological problems to generate tools for sustainable development, which can be used in a particular context of system management or policy development.

Without the claim that this research will concentrate in depth on all three levels, they are all included. The focus is on level b: study the complexity of design, management and performance and develop an integrated, participatory design approach for small water retaining structures. To do this properly, however, issues from the levels a and c, have to be covered, such as community involvement (in which the gender component is crucial) on level a, and structural and hydraulic aspects of water retaining structures on level c. Such an approach includes a process of thematic concentration, which is mentioned in the research call: policy research covering strategic sectors (in this research proposal water source development and community involvement), systems research narrowing to natural capital (groundwater hydrology, semi-arid regions) and the human environment (management and design, socio-economic context, water use and health), and tools research focussing on specific key items (dam stability, hydrological performance).

Priorities

- Teaching and learning processes, taking into account new, existing or traditional knowledge, and ways to integrate these different knowledge sources to support sustainable development (a.i);
- Management of local water resources, to ensure hygienic conditions, multiple water use, and to prevent pollution of and pressure on existing water resources (b.ii.2);
- Safe and efficient water management through low-investment and ecologically suited technologies (c.iv).

B4. Innovation

The technology

Water retaining structures intercept or obstruct the natural flow of water and provide storage. Damming groundwater itself is not a new concept: groundwater dams were constructed on the island of Sardinia in Roman times and by old civilisations in North Africa (Nilsson 1988). More recent efforts include small-scale projects in many parts of the world, notably India, Africa and Brazil. The basic principle of the groundwater dam is that instead of storing the water in surface reservoirs, water is stored underground. Evaporation losses are much less for water stored underground. Further, risk of contamination of the stored water from the surface is reduced because as parasites cannot breed in underground water. The problem of submergence of land which is normally associated with surface dams is not present with groundwater dams. The technology is not new, but unfortunately many of the development programs in which the technology has been implemented were not new either, as stated in section B2. In response to such failures, approaches that do try to take into account local conditions (material and immaterial) have come to the front, under the umbrella concept of participation.

Participation

Participatory approaches start with the community: it defines its problems, sets its priorities, and makes decisions on how to solve them. External organisations can be a catalyst or facilitator. Such approaches recognise that local people in a given area know the problems they face more in detail than anyone else, know the natural and human resources available, and know what may or may not work in a given situation. By encouraging the local community to seek own solutions rather than imposing solutions from outside, the initiative, knowledge and talents of the people are released, the community is empowered and the likelihood that development measures will be sustained is greatly enhanced. It usually gives women, who generally carry the greater burden of feeding the family, rearing the children and maintaining the home, the chance to participate on an equal basis with men. In Eastern Kenya, in the Kitui and Tsavo regions, several groundwater structures have been built in the last 6 years. In Tsavo East National Park, a co-operative effort of several organisations, including project participants (pp) 1, 4, 7 and 9, resulted in 10 small dams to conserve water for wild-life. The impact on vegetation, although not yet studied systematically, is already showing. In Kitui (north of Tsavo), more than 200 dams have been built in co-operation between pp4 and local communities. These dams are in full use.

Debates of innovation

The aim of this research project is to link these local experiences on design and performance of groundwater dams, both the individual and the community based ones, with scientific theories on participative design and research, resulting in guidelines for participatory design of small water retaining structures in semi-arid regions world-wide. The research studies the possibilities for extending a reference approach to other regions with similar conditions and needs. What is significant about the reference approach is (1) making the demands and knowledge/experience of the community the starting point, and (2) aiming to create and study a network of water points (including shallow wells and sand dams, supplemented by roof and rock catchment and other sources). The project adds two extra dimensions: (3) exploring relations between practice and theory (including academic learning and training), and (4) exploring the relations between design and performance (using a system approach). All this effort should result in a action oriented, participatory, systematic and scientifically sound design approach, interesting for the project members and water development programs world-wide.

An extended design concept

Conventional design practices are primarily built around physical data and technical norms. More implicitly than explicitly, a certain use is expected. This expected use, however, is usually not related to an in-depth understanding of the local (social and natural) context. Often the actual use of water structures differs from the expected one. Thus, an improved design approach should include technical considerations as well as information from the local context. An understanding of the desired use, potential performance and management issues and its relations to technical, social and natural aspects will usually be reached through a process of communication and negotiation, which would be an iterative process, much like the conventional process. The technical design is reviewed and adapted to

the social factors influencing its use; inversely, the social factors and implications are reconsidered in view of technical requirements. In such a way, the concept of designing is extended.

Integrated system analysis

Projects designed to improve water resources should take into account a number of related aspects. One issue centres on the question of water use, with immediate implications for the design. There is a functional difference between different types of dams in terms of water use. Usually sand-storage dams are used for the provision of drinking water, and not for irrigation. About half of the sub-surface dams on the other side documented by Nilsson (1988) supplied water to irrigation. The figures of stored water explain this difference. Sub-surface dams can store larger quantities, as they can dam existing aquifers. However, negative aspects on environment and local development of larger dams have been widely advertised, and local initiatives on building small sized water-retaining structures to retain water for human, animal and agricultural purpose have proven to be highly successful. These dams retain the little amount of water streaming down the rivers, improving plant life and thus agricultural opportunities around its banks. Existing economic activities are sustained and new economic activities are able to emerge, but only on a local scale. Nevertheless, economic stability is the most important incentive for local households to stay in the area instead of leaving to seek better opportunities in the cities. The research project will use a system analysis to link all these issues, and provide both practical outcomes and theoretical implications of such an approach.

Local versus scientific knowledge

Because of the failures of the standard approaches to development problems, the power of 'indigenous' knowledge has been stressed by many contributors to the discussion. Scientific approaches (or technological-scientific approaches for that matter) would be inherently insufficient to deal with the diversity and specificity of local practices, let alone to improve these practices. Much of this apparent fundamental difference, however, has a highly practical dimension and relates to the different spatial and temporal focus of the different systems. Usually, scientific theories and laws are only valid in abstract and/or idealised situations and are not meant to be applicable to concrete every day situations. Local knowledge on the other side particularly is based on the every day situation, and can be highly successful in coming to terms with them. To be able to link with local practice is not impossible for science, but needs a focus on further translation of scientific knowledge to the local situation. In such a way, scientific approaches and technologies can contribute to new and improved processes of local practice and learning. This research project will link local and scientific knowledge about groundwater management and dam design, and will at the same time link theoretical debates (science) and local design activities (practice) on knowledge and participation.

Creating links

All debates of innovation, and this proposal, centre around a crucial aim of this project: to create links between a number of aspects. Using known and successful approaches, both from practice and from theory, using the creative capacities of the participants, the project aims to clarify a number of relations and to take these into account when establishing the new and extended design approach for small water structures. These relations include links between different target groups. More often than not, several potential target groups use the same natural resources in an area, having different goals and methods, and a differential impact on both the natural environment and other target groups. Groups included in this project proposal include farmers, peri-urban people, nomadic groups, animals (both wildlife and domestic). An important factor within most of these categories is gender. Another type of relations is explored too: links between different regions in Africa. The project aims to extend the localised activities in Kitui, Kenya to other parts of Kenya and another country Tanzania. Another regional aspect is that 9 different organisations of 4 different countries, in Africa and Europe, combine their specific expertise and interest into this project. This will result in a systematical approach to study a variety of aspects related to water structures in an integrated way, using both local and scientific knowledge in the context of an extended, integrated design approach.

B5. Work plan

Introduction

The project work plan is based on a number of connected elements:

- Clearly there is no single solution to the problems of water supply and distribution, and there is much to commend an integrated approach that develops different sources to meet a variety of needs. The project focuses on an existing participatory approach for the construction of small water structures, mostly groundwater dams in combination with shallow wells.
- Both existing as new situations in which the chosen constructions have been designed and/or are in use will be studied. Some through a literature survey, some through field visits, others through participatory design, construction or research.
- The study into the performance of groundwater dams focuses on the constructed dams in Kitui area, formulates recommendations for dam and water management and supports the implementation of these recommendations.
- Integration and testing of results is studied through the construction of a few new dams, in other parts of Kitui, in the pastoral area of Amboseli, Kenya and in Ngorongoro area in Tanzania. Recommendations from these experience will be brought into the discussions.
- Throughout the whole project, participating members will meet three times at a workshop. A final conference, during which the design manual is presented and discussed, will conclude the project. PhD- and MSc-students from participating universities are encouraged to take part in the project within their formal education and training program.

Groundwater dams

Groundwater dams have come to assume a central role in the Kitui programme of water development. They can store sufficient quantities of water for livestock and minor irrigation as well as for domestic use, and the cost per cubic metre of water stored is very much less than that for a rainwater tank. However, the quality of water can be poor unless there is an adjacent well from which the filtered water can be drawn, and the burden of transporting the water can be heavy. If properly sited and built, dams can be a welcome water source. There are also unfortunately many examples of groundwater dams which have not been successful. Therefore, a number of aspects have to be dealt with to find out whether a groundwater damming solution is adequate for a certain region:

1) The hydro-geological conditions at the site have to be known. Proper investigations have to be carried out, but as the dams and the volumes of water usually are relatively small, costs of research should be kept to a minimum. Thus, investigations have to be simple too.
2) Caution is also needed when the construction itself is considered. As costs should be kept low, the choice of materials, building methods etcetera, is limited. At the same time, the dam should have a certain quality, and be durable to withstand water pressures and sediment loads.
3) The importance of local management is recognised nowadays as a prerequisite for long-term use of the facilities. Local management does not start after construction of the dam, but during the design and construction.
4) The performance of existing groundwater dams in different regions provides at least starting points to consider the application of the water technology in new areas.

In short, sand dams are an option, if locally adapted and cheap (with the two related). In combination with the demand for local management (including local monitoring of performance) one easily recognises the need for participatory approaches, in which knowledge and experiences of parties involved are exchanged and integrated.

Documenting experience

In 1994, pp4 adopted the participatory approach to development, drawn on experience from participatory activities in neighbouring Mwingi District. It developed educational materials for community training, procedures for assessing the impact of the project, and improved methods for accounting, planning, monitoring and evaluation. Communities are mobilised through Participatory Rural Appraisal (PRA). The community selects from 25 to 50 trainees, both men and women. The training lasts from five to eight days and follows a well-defined pattern. At the start, the trainees appoint individuals from within their group to take responsibility for timekeeping, recording, controlling discussions, organising meals, and so on. The first activity is to prepare maps to show the

social setting, the resources of the area and other aspects of importance. A second activity is to collect basic information. Another activity is to prepare a time line showing major events such as droughts, famines or floods against a chart of years. This leads naturally to an analysis of trends, and it changes when participants record their observations on changes in population, land use, fertility of the soil, availability of food, water fuelwood and so on. Although not everything can be quantified, a consensus among the people about what is happening to their environment is a powerful tool in reaching agreement on priorities for development. All this baseline information provides a point of reference for future comparison after developments have taken place. It will be the task of the project to extend the baseline information to a more systematic and generally applicable knowledge base.

Experimental sites

Next to documenting existing practice, the project will use an action oriented research approach by organising and studying the implementation processes of new water structures in three other areas, two of which are in Kenya and one in Tanzania. On these three sites new dams will be constructed, based on the Kitui approach, but improved and extended both with the first results of the performance analysis and the specific expertise of the different partners in the project and the work packages. All areas are located in the semi-arid zone, and differ from each other regarding certain aspects. They are:

- Kitui, Kenya. Focus in this region will be the construction of a technically improved dam taking into account specifically the future land use of the population, impact on the water system and influences from other elements in the environment, notably other structures and peri-urban areas;
- Amboseli, Kenya. Focus in this region will be how to take into account the design, construction and management for dams for different target groups (notably farmers, pastoralists and wildlife) and aspects of multiple use of water retaining structures;
- Ngorongoro, Tanzania. Focus in this region will be on the question how to establish a participatory, integrated approach in an area with relatively little experience with water retaining structures and participatory design and construction.

Work packages

The project is divided into four work packages. Three of them are both geographically and thematically defined, one work package has the specific aim to integrate the different contributions from the other packages.

Work package	*Central goals*	*Final products*
1 Integration	▪ To monitor project progress ▪ To administer all project activities and finances ▪ To integrate project findings into a design manual	▪ Program evaluation report ▪ Small water structures manual ▪ Final conference proceedings
2 Performance	▪ To evaluate management and use of existing dams ▪ To give recommendations for future design and management of dams	▪ Management and use of existing structures
3 Integrated design in Kenya	▪ To determine the influence of user demands on design issues ▪ To give recommendations for future design and construction of dams	▪ Design report for new structures in Kitui and Amboseli, Kenya
4 Integrated design in Tanzania	▪ To test the approach and recommendations for user participation in integrated design ▪ To give recommendations for future design and construction of dams	▪ Design report for new structures in Ngorongoro, Tanzania

Deliverables

The proposed activities will result in a number of deliverables. The main products will be a manual for participatory design of small water retaining structures. This main deliverable will be supported by a number of deliverables from the work packages 2, 3 and 4. The results from the packages will be an important input for the manual during the process of establishing the manual, but it is expected that the work packages themselves will yield much more interesting results which would not directly fit into a

manual-like document. Therefore, the project aims at a sub-set of deliverables in the shape of final reports per work package.

Adequacy of chosen approach

Introduction

Modern design approaches conceptualise a design process as a learning process, in which designers (engineers and users) develop ideas, concepts and a design through continuous interaction and communication. The (separate) learning cycles of participants are linked to and confronted with each other. During the confrontation, the learning experiences of both sides are shared. Scheer (1996) introduces a model, in which the stages of the learning process are made explicit, based on concrete experiences with the approach in Senegal. In interactive design processes (future) users of the artefact or other product to be designed are involved explicitly in the decision making process. This approach is similar to the one used in Kitui, and forms the backbone of this project. All working packages centre around the interaction between people and groups of people involved. The project contains working packages aimed at analysis and evaluation of existing theory and practice, and working packages aimed at testing of existing approaches and implementing of new findings.

Types of issues

The construction of groundwater dams has impact on the community, on agriculture and on the environment. For many aspects, quantitative data are lacking. The achievements in improved quality of life, changed attitudes and empowerment of people are difficult to measure, but first experience gives some indication of what has been achieved. Systematical research is necessary.

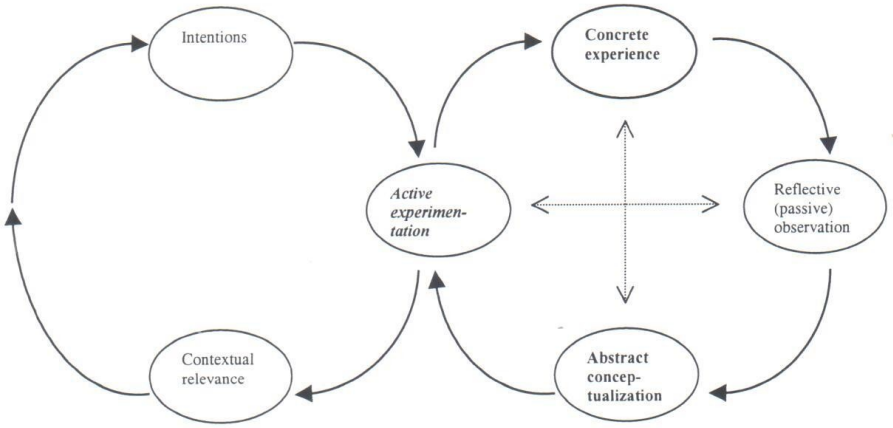
- The most immediate impact of the construction of a dam or a shallow well is improvement in the availability of water. Construction of dams impedes downstream flow and recharges the riverbanks, from which water returns as the dry season proceeds. This has the effect of maintaining a steady water level for longer. When the usual water sources dried up, people had to go farther and farther afield to find a river where water is still available. The time and energy employed in fetching water diverted attention from other tasks.
- The impact of dams on health has already been recognised by some women but will be more noticeable as wells are constructed and the risk of pollution is reduced. The quality of the water from these dams has not been investigated. There is a need to investigate the (bacteriological) quality of the water and relate this to the water management and use patterns of women and men user groups, in view of the longer-term health benefits of the provision. This research can only be done in co-operation with users, as they are maintaining and managing the source.
- The impact on the environment starts with, that raising the bed level of the river by installing dams reduces the erosion of the riverbanks and of the water courses leading into the river. The biggest question to answer is what is the impact on river flow. Preliminary data seem to show that there is more water downstream than in the past as the overall flow is slowed. No doubt, observations of the local people will answer many of these questions in time, but it will be important for future planning to have a systematic record of what changes take place in stream flow and water storage as a result of sand dam installation.
- Completing a sand dam and installing a well upstream from which clean water can be drawn opens new doors for raising tree seedlings, growing vegetables and improving health. But it can also generate new challenges. Who, for example, has the right to grow fodder grass along the riverbank? Who can have access to land for a tree nursery or a vegetable plot? Who will take responsibility if a leak appears in the dam wall, and who will ensure that the well windlass is kept in working order? The rights to water will need also need to be clarified. Can those who have land upstream and adjacent to the river take water out by pumping to irrigate their vegetables?

With so many issues at stake that rise from actual practice, and the need to link research on and implementation of design, construction and management with actual practice, the methodological approach of this project builds on recent theoretical and practical inputs in the fields from engineering and design, which focus on learning processes of participants involved in design and management. These inputs, from countries as divers as Bangladesh, Senegal and the United States, show that such an approach is both feasible as potentially highly successful. In combination with the proved abilities of the participants in this project to study, design and improve water resource systems, it can be expected that the project will be successful.

Confirmation by theory and practice

Learning cycles are described by Kolb (1974). Kolb distinguishes two dimensions in which learning processes can vary between two poles: concrete-abstract and active-passive. On the basis of these dimensions he defines four possible learning moments in a cyclical learning model. In most non-school situations, immediate concrete experience is the basis for observation and reflection. Observations are used for the construction of theories that guide for new active experimentation. Then the four entries become elements of a learning cycle, moments of certain learning activities in a cyclical learning process. These four moments are found in design settings, in which a concrete problem is the starting point of the learning process. Törnkvist (1995) adds an extra cycle to the Kolb cycle, to account for an extended empirical base, allowing the learning designers to search for the higher levels in problem analysis, through a systematic reflection on linkages between types of knowledge, levels and the design problem. This extension is exploited in the project.

Figure. An extended experiential learning cycle



As stated, learning cycles of participants are linked to and confronted with each other. This has similar characteristics with developments in other engineering disciplines (Ertsen 1999), like Simultaneous Engineering (SE) (Concurrent Engineering). The aim of SE is to avoid as much as possible changes in a relatively late stage of the design process. At the same time the danger of making mistakes in an earlier stage should be avoided. This is done by bringing the expertise that is traditionally used in later stages (like use, servicing, sales, component supply) to bear at the same time, early enough to resolve design and manufacturing concerns before production requirements are fixed and equipment is ordered. The concept of SE was developed in manufacturing industries like the automotive industry, aircraft and electronics. Its general applicability, however, has been increasingly recognized in other fields of engineering, like chemical engineering and civil engineering.

Challenges

Two factors appear to be significant for success of simultaneous engineering (Payne et al 1996) and interactive design (Ertsen 1999). The participants in this project will further clarify the importance of these factors and how to employ them:

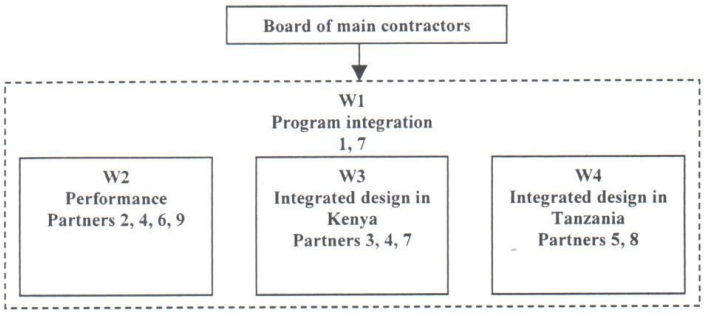
[1] Coordination between design, construction and management/use. If all the design work precedes all the construction work, the project must take longer than if some of the work can be done simultaneously. If the users have no involvement in the design phase there is no check whether the design can be management properly.

[2] The degree of involvement of other actors, especially users. Usually, only a small part of the expertise that is required will be available within the design team. An important early step is recognition of this outside capability by the internal experts.

B5.1 Work package list

Work Package No.	Work package title	Lead contractor No.	Persons-Months	Start Month	End Month	Deliverable No.
W1	Program integration	1	15	0	35	D1, D2, D3
W2	Performance	4	16	0	35	D4
W3	Integrated design in Kenya	3	8	0	35	D5
W4	Integrated design in Tanzania	5	9	0	35	D6
	TOTAL		49			

Organisation of the research project, including work packages



B5.2 List of deliverables

Please note, that the deliverables presented below are the 'umbrella' hard-copy products of the program. In the detailed description of the work packages, all related activities to the composition of these 'umbrella-products' are given.

Deliverable No.	Deliverable title	Delivery date
D1	Program evaluation report	35
D2	Small water structures manual	35
D3	Final conference proceedings	35
D4	Management and use of existing structures	35
D5	Design report for new structures in Kitui and Amboseli, Kenya	35
D6	Design report for new structures in Ngorongoro, Tanzania	35

B5.3 Work package description

W1 Program integration

Work package number :	W1						
Relative start month [1] :	0						
Participant number:	1	7					
Person-months per participant:	13	2					

[1] Month 0 being the start of the project.

Objectives

- To monitor project progress
- To administer all project activities and finances
- To integrate project findings into a design manual
- To inform the world outside the consortium about the project activities

Description of work

The program integration work package has three main responsibilities. A first responsibility is the administration of project activities, monitoring of financial issues and keeping in contact with the EU. A second responsibility will be the contact with the world outside the consortium, through a web-site and other communication channels. Most time, however, will be devoted to the integration of the different activities of the project. The integration works along three lines:

- A string of documents will be produced which step by step integrate the results of other work packages into a design manual. The documents are discussed in workshops, and drafts are sent to participants for comments and additions. The set-up of the workshops is co-ordinated, and workshop reports are produced.
- A line of integration is to inform all participants what is going on in the project, especially in the months between workshops. At the same time, it will be necessary to ask information from participants regularly.
- Furthermore, the different design activities in the field within work packages 3 and 4 will be monitored in the respective areas by a number of short evaluation missions.

Deliverables

D1 Program evaluation report
a) Yearly report 1, including proceedings of workshop 1
b) Yearly report 2, including proceedings of workshop 2
c) Yearly report 3, including final program evaluation
D2 Small water structures manual
a) Position paper on participatory design of small water structures
b) Paper on technical issues in dam design
c) Draft manual
D3 Final conference proceedings

Milestones and expected results

Month 0 Starting workshop (in Kenya)
Month 11 Second workshop (in Tanzania)
Month 23 Third workshop (in Kenya)
Month 35 Final conference (in the Netherlands)

Month 0 Position paper (50 pages) on starting workshop (D2a)
Month 11 Paper on technical issues in dam design (D2b)
Month 11 Yearly report 1 (D1a)
Month 23 Draft manual, including literature review (D2c)
Month 23 Yearly report 2 (D1b)
Month 35 Final manual D2 (D2)
Month 35 Yearly report 3 (D1c) and final evaluation (D1)
Month 35 Conference proceedings (D3)

W2 Performance

Work package number :	W2						
Relative start month [1] :	0						
Participant number:	2	4	6	9			
Person-months per participant:	5	4	3	4			

[1] Month 0 being the start of the project.

Objectives

- To evaluate management and use of existing dams
- To give recommendations for future design and management of dams

Specific goals

- To assess the (biological) quality of the water at all points between source and cup;
- To investigate the water handling and source management practices for domestic and agricultural water use and relate these to the water quality conditions found through testing;
- To determine any improvements achieved in comparison with previous conditions in domestic and agricultural water use;
- To assist the user groups to plan and implement any further improvements if necessary and monitor the effect on water quality conditions, management and use.

Description of work

This is the most labour intensive work package of the project, as it requires a large amount of data analysis. The research approach opted for this is one, whereby international and national consultants and farmer groups (male and female) work together in carrying out the research, using a participatory research design on water use and quality evaluation and management. The project will use a case study approach in 3 to 5 communities that represent the various conditions in the area. Knowledge of the water sources and their management is required to draw conclusions on progress achieved so far and possible areas for further development. The study will consist of testing of the water quality at the various relevant points from source to cup and in a sufficiently large sample to warrant conclusions. The assessment of management and water use patterns will be done through a participatory study using Participatory Rural Appraisal tools, which has the advantage of leading to increased capacity of the water users to monitor their water source. The research will further triangulation technical / scientific research for chemical and biological data with user perceptions of water quality in relation to water management and use patterns. A research project will be designed on water quality evaluation and management within which a gender angle will be integrated as one of the social variables. Existing farmer groups (water users) will be selected to become partners in the participatory research. The following components are foreseen:

- Preliminary planning of the research. Refining the research programme together with the stake holders. The fieldwork is started by developing the PRA tools with water user groups, to ensure ownership of the results.
- Comparative field data collection of water sources in different social and natural environments. Assessment of local patterns of management and use, including the effect of gender and socio-economic differences on use and management. Parallel academic / technical sample collection for reference material to verify relevance of the results obtained. Water quality measurement at the source and at the point of use.
- Planning of improvements, if needed, and monitoring of impacts on human practices and water quality parameters. A workshops to disseminate the results and to promote acceptance of recommendations in the Kenyan water sector.

Deliverables

D4 Water use and health

a) Report on relationships between dam water use and improvement in hygiene.
b) Report on water quality and possible relationships with patterns of water sources management and use.
c) An implemented plan for improvements by the user groups.
d) Recommendations for design and construction

Milestones and expected results

Month 11 Field work reports (D4a, D4b,)
Month 11 Recommendations (D4d)
Month 23 Draft report D4c and D4d
Month 35 Final report D4

W3 Integrated design in Kenya

Work package number :	W3						
Relative start month [1] :	0						
Participant number:	3	4	7				
Person-months per participant:	2	4	2				

[1] Month 0 being the start of the project.

Objectives

- To determine the influence of user demands on design issues
- To give recommendations for future design and construction of dams

Specific goals

- To design and construct a total of three groundwater dams in the Kitui and Amboseli regions
- To define a checklist on land evaluation components of design
- To integrate land evaluation aspects into the design approach and manual
- Defining and implementation of a land evaluation survey for designing water harvesting systems, including land use, soil, topography, and hydrological issues in the areas

Description of work

The existing approach is tested and improved by extending the activities to other parts of Kitui district, with different soils and gradients and in different social structures. Besides these already challenging circumstances, two other typical difficulties will be encountered. In view of the out-migration of a large section of the able-bodied men in search of employment, communal work will be harder to organise. A second problem, in relation to the expansion of towns, is increasing water pollution. This problem is increasingly becoming important, as most river beds without pollution problems have already been used. Furthermore, new dams will be constructed in another Kenyan region, the Amboseli region, close to the Kilimanjaro, backdrop to an area where the pastoral Masai and their cattle live together with the wildlife. Although the Masai are in a way caretakers for the wildlife in Amboseli too, the establishment of wildlife reserves did take away rich lowlands and drought refugees. The present day Amboseli National Park was established about forty years ago as a sanctuary for the remaining elephants. The park embraces two large, spring-fed swamps, in a region that receives only 12" (300 mm) of rain a year. For the pastoralists, however, water availability has become a serious problem, especially since the droughts of the 1990's. Given the success of groundwater dams in another national park (Tsavo East), the research project will include this area to study the implications of dam development in such circumstances. In short, this work package will answer the question how the existing approach can be extended and integrated with issues on future land use of target groups, impact on the water system and influences from other elements in the environment, notably other structures and peri-urban areas. The following components are foreseen:

- A short literature survey on land evaluation aspects, together with the preparation of study design and instruments (maps, land and hydrological survey). Refining the research programme together with the stake holders. The fieldwork uses PRA with water user groups, to ensure ownership of the results.
- Comparative field data collection of available water sources. Assessment of local patterns of intended use (respectively farming, pastoralism and wildlife), including effects of gender and socio-economic positions.
- Design and construction of three dams (one in Kitui, two in Amboseli).
- Intensive monitoring of design, construction, management and use process during the project.

Deliverables

D5 Design report for new structures in Kitui and Amboseli, Kenya

a) Report on relationships between design of dam and land use by target groups.
b) Report on hydrology and possible relationships with patterns of water sources management and use.
c) Three dam designs
d) Recommendations for design and construction

Milestones and expected results

Month 11 Reports on land use (D5a) and hydrology (D5b)
Month 11 Criteria and starting points for design
Month 23 Dams constructed (D5c), first draft recommendations (D5d)
Month 35 Final report D5

W4 Integrated design in Tanzania

Work package number :	W4						
Relative start month [1] :	0						
Participant number:	5	8					
Person-months per participant:	4	5					

[1] Month 0 being the start of the project.

Objectives

- To test the approach and recommendations for user participation in integrated design
- To give recommendations for future design and construction of dams

Specific goals

- To implement a participatory community approach in preparing design and construction activities
- To implement a participatory, integrated resource assessment in the design process
- To design and construct a groundwater dam in the Ngorongoro region

Description of work

In order to test the participatory approach in an environment with relatively less experience with water retaining structures, but with the need to develop them, the activities in this work package centre around the design and construction of a small water retaining structure in the Ngorongoro area. Ngorongoro is a microcosm of East Africa. The land of the Masai, of their cattle, of the fauna, this protected area is located in the Great Rift Valley. The area is managed by the Ngorongoro Conservation Area Authority NCAA) and they try to balance the needs of the wild animals, the local Masai people and their domestic stock and the general natural environment. The research project focuses on the Karatu Arusha Region. Some 200 km. west of Mount Kilimanjaro, Karatu lies on the plateau above the Great African Rift. It is an area, as the regions in Kenya, in which the demands from several target groups can be distinguished (including urban development related to tourism, wildlife, farming and pastoralists). As water development activities, and participatory approaches in particular, are a new phenomenon in this area, the work package concentrates on one design. Using the known Kitui-approach as a starting point, the ins and outs of the approach will be studied and if necessary adapted to the local conditions. This will provide valuable input for the other activities of the project, notably the manual. The following components are foreseen:

- A short literature study on development activities in the region, especially on water related projects.
- The preparation of study design and instruments (maps, land and hydrological survey). Refining the research programme together with the stake holders. The fieldwork uses PRA with water user groups, to ensure ownership of the results.
- As the participatory approach is new, a training component of local partners is vital in the work package. Trainings on ownership and empowerment in relation to participatory integrated water management are planned.
- Comparative field data collection of available water sources. Assessment of local patterns of intended use (farming), including the effect of gender and socio-economic positions.
- Design and construction of one water retaining structure.
- Intensive monitoring of design, construction, management and use process during the project.

Deliverables

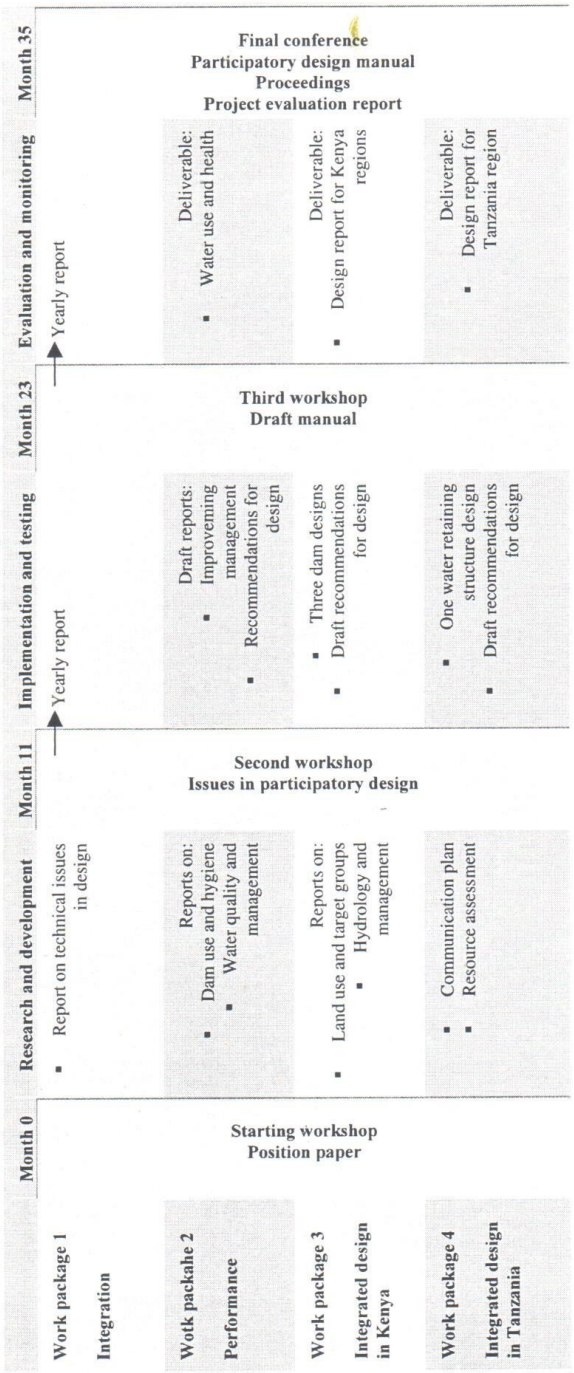
D6 Design report for new structures in Ngorongoro, Tanzania

a) Community participation plan
b) Integrated, participatory resource assessment
c) Participatory water retaining structure design and construction
d) Recommendations for design and construction

Milestones and expected results

Month 11 Reports on community participation (D6a) and resource assessment (D6b)
Month 11 Criteria and starting points for design
Month 23 Water retaining structure constructed (D6c)
Month 35 Recommendations (D6d) and final report D6

Annex with the work packages. Planning Chart



Part C Policies, partners and impact

Rehydrating the Earth in Arid Lands

Systems research on small water retaining structures under local management in arid and semi-arid areas of East Africa

Proposal acronym **REAL**

C2. Community added value and contribution to EU policies

The research proposed in this document is building along a number of similar lines of water policy and research in both European Union internal and foreign policies.

In the Action Plan, discussed in a July 1998 publication (EUR 18098 EN), some key, general messages, are identified and actively considered in the development of the Action Plan. These include:

- Consultation and dialogue with end-users, are essential in setting European research priorities;
- Both fundamental and applied research is required for both problem definition and solution.

The Key Action on 'Sustainable Management and Quality of Water' is the main instrument for implementing actions. The aim of this Key Action is to produce the knowledge and technologies needed for the rational management of water resources for domestic needs and those of industry and agriculture. Among the priority fields concerned are (1) technologies for monitoring and preventing pollution and the protection and management of groundwater and surface-water resources, including ecological quality aspects, and (2) technologies for the regulation and management of stocks and technologies for arid and semi-arid areas and generally water-deficient regions. All these issues are studied in this proposal. The results of the project will be useful for the Mediterranean countries (Spain, Portugal, Italy) especially, as their interests concentrate on groundwater (both management and recharge), water storage through artificial recharge and water conservation.

Furthermore, the Action Plan contains 10 Action Lines, of which a number are applicable and relevant in the context of this proposal. Action Line 2 is directed at actions on freshwater systems at the water basin level, including attention on soil/water interaction in agricultural areas. It should focus on procedures assessing the impact of agricultural practices on water catchments, including influences on downstream surface water bodies. Research and demonstration in the area of aquifer recharge should focus on artificial aquifer recharge for compensating/supplementing natural groundwater recharge and regulating the availability of water at the local level. Action Line 9 focuses on the role of the EU in the fostering of international co-operation in the field of water. It aims, amongst others, to find solutions to mitigate potential conflicts between multiple users of a given water body and to adapt existing (and develop new) technologies, water management techniques and financial/institutional arrangements to meet the specific needs of different regions of the world. It calls for a (limited) number of combined multi-project pilot experiments in carefully selected 'water-problem zones' around the world as 'test beds' and demonstrators for European expertise and technologies. Such initiatives, amongst others focused on integrated water management, should encompass the testing and demonstration in real life conditions of a range of potential innovations, technological as well as managerial and institutional, and should be geared at extending successful experiences to other regions. To conclude, Action Line 10 addresses the question of the promotion of water research. All parties must therefore improve communication and strive to keep each other better informed of their research priorities and activities. More interactive relationships should be promoted both within the research systems and between researchers and research users. Linkages should be established at all geographical level and be continuously reviewed. This proposal aims to combine these issues into a focused approach to integrate a number of issues, and determine workable links for comparable regions, situations and problems around the world, including areas within the EU.

Finally, the project's approach is in reliance with EU frameworks of co-operation with a number of countries world-wide, including Kenya, which state that community based development has a high priority, to satisfy the demand of NGO's and local communities for basic social services and facilities (such as health, education, water & sanitation, etc.), and address the needs of people in marginal areas of the country. Focus is amongst others on the promotion of community 'partnership' in the sustainable use of natural resources. This community focus, which is one the backbones of this proposal too, is supported by remarks made by Edith Cresson: 'Given the importance of 'local factors', the EU's intervention in the area of water RTD, as in other water-related fields, will necessary have to be conceived and implemented bearing in mind that the system to which they apply, is characterised by highly decentralised decision-making mechanisms. Beside making sure that European actions concentrate on problems that are relevant, despite the variety in local situations, there is an implied need to give importance to the transfer of information to the local actors, and to the development of collaborative networks by which knowledge and experience can be effectively shared.' Cresson, Edith in the Preface of 'Freshwater. A challenge for research and innovation. A concerted European response'. July 1998. EUR 18098 EN

C3. Description of the consortium

Three sets of factors have determined the consortium:
1) Countries of origin;
2) Knowledge of the participants concerning the different aspects of water development;
3) Position of the participants in the professional field.

The consortium consists of participants which together share experience and knowledge on:
a) Design issues, including technical, management and participatory aspects;
b) Performance, including hydrological, water use (agricultural and domestic) and health aspects;
c) Education, including training of students, staff and farmers;
d) All are involved in the integration of science and practice, or in other words research and water development.

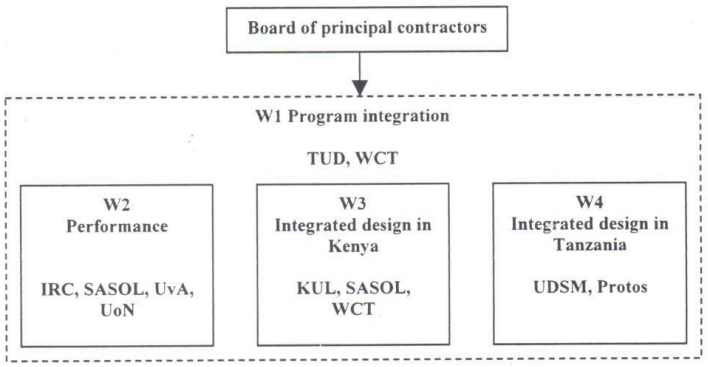
These four fields constitute the work packages (a,b specific, and c,d overall).

	Participant	*Country*	*Knowledge*	*Position*
1	**Delft University of Technology- TUD**	Netherlands	Design issues Education	University
2	**International Water and Sanitation Research Centre- IRC**	Netherlands	Water use performance Health	Research insitute
3	**Catholic University of Leuven- KUL**	Belgium	Agriculture and hydrology Education	University
4	**Sahelian Solutions Foundation- SASOL**	Kenya	Design issues Water development	NGO
5	**University of Dar es Salaam- USDM/IRA**	Tanzania	Resource management Education	University
6	**University of Amsterdam- UvA**	Netherlands	Education Sustainability issues	University
7	**Westerveld Conservation Trust- WCT**	Kenya/the Netherlands	Design issues	NGO
8	**Protos**	Belgium	Water development projects	NGO
9	**University of Nairobi- UoN**	Kenya	Water use performance Education	University

The contracting structure

Contract/*country*	***Netherlands***	***Netherlands***	***Tanzania***	***Belgium***	***Kenya***
Principal contractors	TUD	IRC	UDS	KUL	SASOL
Assistant-contractors	WCT	AU		Protos	UoN

The work structure



C4. Background Information on partners

Partner 1, Delft University of Technology

Founded in 1864, Delft University of Technology (TUD) is the oldest, largest, and most comprehensive technical university in the Netherlands. With over 13,000 students and 2,100 scientists (including 200 professors), it is an establishment of both national importance and significant international standing. The University collaborates with other educational establishments and research institutes, both in the Netherlands and overseas. It also enjoys partnerships with governments, branch organisations, numerous consultancies, the industry, and companies from the small and medium business sectors. TU Delft wants to continue focussing on combining its own strengths, building more partnerships, and participating in both nationally and internationally-recognised research programmes, committed to answering to increasingly multifaceted demands, to benefit people in the future.

CICAT
CICAT is the central liaison office of TUD providing its faculties and departments with management support in the field of development co-operation activities. The activities implicate long lasting co-operation projects with universities and research organisations in Africa, Asia and Latin-America and to some extend in Easter Europe. CICAT is commissioned by the University Board of TUD to stimulate international co-operation at the faculties and departments of TUD. The aim of the projects should be to strengthen the education and research of the university or research institute involved. Simultaneously CICAT locates relevant expertise in Delft, when asked to do so by organisations from outside the university, to work on development co-operation projects. CICAT is responsible for the management and co-ordination of the projects, while the faculty or department involved is responsible for the scientific content of the project.

Land and Water Management
The Land and Water Management group is part of the department of Civil Engineering and Geosciences. Its' education and scientific research is concentrated on the planning, design, construction and operation of water management systems, including the organisational aspects. Areas of special interest are:

- Design of water management and distribution systems such as polders, irrigation/drainage systems, flood control systems and urban water management.
- Maintenance planning and budgeting of water management systems
- Design of operation strategies and control algorithms for controlled water systems.
- Integrated water management with the accent on policy-analysis and the decision methods for developments in water management, considering the legal and institutional environment.
- River Basin Management

Civil Engineering Project Education
The Faculty of Civil Engineering and Geosciences at Delft University of Technology is unique in the Netherlands. Its principal teaching and research areas deal with the design, the construction and the maintenance of complex systems of infrastructure. Within the educational program, Civil Engineering Project Education organizes about 125 projects each year. Each project group has about student 8 members that spent four to six weeks during the year in the project, depending upon the year in which the project is carried out. In project groups students analyze a problem and design a solution for it. Learning goals are the gathering and elaboration of information, the application and integration of knowledge in a concrete situation, working in a group, oral and written presentation of results and learning how to analyze a problem in order to solve it. During the project many relevant aspects have to be taken into account, both social and technical, as in real practice. All these analyses are to be used to elaborate upon a technically and socially acceptable solution. In project education students have to apply the knowledge they already have acquired in a systematic way. In daily practice, this means that they try to apply a number of methodologies that have been introduced in the lectures of other courses. Process-oriented and technical tutoring is provided by staff-members. Each project group has to write a report, which will be available to fellow students, supervising staff-members and institutions involved.

TUD Personnel

1. Theresia Twickler
Senior Project Co-ordinator at CICAT

Key qualifications

- Professional experience: 11 years
- Present position:
  senior co-ordinator of international co-operation projects in the fields of higher education and research
- Main interests and specialisation:
  - Co-operation with Universities and Research Centres in Latin America
  - EU- funded research and training projects (4th and 5th framework, ALFA, Development)

Relevant publications

Identification- and feasibility studies, Project proposals, Progress reports, Review reports, Final reports, Follow-up study reports.

2. Maurits W. Ertsen

Land and Water Management/Civil Engineering Project Education. Irrigation engineer

Key qualifications

- Professional experience: 7 years
- Present position:
  - coordinator of civil engineering project education
  - PhD-research at Land and Water Management
- Main research interests and specializations:
  - water management,
  - integration of social and technical aspects,
  - education and training,
  - participation of users in technological development,
  - design issues,
  - history of technology

Relevant publications (selection)

Ertsen M.W. 2000 Integrated learning in engineering studies. The potential role of project education. Sixth Interamerican Conference on Engineering and Technology Education, Cincinatti, Ohio, USA, 14-16 June 2000

Ertsen M.W. 1999 The technical and the social in engineering education. Design and the social sciences. Making connections. Alberta, Canada

Ertsen M.W. 1999 Sustainable water use in the Proyecto Rio Dulce. Why history matters to modern irrigation. International Symposium on Irrigation, Drainage and Flood Control, Bratislava, Slovakia

Ertsen M.W. en T. Heijer 1998 A systems approach to sustainability in water issues. 1st inter-regional conference on environment-water: innovative issues in irrigation and drainage, Lisbon, Portugal

Ertsen M.W. 1997 Supplemental irrigation in the Proyecto Río Dulce, Argentina. How farmers make use of available rainfall. Workshop International Commission on Irrigation and Drainage, Oxford, England

3. Professor Robert Brouwer

Professor in Irrigation and Water Management at the Delft University of Technology.

Key qualifications

- Professor in Irrigation and Water Management at Civil Engineering and Geosciences of TUD
- Member of the Royal Netherlands Institute of Engineers (KIvI), The Hague, the Netherlands
- Member of the Dutch National Committee of the International Commission on Irrigation and Drainage, ICID.
- Member of the Working Group on Operation, Maintenance and Management, ICID
- Member of the European Regional Working Group, ICID
- Director of the RBA centre; interfaculty research institute on river basin administration and management

Experience

Supervising several co-operation projects of TUD with universities such as the Bangladesh University of Technology and CanTho University, Vietnam. Frequently assisting governmental agencies and financing organisations such as World Bank with consultancy and advisory work on Water related issues. These activities are carried out world-wide. For more information on specific consultancies, please consult Cicat.

Selected Reports and Publications

- *Introduction 4th ICID National Waterday*. Delft, 19 March 1998: Blz.3-5: author
- PAO-GT cursus, *sturingsprincipe, het modelleren van open waterlopen*, september-october 1998. Stichting Post Academisch Onderwijs, Delft, Holland, 1998, 10 p.
- *Integrated water management for the civil engineer*. In: J. Wessel, H.G. Wind, (eds.); Proceedings of a workshop within the framework of the European Thematic Network of Education and Training for Environment-water, Delft, Holland, March 5 1999. ISBN 0929-3531 River Basin Administration, report 11., Delft, Holland, 1999, p. 63-65.
- *Modelling of irrigation and drainage canals for controller design*. Journal of irrigation and drainage engineering, 6, 1999, p. 338-344.
- *Simple water level controller for irrigation and drainage canals*. Journal of irrigation and drainage engineering ISSN 0733-9437, 125, 4, 1999, p. 189-195

Partner 2, the International Water and Sanitation Centre (IRC)

IRC is an interdisciplinary resource centre for knowledge development and exchange on community water supply, sanitation, and hygiene. It was established in 1968 and is an independent, non-profit organisation supported by and linked with the Netherlands Government, the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), the World Health Organisation (WHO), the World Bank and the Water Supply and Sanitation Collaborative Council. IRC is located in Delft, The Netherlands. IRC works with partners and strengthens sector resource centres in the South to facilitate the sharing and use of this knowledge and information.

IRC facilitates the creation, sharing and use of knowledge so that sector staff and organisations can better support poor men, women and children in developing countries to obtain water and sanitation services they will use and can sustain. Using its web site, documentation, publications, training and experience-based learning activities, advisory and evaluation services, applied research and learning projects, IRC advocates change and aims to improve the information and knowledge base of the sector. Topics include: community management, gender and equity, institutional development, integrated water resources management, school sanitation, and hygiene promotion.

Staff involved in the study

1. Christine van Wijk-Sijbesma

Sociologist with post-graduate diploma in health education.

Key qualifications

- 31 years of professional experience
- Senior Programme Officer
- Has worked in management functions, training and research
- Water use studies in Tanzania and India
- Editor of an abstract journal and has assisted others in documenting participatory approaches
- PhD Research on participatory research methodology

Main interests and specialisation:

- social and health aspects of community water supply and sanitation programmes
- gender analysis and strategies
- institutional development/ integration of social and technical aspects

Selected publications

- Wijk, C. van (1995). Gender in community water supply, sanitation and water resources protection, a guide to methods and techniques. (Occasional paper no. 23). The Hague, The Netherlands, IRC.
- Wijk, C. van, Lange, E. de, Saunders, D. 1996. Gender aspects in the management of water. Natural Resources Forum, vol. 20, no. 2, pp.91-103.
- Wijk, C. van (1998). Gender in water resources management, water supply and sanitation: roles and realities revisited. (Technical Paper Series; no. 33-E). The Hague, The Netherlands, IRC International Water and Sanitation Centre.
- Wijk, C. van and Walle, F. B. de, (1995). Environmental hygiene and human health. In Velden, K. van der; Velema, J.P., Walle, F.B. de; Wijnen, J.H. van; Ginneken, J.K.S. van, (eds.), Health matters: public health in North-South perspective. Houten, The Netherlands, Boom; Amsterdam, The Netherlands, Royal Tropical Institute.
- Sijbesma, C. (forthcoming). The best of two worlds? Methodology for Participatory Assessment of Community Water Services. PhD Thesis. Wageningen, Wageningen Agricultural University.

Languages: Dutch, English, French, Kiswahili, Spanish.

2. Leonie Postma

Tropical land and water management engineer with specialisation in rural extension

Key qualifications

- Seven years of professional experience
- Project officer in Senegal and Namibia
- Participatory evaluation using PRA/MPA for Plan International in West Africa
- Has worked in training and training development
- Manages an international project for applied research on school sanitation

Main interests and specialisation:

- Hygiene and sanitation promotion,
- Community managed water supply and irrigation.

Selected publication:

- Brikké, F. ; Postma, L. ; Campaoré, L.M. ; Mar, L. ; Yaro, J. ; Djoukam, J. ; and Blanchet, F. (2001). West Africa water programme : evaluation and advisory mission. Final Report. London, Plan International.

Languages: Dutch, English, French and Spanish.

Partner 3, the Catholic University of Leuven (KUL)

The Spatial Applications Division (SADL) is a multidisciplinary R&D Division established at the Katholieke Universiteit Leuven. R&D Divisions differ from other research groups at K.U.Leuven, since they focus the application of research results and therefore co-operate closely with public authorities and private companies. Divisions are considered as points of transfer between the university and society. SADL is a co-operative effort of six research units of K.U.Leuven, termed division members. It combines two former R&D entities: Ground for GIS (GfG) and Leuven Earth Observation (LEO). Its particular mission is to promote the transfer of scientific knowledge and innovative technologies regarding earth observation, geo-spatial modelling and the handling, analysis and application of spatial data with respect to the wide and interrelated array of thematic domains in which the division members are involved. Thematic domains of SADL are:

- Transport and mobility;
- Spatial planning;
- Soil and water;
- Agriculture and agri-environment;
- Forest, nature and landscape; and,
- Social and economic geography.

Products and services are:

- Applied research: participation in international, national and regional research programmes focussed on geo-spatial modelling for thematic application
- Scientific support: offering scientific support to public authorities, non-governmental organisations and private industry.
- Professional training: organisation of technical, thematic and customised courses in GIS and Remote Sensing.
- Consultancy and policy support: provision of scientifically based decision support, combined thematic and technical expertise, including networking activities and project management assistance.
- GIS database development: implementation and maintenance of GIS database systems.
- GIS application development: from needs-assessment to operational applications and support.
- Earth Observation applications: land use and land cover classification and monitoring.

SADL currently employs 22 staff, 19 of whom have a university degree in agricultural, bio- or civil engineering, urban and regional planning, geography and biology, informatics. Due to its position at KU Leuven, SADL can also call upon the services of a wide range of specialised academics and technicians.

Staff members involved

1. Paul Campling

PhD. In Applied Biological Sciences.

Key qualifications

- Manager for Ground for GIS/K.U.Leuven Research & Development:
- Member of Executive Management Board (proposal writing, project planning and implementation).
- Project leader of applied research projects related to earth observation, spatial analysis and modeling, GIS applications.
- GIS consultant to DG-AGRI – agri-environment indicators, database development and spatial analysis

Main interest and specialisation

G.I.S. and Environmental Modelling
Development of Modelling approaches for use in G.I.S.
Inventorying, geo-referencing and characterising land and water resources

2. Anne Gobin

PhD in Participatory and spatial-modelling methods for land resources analysis.

Key qualifications

- Design and implementation of development-oriented research and activities;
- Guidance of 6 Nigerian and 4 Belgian Masters students;
- Training of Project Personnel and Village Record Keepers.
- Rainwater harvesting, Small-scale irrigation (experiments), farming systems research, land use and management: field surveys, participatory appraisals, local knowledge and soil resources, database development, mapping.
- Research associate in EU program on Pan-European Soil Erosion Risk Assessment (Co-ordinator: KULeuven). Co-operation project with EU-JRC (Italy), ULeeds (UK), INRA (France), AUA (Greece), CSIC (Spain), ISRIC (The Netherlands). Budget: 1.4 million Euro, Period: 3 years. Development of physically based erosion model from spatial data. Development of policy-relevant indicators on soil erosion for the European Environmental Agency.

Main interest and specialisation
Land and Water management

3. Anne Willekens

Agricultural engineer

Key qualifications
- Collaborator to project "Development of a GIS-application translating VLAREM-regulations into digital geographical databases", commissioned by the Flemish Government, GIS Flanders, february 2001 – June 2001
- Collaborator to project "Development of a Digital Terrain Model and related analysis tools for the riverbed of the Schelde", commissioned by the Ministry of the Flemish Community, Dpt. L.I.N., Administration for Waterways and Maritime Transport, october 2000 – november 2000
- Collaborator to project 'Development of a modular professional training programme related to Earth Observation in general and VEGETATION data in particular', commissioned by the Belgian Federal Office for Scientific, Technical and Cultural Affairs (OSTC), july 1999 – june 2000.
- Collaborator to project 'GIS-AGRI'. ARC/INFO-based GIS-work - and cartography for DG-AGRI (Supervisor Mr. Vlahopoulos from DG AGRI.AII.3): april 1998 onwards

Key publications
- Willekens, A., J. Van Orshoven, J. Feyen and W. De Weirdt, 1998. Estimation of the phenological calendar, Kc-curve and temperature sums for cereals, sugar beet, potatoe, sunflower and rapeseed across Pan-Europe, Turkey and the Maghreb countries, by means of transfer procedures. Project Report JRC-SAI-MARS (Contract no 13118-97-07 F1ED ISP B) Volume I, II and III.
- Willekens, A, J. Van Orshoven, S. Vanlishout and J. De Beer, 1997. Final report of the area frame sampling survey campaign 1997 for the BENELUX-site of Hasselt (Contract no 23977/13.6.97): 68 p.
- Willekens, A. Notenbaert, J. Van Orshoven and J. Feyen, 1997. Concrete afbakening en differentiatie van agrarische gebieden in Vlaanderen, i.o.v. AMINAL, Afdeling Land (in Dutch).
- Willekens, J. Van Orshoven and J. Feyen, 1996. Globale afbakening en differentiatie van agrarische gebieden in Vlaanderen, i.o.v. AMINAL, Afdeling Land (in Dutch).

4. Jos Van Orshoven

Doctoral degree, cum laude, in agronomy (quantified land evaluation)

Key qualifications
- Elaborated experience in development, implementation and management of both large multi-purpose and project-based geographic information systems related to agricultural and environmental policy, rural land planning and physical land management
- Experience in project management, project leadership, project consultancy
- Elaborated experience in research related to quantified agro-ecological land evaluation with emphasis to soil database and soil information system development, computer-assisted soil cartography, pedo-transfer functions, soil-water dynamics modelling, GIS and Remote Sensing

- Several years of teaching at undergraduate level and vocational training in the fields of GIS, Remote Sensing, agro-ecological land evaluation and planning, soil geography and mapping and general agronomy
- Good experience in land evaluation for irrigated agriculture and in the planning and evaluation of small and middle scale irrigation projects under tropical and temperate climates
- Good experience in the use and teaching of micro-computers and workstations in agricultural research and extension

Recent publications

- Willekens, A. en J. Van Orshoven, 2001. *Inventarisatie en GIS-toepassing van beleidskartografie inzake milieu en stedenbouw; uitbreiding van de GIS/Vlarem-applicatie.* Eindrapport van een studie-opdracht voor de Vlaamse Landmaatschappij, Afdeling Ondersteunend Centrum GIS-Vlaanderen: 39 p.
- Librecht, I. en J. Van Orshoven, 2001. *Afbakening en differentiatie van bodemkundige aandachtszones voor bodemerosiebestrijding in Vlaanderen.* Eindrapport van een studie-opdracht voor het Ministerie van de Vlaamse Gemeenschap, AMINAL, Afdeling Land: 12 p.
- Verdonckt, F., J. Wellens, D. Tirry, S. Keijers en J. Van Orshoven, 2001. *Inschatting van de geografische risicofactoren m.b.t. het optreden en de verspreiding van bodemverontreiniging.* Pilootproject. Eindrapport: 70 p. + kaartenbundel.
- Verwimp, R., A. Willekens, J. Van Orshoven en J. Elen, 2000. *An ICT-based course in Earth Observation with emphasis on VGT-data.* Proceedings of the VEGETATION 2000 conference, Belgirate, Italy, April 3-6, 2000: 7 p.
- Van Orshoven, J., 2001. *Van nature overstroombare en recent overstroomde gebieden in Vlaanderen.* Proceedings van de studiedag 'Ruimte voor Water, de beste verzekering tegen wateroverlast', Brussel 15 mei 2001 (ed. M. Vandenbulcke).

Partner 4, Sahelian Solutions Foundation (SASOL)

Sahelian Solutions is a foundation registered in Holland and Kenya. It was created by founder members with more than one hundred and fifty years of experience in research, teaching, management and consultancy in Arid and Semi-Arid (ASAL) or Sahelian parts of Africa. SASOL was established to render governance, technical and financial assistance for the development of arid and semi-arid regions. Special emphasis is laid on solving water problems as a platform for subsequent development through building capacity in local governance institutions, natural resources conservation and management, food security, health and education

Central in SASOL philosophy is commitment to participative development, which cannot be if resource conservation within the framework of time tested technologies sustained by ASAL populations are ignored. This does not mean that the scientific approach, planning and new ideas are not introduced to base communities. It simply means that the beginning point is what is known and sustainable by the base communities as evaluated by our multidisciplinary team.

Over the past ten years, 230 sand dams have been built in Kitui. These dams have affected the socio-economic life of the particular communities positively by providing water for household and livestock use. They have had an impact on production as new high value crops are now grown. At the same time SASOL has constructed 150 school wells. This effort was geared to providing water in schools for drinking and cooking. Other efforts have been in provision of famine relief as well as nurseries for provision of trees for ecological rehabilitation.

Key staff involved

1. Gedion Cyrus Makau Mutiso

Ph.D. Political Science

Key qualifications

Prof. Mutiso obtained his Ph.D from Syraruse Unviersity, New York, USD, in 1968. He lectured in the U.S. and at the University of Nairobi until 1979. In 1983 he founded Muticon Ltd., which specialises in development management. He has carried out more than a hundred and ninety consultancies for government, ngos, private sector and donor agencies. Prof. Mutiso has authored ten books and over eighty professional papers on development, including education, environment, governance, management, gender, organisational development, participation, strategic planning and capacity building. In 1989, he created SASOL foundation , a rural development NGO specialising on ASALs. He had conducted consultancies in Sudan, Uganda, Ehtiopia, Somalia, Tanzania, Malawi, Zimbabwe, Mauritius, Nigeria, Ivory Coast, Ghana, Senegal, South Korea, The Netherlands, France and USA. The SASOL Board has requested him to be the project officer of this activity.

Key publications

- Kambiti Farm: The Role of Water in Capitalising Dry lands. G-C.M. Mutiso and Sam M. Mutiso. Nairobi: Lectern Publications. 1995.
- Kenya: Politics, Economics and Technical Training. (With Martin Godfrey), Nairobi. EALB, 1976.
- African Political Thought: A Reader. (With S.W. Rohio) London. HEB, 1975.
- Kenya: Politics, Policy and Society. Nairobi. EALB. 1975.
- Weusi: Socio-Political Thought in African Literature. London. Macmillan 1974.

2. Joseph Muinde Munyoki

Geo-ecologist researcher

Key qualifications

- Joseph Muinde has been involved in his studies as researcher in Mapping of the Kitui disctrict and a project on ground water contamination in urban areas.
- He was among others member of the student science, economics and debating clubs.

- He is engaged by SASOL as Geo-ecologist researcher to evaluate hygienic standards and wateruse technics for the Organisation and Maintenance projects starting up.

3. Ancent Ngungu Mumima

Key Qualifications:
Ancent Mumima has during his studies been involved in several Environmental projects and took responsibilities in student Associations and University environmental clubs. Since his graduation in 1997 worked as a technical advisor on handling trees in community groups and assisted in follow-up on organic farming projects. Also he collaborated with nog's and assisted in training of community based small groups. SASOL engages him in community development and land use aspects of the dam building activities in Kitui.

Partner 5, University of Dar es Salaam (UDSM)

The University of Dar es Salaam was born out of a decision taken on March 25th, 1970, by the East African Authority, to split the then University of East Africa into three independent universities for Kenya, Uganda and Tanzania. The University of Dar es Salaam consists of six faculties, five institutes and two colleges. For purposes of maintaining East African inter-university academic cooperation and communication, an Inter-University Council for East Africa was set up in 1970. The Council has established an Inter-University Exchange Program, through which the University admits students from other East African countries mainly Kenya and Uganda. The University also admits students from several other countries the world-over through established links, exchange programs or individual applications. Most of these students receive their bursaries from their respective governments. Students from other countries are considered for admission to both undergraduate and postgraduate studies, subject to the availability of vacancies.

The Institute of Resource Assessment (IRA) formerly Bureau of Resource Assessment and Land Use Planning (BRALUP) was established in July 1982 when the Government agreed on a proposal to elevate BRALUP to an Institute of the University of Dar es Salaam. BRALUP was established in 1967 as a research wing of the University College of Dar es Salaam in the Faculty of Arts and Social Sciences. Its main activities were to conduct research of an applied nature and offer consultancy services in the fields of population resources and human settlement; agricultural systems, with an emphasis on food production; distribution of social services, particularly health and education; and transportation.

Some of the current IRA's activities are somewhat a continuation of BRALUP's activities but with modification in approaches and emphasis. Other activities are new. In these new activities emphasis has had to change in accordance with the changes in the country's socio-economic and environmental conditions. The Institute is both a multidisciplinary and an interdisciplinary research organization within the University of Dar es Salaam. It operates under the direct responsibilities of the Chief Academic Officer and reports directly to the University Senate. IRA has a Board of Directors whose membership have been drawn from the University of Dar es Salaam, Government Ministries and Pan-African Organizations.

The Institute of Resource Assessment is a unique Institution in Africa. It is essentially an academic institution conducting independent research but it also provides consultancy services to the government ministries, parastatal organizations, private organizations, individuals and international organizations. The Institute has a role of bringing to Tanzania's attention the experiences of development issues in other parts of developing and the developed world. Thus it serves as a link with the outside world and provides insights that would not otherwise easily reach Tanzania. In an effort to disseminate the institute's research findings, the Institute has a publication section that deals with sales and distribution of publications inside and outside Tanzania The Institute also conducts workshops, conferences and seminars as means of disseminating its research findings.

The major efforts of the Institute are directed to the development of its research capacity and providing professional advice. The Institute maintains links with various local and international organizations / institutions, and continues to build new ones.

Staff Involved

Mark R. Mujwahuzi
PhD. In Water Resource Management and Development

Key qualifications

- Research and advisory work for numerous national and international organisations on water resource management
- Member of several international committees on water issues.

Recent Publications

- Mujwahuzi et alii, (2000) "Waiting at the tap: Changes in Urban Water Use in East Africa over three decades" in Environment and Urbanization, Sustainable Cities Revisited III, volume 12, Number 2, October 2000.
- Mujwahuzi, M.R.(2000) Water Resources Management in Southern Africa : Enhancing Environmental Sustainability. Chapter 8: Community Based Water Resources Management. Book to be published by World Bank.
- Mujwahuzi, M.R. (2000), Proceedings of Water Utilities Partnership Project No. 5, Tanzania Launch Workshop, 17th – 19th April, 2000
- Mujwahuzi, M.R. et all, (2000), Evaluation Report on Water Supply and Sanitation projects in Mtwara – Lindi and Zanzibar – Pemba.
- Mujwahuzi, M.R. (1998) "Domestic Water Use and Environmental Health in East Africa, - Tanzania Case Study", IIED -London

Partner 6, University of Amsterdam (UvA)– Dutch national network for Sustainable Higher Education

From the University of Amsterdam, Centre of Expertise on Sustainable Development in Education (ECDO), the Dutch national network for Sustainable Higher Education is co-ordinated. This is a growing network within which more than 600 members of university boards, teaching staff, and students work actively on integrating sustainable development into curricula of all higher learning institutions in the Netherlands. Delegates from higher learning institutions, the ministries of Education, Environment, Economic Affairs and Agriculture in the Netherlands are represented in the steering committee of the network. Through this network, expertise from a great number of higher learning institutions in the Netherlands concerning sustainability and higher education is gathered. For over 25 years ECDO (formerly the Department of Environment), has built expertise on interdisciplinary, problem-oriented education. One of the projects of the Dutch national network for Sustainable Higher Education is 'North-South, projects for students in Africa, Asia and Latin America'. The focus of this project is creating possibilities for students in the Netherlands and students in the South on problem-oriented research on sustainable development. The research predominantly takes place in interdisciplinary groups with students from different cultural backgrounds.

UvA personnel

1. Hans van Zonneveld

Sustainability in Higher Education / Dutch National Network for Sustainable Higher Education

Professional experience: 25 years

Present position

- Coordinator Centre of Expertise on Sustainabile Development in Education (ECDO)
- Chairman national commission of sustainability in higher education in the Netherlands
- Project coordinator Project North-South – projects for students in Africa, Asia and Latin America
- Education in sustainable development

Relevant publications:

- Phd thesis: Educational elaboration of interdisciplinary, problem-oriented higher education. In cooperation with de Vries, A. 1991.
- Van Zonneveld, J.B.F., 1996. Interdisciplinary problem-oriented higher education at the University of Amsterdam, development 1976-1995. In: European Journal of Engineering Education.
- A.P.Heideveld, R.Wemmenhove, J.B.F. van Zonneveld, 2001. Sustainable Higer Education 2001 – state of the art on integration of sustainable development within higher education institutes in the Netherlands.
- Lectures and workshops on sustainable and interdisciplinary higher education

2. Roos Wemmenhove

Sustainability in Higher Education / Project North-South – projects for students in Africa, Asia and Latin America. Social environmental sciences

Professional experience: 2 years

Present position:

- project assistant Project North-South – projects for students in Africa, Asia and Latin America
- education in sustainable development

Relevant publications:

- Wemmenhove, R., B.J. van de Laar & P.A. Maarleveld, 1999. Poster Presentation: A method for measuring problem-solving-ability and interdisciplinary skills in environmental sciences modules in the Netherlands. 5th Conference on enviornmental education Zurich, Switzerland, April 15-17, 1999.
- Wemmenhove, R., 2000. Field report - principles in environmental education at the University of Dar es Salaam. University of Nijmegen, the Netherlands.
- Wemmenhove, R. & W.T. de Groot, 2001. Principles for university curriculum greening: An empirical case study from Tanzania. In: *International Journal of Sustainability in Higher Education; Volume 2 No. 3; 2001.*

Partner 7, Stichting Westerveld Conservation Trust (WCT)

The foundation is registered in Amsterdam, The Netherlands. The objectives of the foundation are to secure funds for the realisation of sustainable cultural and social development-projects on a non-commercial base. Furthermore the foundation conducts all operations, that directly or indirectly refer to the objectives or may advance the objectives in the broadest sense. The foundation aims at realising the objectives among others by bringing in effect or sustain initiatives for such projects, by assisting in the organisation of the preparation or execution of projects, as well as providing publicity and information concerning the preparation and execution of projects.

Organisation and financial responsibility:
In 1993 Peter Westerveld started to ask safari guests a contribution for nature preservation.
In 1993 and 1994 the collected funds were transferred to KWS for their work in the Rhino Release area in Tsavo. In the following years the funds have been spend on the costs of the research of Peter and on the publishing and distribution of Newsletters in the Netherlands. The work has resulted in advice for KWS and project-proposals. June 1997 WCT has been registered in Amsterdam, The Netherlands. Peter Westerveld is chairman. The purpose is to realise the conservation projects, to collect the necessary means and publicise the developed methods for a durable development. WCT collects and manages donations and funds. Peter Westerveld, Nairobi, Kenya has been assigned for the execution of the projects. In the Netherlands operations are steered by Marianne G. van Westerop, secretary of WCT. From 1997 ongoing WCT has received among others donations and membership fees from donors and participants in so called fieldwork safaris. There were also revenues from the sales made of works of Art, The African Wildlife Footprints world-wide (25% of the revenue is for WCT). Some institutions and companies have made a donation in the frame of their environmental policy. The start of implementation of the re-hydration project was made possible by contributions of the Rotary Clubs of Amstelveen and Amsterdam, The Netherlands.

Key staff involved

1. Peter Westerveld

Conservationist, field-experience in habitat re-creation/Professional Artist and Photographer

Key Qualifications

- Professional experience: 29 years
- As from 1985 settled in Kenya creating low-cost methods to reverse the human and wildlife threatening dehydration process.
- Photographic aerial survey on the erosion areas on request of the relevant Park authorities. Implementation of rehabilitation proposals in Tsavo by the Westerveld Conservation Trust (WCT). Production African Wildlife footprints.

Relevant productions (selection)

- Timelines exhibition in the Rijksmuseum Kröller Müller, Otterlo, The Netherlands. 1979
- Exhibition of the First and Second Moment series of paintings on the impact of colour on form and space, in amongst others the Stedelijk Museum Fodor, Amsterdam, and exhibition and participation in the Film and Art forum, Sietar (Society for Intercultural Education, Training and Research), Intercultural Centre, San Gimignano, Italy, 1982-1983.
- Installation of the First Moment in the conference hall of the UNEP and Habitat Headquarters in Nairobi, donated by the Netherlands government and industry, 1985.
- Audio-visual production on the Ruwenzori mountains for educational utilisation, 1987
- Exhibition Footprint in Gallery Link, in The Hague in an effort to influence the Netherlands Government to counter the reintroduction of ivory as a legal commodity on the market and exhibition in de Kleine Aarde, Boxtel, the Netherlands to introduce "Re-hydration" proposals as a non-consumptive alternative for sustainable economic development, 1997
- CITES/Biodiversity Exhibition, UNEP Building, Nairobi, Kenya, 1998

Languages: Dutch and English fluent- German, French and Swahili working knowledge

2. Marianne G. van Westerop

Human Resources Management Consultant/Master of Law, Bachelor of Social Sciences, Qualifications to

teach Economy/Social Sciences

Key Qualifications
Professional experience: 33 years
1978 –present : Employed with Ballast Nedam N.V., Dutch International Construction Company and from 1987 : Director of Human Resources Management advisor of the Board of Management in all Personnel policies. Presently being internal consultant on management development and labour market relations.
Additional Jobs (selection)

- Chairman of the Board and Director of the Foundation for Company-integrated Education based on Cooperating Dutch companies (BOSNO)
- Secretary of the Westerveld Conservation Trust, a Foundation for development and implementation of sustainable development methods.
- Member of the Board of "Chance for Success", regional experimental initiative by employers in the Haarlemmermeer/The Netherlands offering jobs including professional training to youth that dropped out the formal schooling systems
- Member of the VSR (Association for social science research of Law)
- Editor of the Handbook Personnel Policies for Building Companies,1997

Languages: Dutch and English fluent, German, French and Swahili working knowledge

Partner 8, Projectgroep voor Technische Ontwikkelingssamenwerking VZW (PROTOS).

PROTOS is a Non-Governmental Organisation, working in the sector of water management and valorisation. The main values PROTOS is promoting through his involvement in the water sector are : sustainability ; equity and thus solidarity ; empowerment of the most vulnerable persons and communities.PROTOS was established in 1977 and is an independent, non-profit organisation, located in Gent, Belgium.

PROTOS is involved in three types of activities:

- Technical, methodological and financial support to water linked development projects in 4 regions in Africa (Benin, Burkina and Mali in Western Africa ; the Great Lakes region in Central Africa) and Latin America (Haiti and Ecuador). PROTOS works in partnership with local NGO's, peasant movements, local authorities or water users associations. The programs are funded by the Belgian Government, EC, international NGO's, local governments and own resources of PROTOS. Through these programs PROTOS is also focussing the strengthening of local stake-holders in water management.
- Technical and methodological consultancy to water related development programs of international or national institutions.
- Sensitisation, mobilisation and lobbying in Belgium for a more sustainable, righteous and solidarity water management in a North-South context.

Staff involved in the study

1. Anne Coutteel

Agricultural engineer (KULeuven, Belgium) with post-graduate diploma in land resources management (Silsoe College, Bedford, UK).

Key qualifications

- 12 years of professional experience, of which 10 years in Bolivia, Haiti and Benin
- regional co-ordinator of PROTOS for Haiti
- sector co-ordinator of PROTOS for soil and water conservation
- has worked in management functions, project implementation (reforestation, water supply, water resources management) and training (gender, PCM, empowerment)
- languages : Dutch, English, French, Spanish, Creole

Main specialisation :

- soil and water conservation
- organizational strenghtening and institutional development for grass-roots organisations and NGO's
- gender issues

Selected publications :

- Project proposal on Water Resources Management in Central Haiti (2001).
- Report of NGO-seminar on improved processes of co-operation between state and non-state actors involved in local development (2001).
- Capitalisation document of a soil and water conservation project with the farmers union (MPP) in Central Haiti (2000).
- Training manual for a research program on empowerment in Benin (ADOA-method) (2000).
- Report of the national seminar on *Opuntia* for production and as an alternative for recuperation of badly eroded areas in Bolivia (1993).

2. Stef Lambrecht

Civil engineer in construction and hydraulics (KULeuven, Belgium) with post-graduate studies on hydrology (VUBrussel, Belgium).

Key qualifications

- 20 years of professional experience, of which 9 years Haiti

- general co-ordinator of PROTOS
- associated consultant for COTA (Belgium) and IRAM (France)
- has worked in management functions, project implementation (water supply and sanitation, water resources management), consultancy and training (PCM, strategically planning)
- languages : Dutch, English, French, Creole

Main specialisation :

- water supply and sanitation
- organisational strengthening and institutional development
- institutional co-operation and stake-holders management

Selected publications:

- Guide for Project Cycle Management in the Micro-Projects Program of the EC in Suriname (2001).
- Capitalisation document of a participatory experimental water supply program in South Benin (2000).
- Evaluation report and strategically planning of the water supply and sanitation program of FIKRIFAMA, Madagascar (2000).
- Evaluation report of the Lengiyave Water Supply Project in North Tanzania (1998).
- Twenty years in the water ? A capitalisation of visions and experiences of 20 years involvement in the sector (forthcoming).

Partner 9, University of Nairobi (UoN)- Unesco Chair

The UNESCO/UNITWIN Chair on Women, Education, Community Health and Sustainable Development was officially given to University of Nairobi in 1997 at the request of the Government Delegation to the UNESCO General Conference. The official launching of the Chair was presided over by the Director of Education, and the agreement signed by both the UNESCO Director General and the Vice-Chancellor, University of Nairobi, in December, 1997.

Mission:
The mission of the UNESCO/UNITWIN Chair is to bridge the gap between basic education and higher education. By basic education its meant the giving of life long skills to communities so that they can, in turn, sustain their own home grown development. Higher Education connotes the kind of skill training and learning given by Universities. The Chair is committed to harmonizing what Universities and communities are doing with a view to promoting sustainable development.

Activities:
The pioneers of the Chair's activities were Master of Arts students who, through the aegis of a Community Based Organization, worked in Makueni District during their vacation, teaching women brick making and better farming methods.
The UNESCO/UNITWIN Chair is not working in isolation. From the beginning, it forged linkages with both local and international Universities. The Chair works closely with the Ministries of Education and Human Resource Development, Health and Agriculture. It is also forging linkages with other UN agencies, local NGOs, and CBOs, Pharmaceutical Companies and individuals in the Private Sector.

Management:
The UNESCO/UNITWIN Chair in Nairobi is managed by a Steering Committee which is chaired by the Deputy Vice-Chancellor, Academic Affairs. The day to day running of the Chair is done by the Chair Holder, who is appointed by both UNESCO and University of Nairobi.

Staff involved:

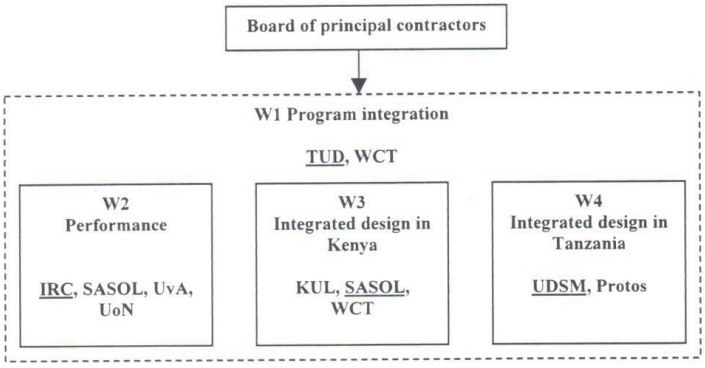
Judith Mbula Bahemuka, PhD.
PhD in Sociology

Main research
- Environmental Action: Learning for Waste Management in Low, Income, Informal, Slum Settlements in Nairobi: funded by UNESCO.
- Rehabilitation of Street Children in Nairobi: funded by UNESCO, 1999.
- Globalisation and Christianity in Africa: The Case of Kenya, 1998: funded by KAAD Germany.
- The Church and the Urban Poor: A study of the presence of the Church in urban slums in Nairobi. 1998: funded by the Kenya Catholic Secretariat.
- Eradication of Poverty in Kenya, 1998: funded by UNESCO, Paris.
- Environment and Education in Tanzania; a UNESCO Sponsored Research for Mainland Tanzania; 1997.

Recent publications
- J. Mbula Bahemuka. *Socio-Cultural Practices Related to Grain Storage in Western Kenya.* A Field Manual for Development Planning and Research Associates, 1987.
- Manual for Development Planning and Research *Associates, 1987. J. Mbula Bahemuka (Ed) Poverty* Revisited: An Analysis of Poverty Eradication in Kenya. Published by UNESCO, 1998.
- J. Mbula Bahemuka; "*Myths, Symbols and Rituals related to Water in Sub-Saharan Africa.*" Published by Church and Development, Graz, Austria, 1995.
- J. Mbula Bahemuka; "*Approaches Towards Rural Development: A New Look at Poverty Alleviation.*" Published by Action Aid, Kenya. 1995.
- J. Mbula Bahemuka; "*The Impact of Social change on Filial Piety Within the African Family.*" Published by the Academy of Korean Studies, Seoul, Korea, 1995.

C5. Project Management

Project management is the responsibility of the Delft University of Technology. The work structure is compiled by the four work packages each leaded by a principal contractor (underlined in the figure below):



Work Package 1is directed only to the programme integration, i.e. the technical and administrative management of the project. Technical management is done by ir. Maurits Ertsen of TUD with input of WCT who will monitor progress made in the local research areas. Administrative and financial management is done by Mrs Theresia Twickler of TUD-Cicat. This division in management has the advantage of taking away the burden of administration from the scientific staff members involved. It has proven to work well in previous EU- funded research projects carried out by TUD (4^{th} and 5^{th} framework).

At the start of the project, all contractors will sign a consortium agreement. This agreement identifies the scientific leaders and contains the responsibilities, tasks and administrative/financial obligations of the consortium partners as well as agreements on quality of scientific output, dispute settlements and publications & dissemination rules. Based on experiences with similar research projects it is extremely important to include in the consortium agreement, a clear set of procedures regarding decision-making power on partner assessment. WP1 is responsible for assessing the academic quality of the input and output rendered by the partners. Negative assessments can lead to re-allocations of budgets.

The first activity planned, the kick-off workshop in Kenya, will result in an operational plan for the first year setting the goals, tasks, responsibilities, key staff, budget assignments etc. This operational plan is evaluated through in-between-meetings held on both sides and co-ordinated through TUD.

The communication strategy is part of the consortium agreement. Main aspects are that from without WP1 Email contact is steered with and between WP leaders. Each WP will have its own Email distribution list in which related partners discuss and plan the progress. WP1 controls all of these lists in order to be able to generate the integration throughout the course of the project.

The project does not want to rely solely on Email communication because African Internet connectivity is still problematic. Therefore it will plan carefully the visits of staff of consortium partners to the field in order to guarantee a regular and continuous presence of staff.

Each year TUD will submit the technical and financial progress reports to the EU officers. TUD Cicat has developed an administrative apparatus that is well tuned to the financial conditions set out by EU. Regarding the cost statements, expenditures on personnel costs are based on integrated time registration of key staff involved.

No durable equipment is acquired in the project, except from PC's and office supplies for southern partners.

C6. Environmental Impact and Ethical Considerations

As the project activities are composed of a combination of known research and intervention strategies, the risk of any potential non-targeted social, environmental and economic impacts of the proposed project is absolutely minimal. Bio-safety aspects of work involving genetically modified organisms are not an issue in this project, as is ethical clearance.

C7. Economic development and scientific and technological prospects

Sharing results is the central aim of the project. Within the project sharing information and expertise is the driving force behind the activities. One of the aims of the project is to share the results and findings with many other institutions and organisations world-wide, which are active in the field of water projects and/or which are interested in participatory design approaches. This sharing, or dissemination of the results, to other institutions has four levels:

- *The consortium as a whole.* Two deliverables of the project are directly relevant at this level. The manual is explicitly directed at a broad outside audience of organisations working in water development. The final conference, during which the manual is presented, will be an opportunity for many people from outside the consortium to share their own experiences and first reactions on the manual with project participants. The resulting proceedings will find their way all over the world.

- *The individual participants.* Depending on the type of the participant involved, the results of the project will be directly used. For some of the participants, notably the NGO's, results will be used in structuring development-aimed activities. For the universities, the result will be brought into the study program, first in existing courses, but eventually the project could be the catalyst to develop new courses and educational projects for their graduates.

- The spin-off products. It is common practice in the scientific world to publish results of research in regular media, like conference proceedings and journals. Although such a way of publishing is not planned for in this proposal, the consortium partners will stimulate each other to publish interesting in-between findings in relevant media. The universities within the consortium are most used to this type of publishing, and depend on it considerably, therefore they will trigger this type of dissemination. All partners, however, will be involved.

- The *general audience and interested institutions* will be informed in general about the project and its' progress by a web-site.

C8. Ongoing projects, previous and related proposals

Over the years, there is an overwhelming of documents dealing with the technology under study, participation of target groups in and outside of Africa. Most of those documents present experiences from single projects, in which something specific was aimed at. On the other hand, the amount of theoretical literature on design processes and participation is growing too. This literature, however, usually lacks either concrete experience in the field, or not fitted for generalisation. The subject of participatory design of small water structures still lacks clear connections between project-based practice and theory-driven science.

The participants in this project are not aware of any other proposal under this call which could have links with this proposal. There are a number of proposals from the recent past, however, which will be used either as source of information or inspiration. Among them are:

- Characterisation of the aridity processes on Mediterranean Europe. Protection and management guidelines, under the ENV 2C program;
- Sustainable use of natural resources in rural systems of eastern African drylands (Ethiopia, Kenya. Tanzania), strategies for environmental rehabilitation, under the INCO program; and

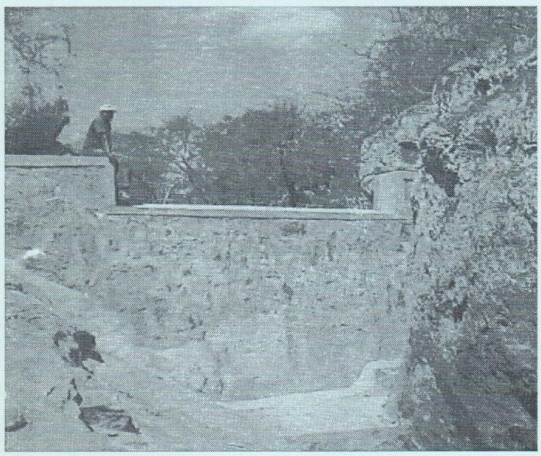
- Methodologies and design criteria for soil and water resource management and policy formulation in semi-urban farming systems in Southern Africa, under the INCO program.

Finally the participants will employ their own existing networks around the world to bring into the proposal activities and share them with other participants.

C9. Cost summary

See attached budget

Report start-up meeting REAL



Period 18 –21 September 2002

Ir. Ertsen
Drs. Twickler
Prof. Ir. Brouwer

TU Delft

CONTENTS OF THIS REPORT

PROGRAM OF THE WORKSHOP

September

18th afternoon	Visit of part of the group to sand dams near Kitui town
19th whole day	Visit of the whole group to sand dams in Kitui South
20th	Administrative aspects The REAL project Working in two groups Discussion on the results of the groups
21th	Working in two groups Discussion on the results Student group presentation and discussion

I GENERAL ASPECTS OF THE REAL PROJECT

I.1 CONTENT OF THE RESEARCH PROGRAM

The general objective of the research project is

to clarify the relations between local practices and theoretical approaches, by focusing on the design, management and performance of small groundwater retaining structures on a communal level in semi-arid regions in two African countries, Kenya and Tanzania, linking both the individual and the community as theory and practice, resulting in guidelines for participatory design of small water retaining structures in semi-arid regions world-wide.

The main product in which this general objective will be materialized is:

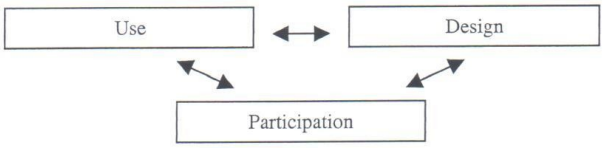
A manual describing a methodology to employ an integrated, participatory design approach applicable in other regions for comparable small water retaining structures will be produced.

Who will use guidelines? REAL needs to:

- Identify audience and / or stakeholders
- Look for generic guidelines, to derive different versions

Nature of guidelines are clarified during the Tanzanian meeting in August 2003.

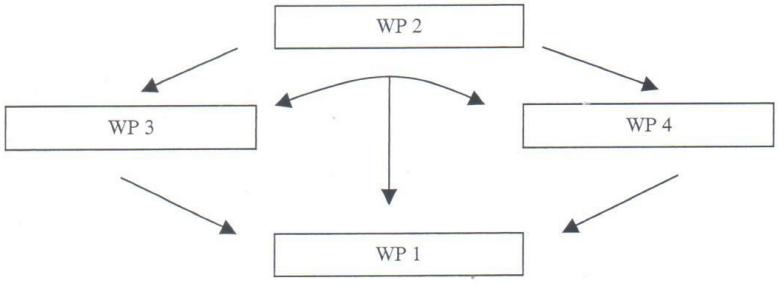
The set-up of the REAL-project is concentrated on the interrelationship between water use (including non-human use), design of structures and participation, as depicted.



The project is executed through four work packages, each focusing on a particular aspect of the above triangle:

- Work package 1 integrates the findings and develops the methodology;
- Work package 2 focuses on water use and participation, and its consequences for design. It provides input for WP 3 and 4.
- Work package 3 focuses the environmental effects of dams and ways to consider that in new designs. It provides input for WP 4.
- Work package 4 provides the test-case in which all aspects mentioned are taken into account.

Detailed descriptions of the work packages are provided in this report. The project is going to study the community development approach and come up with recommendations for improvement, if necessary. If any suggestions come up, they should be incorporated in the 2 last dams to be built: Kitui and Kilimanjaro.



I.2 PROJECT MANAGEMENT

The management of the REAL project is divided into technical management and administrative management. For the sake of transparency, a separate Work Package (WP1) was defined for technical and administrative management.

- DUT's faculty of Civil Engineering handles technical management through its section Land and Water Management, under supervision of Prof. Rob Brouwer. Daily project management is done by ir. Maurits Ertsen.
- Administrative management is done by DUT's office for the coordination of international projects "Cicat". The role of Cicat is to support faculties in the implementation of international projects by taking away the "burden" of administration involved in such projects. This division in management means that Cicat staff has to be in regular contact with scientific staff in order to monitor and evaluate the progress and communicate with the EC officer. This has to be done in light of the obligations and responsibilities defined in the contract and the consortium agreement.

A project steering committee will be created, to act as an independent, supervising committee, with the tasks to read reports (peer review annual reports) and referee internal disputes (arbitration). The Steering committee will consist of two external members, knowledgeable on the subject, but not involved in REAL, with DUT the daily project manager of DUT as third member. DUT will approach suitable external candidates. Two candidates were put forward:

- Prof Schultz (IHE, President of ICID)
- Prof Doorenbos (Institute of Social Studies, Den Haag)

I.3 ADMINISTRATIVE COORDINATION

The administrative coordination depends on information provided by consortium partners. Especially for financial reporting, Cicat depends on information provided by the partners (details to be found under Finance). Cicat support staff involves project assistants for administrative and logistics actions and financial officers for payments, accountancy overviews and organizing audit controls.

Administration involves:

- Monitoring of progress
- Monitoring of communication flows
- Reporting on progress and finances
- Budget control, re-distribution of budget
- Organisation of project- and commission meetings, minutes
- Organising for audit controls
- Maintaining contact with financing organisation

I.4 PROJECT CONTRACTS

The EC contract

The EC contract is signed between each partner individually and the EC meaning that each partner is fully responsible for its specific contribution to the realisation of annex 1 (the project description, or otherwise known as the Technical Annex). The official starting date is 1 September 2002 and the duration is 36 months. Eligible costs can be made on the project's account as per 1 September 2002 till 31 August 2005.

- Annex 1 concerns the technical work plan (a compilation of proposal text parts) indicating the work to be carried out (in general).
- Annex II contains the general conditions of the execution of the contract. These conditions apply and rule over the consortium agreement rules, in case they conflict.
- Annex III defines any special conditions.

The EC right will grant a first payment of 40% after signing of the contract, according to the table included in the contract. After one year another 40% will be granted. The final payment of 20% will be paid after receiving and approving the final report, i.e. end of 2005.

Progress reports need to be submitted every 12 months. In order to have them ready in time, the REAL-partners will produce internal progress reports every 3 months that will build the final version after 12 months. Each WP Leader will prepare a short (maximum 2 pages, format to be delivered by Cicat) INTERNAL progress report every 3 months. A compilation of these reports will be made by Cicat and distributed amongst the members.

For the yearly report, the WP leader will integrate contributions for the content report and send one report to DUT. The financial yearly report will be sent to DUT too, with copies to the other participants in the WP.

Consortium Agreement

This agreement is purely for internal purposes, although EC has a copy. It arranges more in detail all issues treated in general in annex II, especially the issues regarding ownership of intellectual property and confidentiality. In case of future disputes amongst members of the project consortium, this agreement should provide the solutions.

Contract between principal contractor and assistant-contractor

To specify the activities and responsibilities, the respective principal and assistant contractors have to sign a contract detailing the tasks, deliverables, deadlines, responsibilities, staff assignment etc of both institutions, like was agreed in the Consortium Agreement. In the agreement to be signed, it has to be specified when the assistant contractor has to relate and report what input (deliverables or contributions to deliverables) to the principal contractor. A format for the contract is provided in an annex to this report. The tasks, deadlines and other information to be put in the contract are specified later in this report when content and planning of the work packages are discussed.

The REAL project

Principal contractor	*Related Assistant contractor*
Delft University of Technology	Westerveld Conservation Trust
SASOL	University of Nairobi
IRC	University of Amsterdam[1]
University of Leuven	Protos

The main features connected with the participation in capacity of "principal contractor" are:

- The signature of a contract with the Community;
- Joint and several liability towards the Community for the implementation of the project (in the event of withdrawal or failure of a principal contractor, the Commission may ask, under the conditions provided for in the contract, the remaining principal contractors to ensure the resumption of the work);
- A limited financial liability towards the Community, to his part of the Community funding (the principal contractors are not required to reimburse amounts owed by a principal contractor unless they have contributed to the latter's default);
- Very ample access rights to the intellectual property.

"Assistant contractor" means a legal entity, an international organisation, or the JRC, other than a *principal contractor*, which has concluded this contract with the Community, acting under the technical supervision of a *principal contractor* and having the same rights and obligations as them, except as regards the extent of its responsibility for carrying out the

[1] Due to developments of later date than the workshop, the involvement of UoA in REAL will change.

project and *access rights*. The main features connected with the participation in the capacity of assistant contractor are:

- The signature of a contract with the Community;
- A limited liability towards the Community to the part of the project specifically assigned to him;
- A limited liability towards the Community to his part of the Community funding;
- Carrying out of the work under the technical supervision of one or more principal contractors;
- Restricted access rights to intellectual property.

The principal contractors are the owners of the results, which have been generated by their own work, and must benefit from access rights to knowledge and pre-existing know-how of other contractors and participants within a project of the same specific programme, at the most advantageous economic conditions. On the other hand, an assistant contractor only benefits from this right with respect to his principal contractor(s), and only to the extent necessary for the use of his own knowledge.

General remarks

- The principle contractor checks the quality of the deliverables / work of its respective assistant contractor. This is detailed in the contract between them. See the annex for a contract format.
- The WP leader checks the quality of all products / deliverables for that WP.
- CICAT is the administrative coordinator and LWM is scientific coordinator. Together, as DUT, they act as contacting towards the EU and controlling institution towards the partners as far as scientific and administrative progress is concerned.
- At all times, partners remain responsible for their contract with the EU.

I.5 FINANCE

The contract includes a table of the breakdown of budget of the first payment of EC. As soon as Cicat receives the money, it will be forwarded to partners according to the table. For this, Cicat needs to receive bank information from the partners involved, meaning:

- Name of the bank
- Address of the bank
- Account number
- SWIFT code
- Name of the organisation/person related to the bank account
- Any specific reference code

Also, the name, tel-fax number and email address of the administrative person of the organisation, responsible for cost statements, is needed.

In order to deliver transparent cost statements to the EC every 12 months, time input of staff involved (according to the number of man months per organisation) has to be registered. This can be done according to the normal procedures of the organisation involved. If the organisation does not have a standard registration procedure, **please define one** in order to avoid future problems in recognition of eligible costs by EC and possible internal disputes amongst members.

In case of other eligible costs, refer to the annex II for definition and calculation. Please be aware that all eligible costs must be justified and supporting documents can be asked for by EC any time. Any changes in expenditures or re-distribution of budgets, must be notified to EC **before** (never after!!). Normally a deviation of 20% between budget lines is allowed. In case of disputes arising on budgets assigned to partners or under performance of partners, the project committee has the authority of deciding on a re-distribution of partners' budget.

I.6 PLEASE NOTE

Delays in submitting progress reports and cost statements must be avoided otherwise financial problems will occur. Therefore, August is the month in which progress reports + cost statements have to be edited every year. Please be aware that the cost statements are difficult to edit. Apart from calculating the man-hours used of all individual staff (therefore: register the time input!!) local currency must be used and converted to Euros, using official EU rates. Please look at: http://europa.eu.int/comm/budget/inforeuro/en/index.htm for the rates.

I.7 COMMUNICATION

Internal Communication

An efficient structure for internal communication is needed. It is important to keep this communication flow confidential and absolutely internal and strictly for members' use only. DUT will arrange a centralized, restricted website (operated from DUT), providing a digital archive, with data stored on a DUT server. Access needs to be arranged by DUT as soon as possible. Where uploading data via the Web is a problem (which for instance is the case regularly for the Kenyan partners), CDs or attachments can be sent to DUT, which will upload it on the site.

External Communication

A strategy of if and how dissemination project results during the realization of the project are arranged has to be defined. It would be convenient to have one partner responsible for the Web site of the project. Next to the closed, confidential website, DUT will arrange and be the responsible partner for an open website with general information on the REAL project. For the sake of confidentiality the consortium must agree that all information to be publicized, must be approved by the consortium partners before.

Within the first six months of REAL, a Dissemination Plan has to be formulated by the project coordinators. The IRC, as one of the main information broker institutes of the consortium, will be involved in this activity.

All versions leading to final, formal reports and deliverables must be marked Confidential.

II THE WORK PACKAGES

During the workshop, the Work Packages have been discussed in two groups. One group defined WP 2 Performance further, the other group discussed WP 3 and 4 together, as these two are both dealing with experimental designs. During the discussions and exchanges it was noticed that some links between the Work Packages, which have not been stressed in the technical annex, had to be established. This was especially the case with issues of participation, empowerment and gender, which play a role in all WP's. At least one practical outcome of this is that one of the partners, Protos, will include Kenyan regions in its work planning too. Close coordination and cooperation between Protos and other partners dealing with the issues mentioned, particularly SASOL, UoN en IRC needs to be established.

According to the Annex 1 of the contract, all partners must provide high-level scientific input to develop the tasks planned and to deliver the deliverables indicated in the contract. It is clear, however, that partners may use students to provide basic input, but that this can never replace the scientific input needed to reach the research goals set for the REAL project. However important selection and supervision of students might be, these tasks can and will never be considered as a valid contribution in itself to a research project as REAL. If students do participate in the research, than obviously some efforts will have to be aimed at supervision, but supervision and other student-related activities in itself are not considered research contributions. Furthermore it is clear that the students will need guidance and supervision to ensure that their work provides the information required by the REAL project.

A spatial database on Kitui, Amboseli and Kilimanjaro shall be implemented for the work packages 3 and 4. KULeuven sets it up and hands it over to Sasol. It can be improved by field data. It shall be put also on the website.

Gaps in the budget that are identified have to be addressed: aerial photographs, satellite imagery, water testing, motorized augers. Possibilities to use part of the existing budget for this, or outside money have to be identified.

II.1 WORK PACKAGE 1

WP1 has two areas of work:

- The general coordination of the project (administrative and scientific)
- The integration of WP 2, 3, and 4 into the final result

The general administrative coordination is dealt with in paragraph I. Scientific coordination runs parallel to the administration and concerns mainly reporting to EC. This paragraph discusses the scientific integration of the different activities of the project. A string of documents will be produced which step by step integrate the results of other work packages into a design manual. The documents are discussed in workshops, and drafts are sent to participants for comments and additions. The set-up of the workshops is co-ordinated, and workshop reports are produced. All participants will be informed on what is going on in the project, especially in the months between workshops. At the same time, it will be necessary to ask information from participants regularly. Furthermore, design activities in the field within work packages 3 and 4 will be monitored in the respective areas by a number of short evaluation missions.

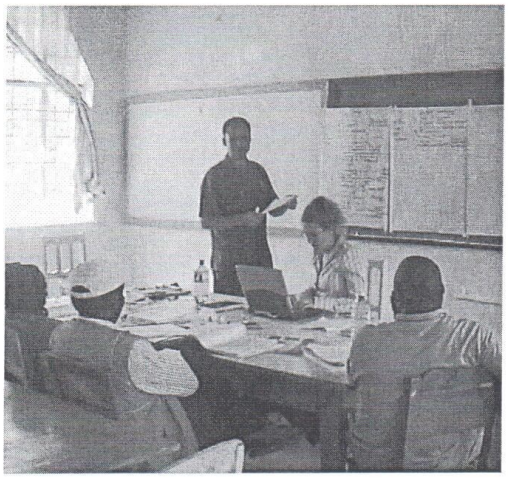
The first deliverable, D2a, a position paper on participatory design of small water retaining structures, which had to be discussed during this workshop, has not been not yet been prepared due to illness of the coordinator. It will be produced before January 2003, and distributed to the partners. It might result in a short email-based discussion. Because of this different timing, the position paper will be more directed at actual issues to be studied in REAL than would have been possible in the original planning. As a major Dutch football player has said: 'Every disadvantage has its advantage'.

The second REAL meeting, in the Kilimanjaro region in either Tanzania or Kenya, will be organized in August 2003. At least a week is needed, to provide ample room to discuss the following matters:

- Discussing the general REAL progress (one day)
- Progress of the WP's (at least half a day per WP, giving two days)
- Checking of deliverable documents (one day)
- Administrative matters (half a day)
- Producing meeting documents (one day)
- Field trip(s) (at least one full day)

Proposed period: **1 to 8 August 2003**
Location: **Kilimanjaro region, details to be decided asap**

II.2 WORK PACKAGE 2



Knowledge of the water sources and their management is required to draw conclusions on progress achieved so far and possible areas for further development. Researchers and farmer groups (male and female) work together in carrying out the research, using a participatory research design on water use and quality evaluation and management. The project will use a case study approach in 3 to 5 communities that represent the various conditions in the area. The study will consist of testing of the water quality at the various relevant points from source to cup and in a sufficiently large sample to warrant conclusions. The assessment of management and water use patterns will be done through a participatory study, which has the advantage of leading to increased capacity of the water users to monitor their water source. A gender angle will be integrated as one of the social variables. Existing farmer groups (water users) will be selected to become partners in the participatory research.

Specific goals:

1) To asses the quality of the water at all points between source and cup
2) To investigate the water handling & source management practices for domestic and agricultural use and relate these to the water quality conditions found through testing
3) To determine any improvements achieved in comparison with previous conditions in domestic and agricultural water use.
4) To co-design with the user groups a planning and implementation of any further improvements if necessary and monitor the effect on water quality conditions, management and use.

Water sampling

To assess the quality of water, water sampling is needed. Water sampling involves determination of the chemical, biological and physical aspects of the water. Credibility/acceptability of the results is important. The sampling activity has to be executed by a certified water technician/consultant. The measurements of the samples have to be executed by a certified laboratory. Sampling has to take place in 3-5 communities, and from water source to household level. Issues to be solved are:

- The determination of community boundary delineation
- Selection criteria and selection proper of 3-5 communities
- Selection of test lab for actual quality measurement, by official lab, concern costs (Nairobi, x,y,z)
- The inclusion of all water points/sources of last resort (quality & perception), including eg. also vendors (number of quality measures also depending on certain perceptions).

Water quality testing has to be done 4 times a year. Sampling months are March, June, September and December. A preliminary selection of communities includes Kamale, Tungutu (Kitui Central) and Ngunga (in Kitui South). Concerning the water quality testing, it is envisaged that during the first year, a total of 40 tests should be conducted.

In order to cover the costs the REAL budget should be checked. The costs have to be established for the cases that SASOL carries out the taking of the samples as well as if this is done by a 3rd party. For practical purposes, a working figure of Ksh 4.000 per sample or 160.000 Ksh total budget has been set. Possibilities to expand the sampling to the Kilimanjaro region (both in Kenya and Tanzania) have to be studied, including budget (see WPIII and WPIV). The results of this technical quality measurements will be interpreted using a method of classification of water quality permitting a more practically useful evaluation than would be possible with a sole application of the WHO-standards.

Source management, perception and improvements

This cluster of issues involves fieldwork by partners together with user groups (male and female). It is planned to include students (which could be on MSc or PhD level). Issues that need to be studied are sanitation & hygiene, different chains of actions related to different uses and disposals of water (domestic / agricultural / livestock), source management practices focusing on tasks, which are or are not performed, and historic perception of users. Looking for improvements involves comparisons of previous and new situations (including previous and current water (perceived) quality, quantity, access and control, use patterns and changes in time. Next to fieldwork, a desk study will provide the necessary background to both planning and results of field activities.

The issues concerning improvements will be emphasised in the 2nd year in September / October, and are typically to be discussed during the second workshop in August 2003. What needs to be established to work on improvements and co-design with the users is a list detailing what is working in the water system, which will be the basis for agreement with the community members, resulting in a list what improvements are required, desired etc. It will be necessary to make a distinction between newly designed dams and existing designs (including its management). Care needs to be taken to sequence the activities in year 2 and 3 (September 2003 and beyond), including coordination of Protos' involvement.

General remarks

As this work package builds around participatory research and design, care needs to be taken when methods of research are discussed. Existing data will be used, for example from the existing socio-economic study, but WPII activities will typically ***not*** involve research methods like household surveys or standardised sampling techniques. Instead, a set of participatory tools needs to be available 'in the pocket' of the researchers, as in participatory research not one fixed pre-designed method or process can be applied. Typically, the experience and research material of the IRC will be used, such as the book "Keep it working", which serves as a basis.

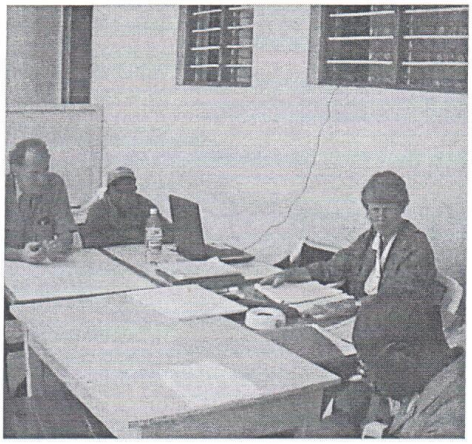
Preliminary planning of student groups

Within WP2, student work could potentially involve four groups:

- Student group I: Sep – Dec 2002. Starting research on two communities, one in Kitui South and one in Kitui Central;
- Student group II: April – July 2003. Concept Terms of Reference (ToR) should be finalised in January. Focus on Kitui Central. Protos visits Kitui in Feb 2003, results included in the final ToR. Feedback to the design activities in WPIII in Kitui South;
- Student group III: Sep – Dec 2003. Emphasis on research into improvements, based on experience in Kitui Central. Final ToR for this group in August 2003. Feedback to WPIII;
- Student group IV: Sep – Dec 2004. Emphasis on community planning and monitoring/evaluation. Draft ToR June 2004, final ToR August 2004. Feedback from WPIII.

II.3 WORK PACKAGE 3

The existing approach is tested and improved by extending activities to other areas, taking up questions how new approaches integrate issues on land use of target groups, impact on water systems and influences from environmental elements. In Kitui South, a dam will be constructed using WP2-results (Kitui Central). In Amboseli, a second dam will be constructed, close to the Kilimanjaro, where the pastoral Masai live together with the wildlife. The design processes of these new structures are to be documented extensively, including detailed day-to-day diary-like overviews, reflection on the approach and results, pictures, photo's and technical design drawings.



Specific goals:

- To design and construct two groundwater dams in the Kitui and Amboseli regions
- To define a checklist on land evaluation components of design
- To integrate land evaluation aspects into the design approach and manual
- Defining and implementation of a land evaluation survey for designing water harvesting systems, including land use, soil, topography, and hydrological issues in the areas

Land evaluation and GIS

The land evaluation research, with the use of GIS, will involve two levels of approach and analysis:

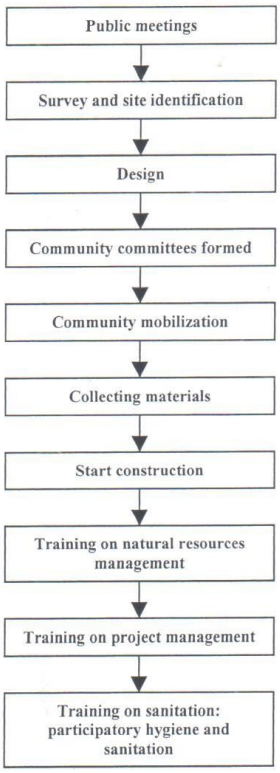
- At a local scale: look at land around dam site, integrated toposequence analysis (land use, water use, soil information (polluting soil), erosion);
- At a regional scale: topography (digital elevation model), land cover (aerial photographs, satellite data if possible.

The possibility to bring in expertise GIS will be studied, especially regarding spatial components interesting for hydrology, water use (potential for irrigation) and socio-economic information. Rainfall data information (daily and monthly) on contributing areas is important. Collecting data in the catchments areas has to be set up. Besides that, long-term information of the area can be used. Satellite images from the regions involved (Kitui District and Amboseli / Kilimanjaro) will be necessary. If aerial photographs and satellite info are available, together with long-term rainfall information, comparative analysis of data (time series) can be done on erosion, land use and impact of the dam construction.

Dam construction in Amboseli

In the Amboseli area, a new dam concept (filtration dam, taking into account the specific land and water use issues of the area) has been constructed, without much emphasis on community participation and negotiation beforehand. Masai people were getting paid for the construction. This first experience, however, has caused interest in more dams being built. The design and construction of a new dam of this type, with strong emphasis on Masai participation with involvement of community organizers of Kenyan Wildlife Service, is scheduled to take place from June 2003 onwards. Experiences with the existing filtration dam will be documented before the new design. As a starting point, the reference sequence as mentioned below will be followed. It is planned for, however, that the community approach is assessed. Lessons learned with this second Amboseli dam, documented in reports based on diary-like working documents will be used in design, construction and evaluation of the Kilimanjaro dam.

Dam construction in Kitui



Dam construction in the Kitui region is scheduled to take place in July 2004. The catchment area for the experimental construction is already known. It will be Ngunga river in the Kibwea sub location. The exact dam site has to be defined yet. Possibilities to include the site selection in the participatory design approach will be studied. The innovations the project wants to pass through have to be concentrated on this new dam, regarding participatory issues, land and water use, regional hydrology, soil information, water quality, and so on. Therefore, ample documentation of activities and experiences is required, in the shape of design reports based on detailed fieldwork and diary-like working documents.

A participatory approach prepared in WP2 needs to be taken up. This asks for specific activities in Kitui South by WP3 partners, as WP2 focuses on Kitui Central. Expertise and experience from WP4 will bring in gender and other socio-economic aspects in Kitui. Existing socio-economic data will be used. As mentioned in WP2, however, participatory approaches need to go beyond these types of studies. Therefore, before the design starts, the reference design process sequence needs evaluation to establish whether it is the most appropriate approach. Improvements to the design approach, if applicable, will have to be based on the results of performance research in the Kitui Central region (WP2), and results from WP3 and WP4 from other regions. As design and construction has to involve and integrate all technical and social issues, construction of the Kitui dam is scheduled to take place from June 2004 onwards.

General remarks

Instead of three dams (as mentioned in the technical annex) a total of two new dams is proposed. Originally, two dams in Amboseli had been planned. If the experiences with and results of the existing dam are incorporated in REAL through an evaluation report by WCT with recommendations for the new dam (see part III Planning, the Amboseli visit report in Annex II already provides some food for thought on this), focusing on two new designs appears to be acceptable. Nevertheless, it has to be notified to the EU.

The capacity to use GIS by SASOL needs to be established (computers are available). The Flemish government (VVOB) has a program for training of technicians in GIS. Contact will be made, hopefully training could be planned. Possibilities for matching this training with Nairobi students shall be explored.

Preliminary planning of student groups

- Summer 2003: Students from KU Leuven, land use study in the Kitui South region, input to deliverables D5a and D5b. The original planning for these deliverables is difficult to respect, regarding the possible timing of students to come in. Given the justification that work has been done to set the work up, this is acceptable, but has to be notified to the EU.
- Summer 2003: DUT students, evaluation of design and construction in the Amboseli region.
- Optional: February – May 2003: DUT students, hydrology issues in Kitui, and if possible, Amboseli.

II.4 WORK PACKAGE 4

In order to test the participatory approach in an environment with relatively less experience with water retaining structures, but with the need to develop them, the activities in this work package centre on the design and construction of a small water retaining structure in the Tanzanian Kilimanjaro region. As water development activities, and participatory approaches in particular, are a new phenomenon in this area, the work package concentrates on one design. Using the known Kitui-approach with improvements from WP2 and WP3 as a starting point, the details of an approach will be studied and adapted to the local conditions.

Specific goals:

- To implement a participatory community approach in preparing design and construction activities
- To implement a participatory, integrated resource assessment in the design process
- To design and construct a groundwater dam in the Kilimanjaro region

Please note

Because it has proved to be impossible to agree with a cooperative institution in the Ngorongoro area, WPIV is concentrating on the Kilimanjaro area instead. Contacts with local stakeholders in this region have been made and are promising. This is not a major change, as the regions are similar and close together ('on the other side of the road', so to speak), but it has to be notified to the EU.

Integrated design

An integrated resource assessment, which has many similarities with the approach used in WP3, is the starting point of this WP. Information exchange on both methods is planned. In the long term, also Tanzania will have a GIS database. Although the resource assessment is priority, there is a clear need to include a socio-economic study, given the integrated and participatory focus of REAL. During the resource assessment, the necessary conditions for the training on community participation are created. As mentioned before, the work in this WP will link to the Kenyan experience, to assure that interesting elements are picked up, and to allow the Kenyan experience to take elements out of the training program offered by WP4.

Regarding the participatory approach, a first field mission aims to evaluate existing organizational structures, and ownership experiences of existing dams. Given the nature of the mission, it has been planned early in the process (January-February 2003), with a first part in Kitui and Amboseli, and a second part on to the Kilimanjaro area. A second mission, on empowerment, will take place in summer 2003. February-March and June to September are good period because farmers are available for training (dry season). Establishing the community participation plan (as a result of the evaluation mission) includes attention to gender, water and hygiene, and technical aspects of design.

Regarding the actual design and construction of the water retaining structure, it will be necessary to involve TANAPA (Tanzanian National Park) and GDTG (Game Department of Tanzanian Government), to prepare and locate the dam site and the Masai village involved. If successful, a process of mobilizing the Masai village will start. A suitable location is already identified, but this has to be confirmed by fieldwork. The proposed site for dam construction is in the corridor of 8 km in between the 2 national parks. The area is surrounded by land where agricultural practices dominate. A first priority is to work on the division between human interests, being livestock and agriculture, and wildlife conservation. This will be taken into account in the resource assessment. Again, ample documentation is necessary.

Preliminary planning of student groups

Student involvement in this WP is not foreseen at this stage, but it is not excluded either. Suitable issues and timing has to be monitored continuously.

III PLANNING

WP	WP leader Partners	Title Tasks	Main deliverable title Sub-deliverable title	Delivery date	Responsible partner
1	**DUT** WCT	**Integration and coordination** ▪ To monitor project progress ▪ To administer all project activities and finances ▪ To integrate project findings into a design manual	**D1 Program evaluation report**	**35**	**DUT**
			D1a Yearly report I	11	DUT
			D1b Yearly report II	23	DUT
			D1c Yearly report III	35	DUT
			D2 Small water structures manual	**35**	**DUT**
			D2a Position paper on participatory design of small water structures	0	DUT
			D2b Paper on technical issues in dam design	11	DUT
			D2c Draft manual	23	DUT
			D3 Final conference proceedings	**35**	**DUT**
2	**SASOL** IRC UoN (UoA)	**Performance of existing dams** ▪ To evakuate management and use of existing dams ▪ To determine the influence of user demands on design issues ▪ To give recommendations for future design and management of dams	**D4 Management and use of existing structures**	**35**	**IRC**
			D4a Report on relationships between dam water use and improvement in hygiene	11	UoN
			D4b Report on water quality and possible relationships with patterns of water sources management and use	11	UoN
			D4c An implemented plan for improvements by the user groups	23	IRC
			D4d Recommendations for design and construction	23	IRC
3	**KUL** SASOL WCT	**Integrated design in Kenya** ▪ To determine the influence of user demands on design issues ▪ To give recommendations for future design and construction of dams	**D5 Design report for new structures in Kitui and Amboseli, Kenya**	**35**	**KUL**
			D5a Report on relationships between design of dam and land use by target groups	11	KUL
			D5b Report on hydrology and possible relationships with patterns of water sources management and use	11	KUL
			D5c Dam design, including documentation	11 23	WCT SASOL
			D5d Recommendations for design and construction	25	KUL
4	**DeS** Protos WCT	**Integrated design in Tanzania** ▪ To test the approach and recommendations for user participation in integrated design ▪ To give recommendations for future design and construction of dams	**D6 Design report for new structures in Kilimanjaro, Tanzania**	**35**	**DeS**
			D6a Community participation plan	11	Protos
			D6b Integrated, participatory resource assessment	11	DeS
			D6c Participatory water retaining structure design and construction	23	DeS
			D6d Recommendations for design and construction	35	DeS

Calendar of activities

	Partic.	2002	2003				2004				2005		
		Sep-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-Sept
General													
Initial exchange of literature	All DUT	X											
Inventory of existing data	All	X											
Internal Progress Reports	WP-leaders		X	X	X	X	X	X	X	X	X	X	X
Yearly reports	DUT				X				X				X
Scientific papers for the final workshop	All are invited												X
Meetings	All				**Tanzania 1 - 8 August**				**X? (Separate European and African meetings)**				Delft
WP1													
Writing report workshop	DUT	X											
Setting up web-sites	DUT	X											
Position paper (D2a)	DUT		X										
Paper on technical issues (D2b)	DUT				X								
Draft manual (D2c)	DUT								X				
Manual (D2)	DUT												X
Conference (D3)													X
Dissemination plan	DUT IRC		X										
Contracting assistance	DUT	X	X										
Project steering committee	DUT	X	X										

Calendar of activities continued

	Partic.	2002	2003				2004				2005		
		Sep-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-Sept
WP2													
Setting up sampling program	SASOL	X											
Water sampling	SASOL	X	X	X	X	X	X	X	X	X	X	X	
Fieldwork performance in two communities.	UoN IRC	X											
Fieldwork performance in Kitui Central	UoN IRC			X									
Field work community participation and gender	Protos (see WPIII)		X										
Fieldwork improvements	UoN IRC					X							
Fieldwork community planning	UoN IRC									X			
ToR's for field work	IRC		X		X				X				
Draft deliverable D4a and D4b	UoN			X									
Deliverable D4a and D4b	UoN				X								
Draft deliverable D4c	IRC / UoN						X						
Draft deliverable D4d	IRC / UoN						X						
Deliverable D4c	IRC								X				
Deliverable D4d	IRC								X				
Deliverable D4	IRC												X

Calendar of activities continued

	Partic.	2002	2003				2004				2005		
		Sep-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-Sept
WP3													
Inventory of available data	KUL	X											
Evaluation on ownership and organizational structure of existing dams	Protos		X										
Hydrological study	KUL DUT		X	X									
GIS activities Kitui	KUL				X								
Mission for guidance of students and participation in meeting Tanzania	KUL				X								
Analysis of data	KUL					X							
Report on land use (D5a) and hydrology (D5b)	KUL					X							
Training on ownership	Protos				X								
Construction dam Kitui (D5c)*	Sasol								X				
Construction dam Amboseli (D5c)*	WCT				X								
GIS activities Amboseli	KUL								X				
Analysis of data	KUL									X			
Draft recommendations (D5d)	KUL									X			
Final Report D5	KUL												X

* Please note that this includes ample documentation of the design process, construction etcetera.

Calendar of activities continued

	Partic.	2002	2003				2004				2005		
		Sep-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-sept	Oct-Dec	Jan-Ma	Apr-Jun	Jul-Sept
WP4													
Inventory of available data	DeS	X											
Site identification	DeS		X										
Assistance for the Community participation plan	Protos		X										
Report on community participation plan (D6a)	Protos				X								
Resources assessment (D6b)	DeS			X	X								
Training on ownership	Protos				X								
Construction dam Kilimanjaro (D6c)*	WCT								X				
Recommendations and final report (D6d and D6)	DeS												X

* Please note that this includes ample documentation of the design process, construction etcetera.

Annex I Concept AGREEMENT

Between

P1…

and

P2…

1) CONCERNING:

The EU funded project "Re-hydrating the Earth in Arid Lands", abbreviated as REAL

2) CONSIDERATIONS:

A contract between 9 partners and the EU has been signed with starting date 1 September 2002 for the implementation of the REAL project (ANNEX A). The consortium consists of 5 Principal Contractors and 4 Assistant Contractors. All 5 Principal Contractors signed a Consortium Agreement on 5 February 2002. DUT is the General Co-ordinator of the consortium. P1… and P2… are involved in work package x of the REAL project, ***with P2… being the assistant contractor of P1….***

3) SOME BASIC FACTS:

Duration
3 years, from 1 September 2002 till 31 August 2005.

Objectives
The general objective of the research project is

- *to clarify the relations between local practices and theoretical approaches, by focusing on the design, management and performance of small groundwater retaining structures on a communal level in semi-arid regions in two African countries, Kenya and Tanzania, linking both the individual and the community as theory and practice, resulting in guidelines for participatory design of small water retaining structures in semi-arid regions world-wide.*

The main product in which this general objective will be materialized is:

- *A manual describing how to employ an integrated, participatory design approach applicable in other regions for comparable small water retaining structures will be produced.*

Other, supporting scientific and technological objects to reach general objective and main product are specified at the end of the research project:

- *A systems' perspective on design, management and performance of small water retaining structures in semi-arid areas is developed;*
- *The performance of existing small water retaining structures, including aspects concerning hydraulics, hydrology, water use and health, is clarified and a participatory small water retaining structures management approach has been established;*
- *Experiences with a participatory design, construction and management approach for small water retaining structures in two pilot areas have been documented;*
- *Staff, students and local communities involved have participated in experiential learning exchanges in workshops, field visits, formal education and networks;*
- *The results of the project have been disseminated through the manual, 3 yearly reports, 3 scientific papers and the conference proceedings of a final conference.*

The Work plan
The project is divided into four work packages. Three of them are both geographically and thematically defined, one work package has the specific aim to integrate the contributions from the other packages.

Work package	*Central goals*	*Final products*
1 Integration	▪ To monitor project progress ▪ To administer all project activities and finances ▪ To integrate project findings into a design manual	▪ Program evaluation report ▪ Small water structures manual ▪ Final conference proceedings
2 Performance	▪ To evaluate management and use of existing dams ▪ To give recommendations for future design and management of dams	▪ Management and use of existing structures
3 Integrated design in Kenya	▪ To determine the influence of user demands on design issues ▪ To give recommendations for future design and construction of dams	▪ Design report for new structures in Kitui and Amboseli, Kenya
4 Integrated design in Tanzania	▪ To test the approach and recommendations for user participation in integrated design ▪ To give recommendations for future design and construction of dams	▪ Design report for new structures in Ngorongoro, Tanzania

Description of the relevant Work package x

Please note
In the context of this agreement, it may be necessary to state that other partners of this Work Package x, … and … respectively, will be responsible for deliverables … and …. This has been arranged in their own agreement. As far as P1… and P2… will contribute to these deliverables, their agreement specifies their respective actions, products and planning. See paragraphs 9 and 10 of this contract.

Budget
Total budget of the project is of which EC contribution is euro 401,000
Total budget for P1… is euro …
Total budget for P2… is euro …
See attached budget overviews.

4) PERSONNEL FROM P1…:

-
-

5) PERSONNEL FROM P2…:

-
-

6) INPUT OF P1…:

Input in time consists of:

-
-

7) INPUT OF P2…:

Input in time consists of:

-
-

9) TASKS OF P1:

Examples could be:

Responsible partner for deliverable … of work package x

Explanation

Contributor to the deliverables of work package x

…

Providing training on …

…

Planning of products to be delivered by P1…

Month	Date	Product

10) TASKS OF P2

… see 9) for an example outline

12) REVENUES OF P1:

Time investment	Euro…
Travels	Euro…
Total:	Euro….

For the execution of the tasks assigned to P1…, a sum of Euro ….. will be paid to P1…, in accordance with the table in Annex 1 of this agreement. This sum is to be paid in three installments depending on the percentage installments of advance payments that will be received from EC. The first payment is to be effectuated upon signature of the contract between TUD and the EC (1 September 2002). Amounts are taken from the Contract Preparation Forms, submitted to EC for contract drawing.

11) REVENUES OF P2…:

Time investment	Euro…
Travels	Euro…
Total:	Euro….

For the execution of the tasks assigned to P2…, a sum of Euro ….. will be paid to P2…, in accordance with the table in Annex 1 of this agreement. This sum is to be paid in three installments depending on the percentage installments of advance payments that will be received from EC ***and after approval of P1… of the deliverables produced by P2….*** The first payment is to be effectuated upon signature of the contract between TUD and the EC (1 September 2002). Amounts are taken from the Contract Preparation Forms, submitted to EC for contract drawing.

13) DECLARATIONS

The information given in this agreement, correspond to the rules of Annex II of the Contract to be signed with EU, the Unified Consortium Agreement signed by the Principal Contractors on 5 February 2002 and the financial information of the Contract Preparation Forms. This agreement is valid considering an extension in terms of the concrete execution of the tasks specified in the work packages, by means of a detailed work plan.

Delft, ……..…… (date)

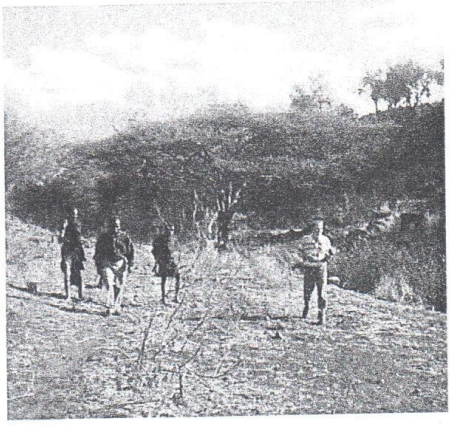
For P1… **For P2…**

Signatures:

Annex II
Report of field visit to Amboseli and meetings in Nairobi, 22-23-24 September 2002

Participants

- Paul Campling, KULeuven
- E.K. Shishira, University Dar Es Salaam
- GC Mutiso, Sasol
- Peter Westerveld, WCT
- Anne Coutteel, Protos



Program

- 22 September:
  - Informal contact with senior warden of Amboseli National Park , Kenyan Wildlife Service: Michael L. Kipkeu
  - Visit to area outside park, south of the national park:
    - gully erosion
    - seasonal river Kitenden: reconnaissance of riverbed and suitable dam sites
    - borehole with broken lister pump
    - infiltration dam downstream on Kitenden river
- 23 September:
  - Meeting at KWS with Michael L. Kipkeu and Simon Musyoki (warden)
  - Amboseli elephant research project (camp site and offices)
- 24 September:
  - Meeting with Belgian engineers working at PolyGIS, Nairobi Polytechnic
  - Visit to Survey of Kenya to enquire about aerial photographs
  - Other contacts by telephone

Description of activities

1. *Informal contact with senior warden of Amboseli National Park , KWS: Michael L. Kipkeu*
   - Introduction of project and participants
   - Arrangement for formal meeting on Monday
   - WCT arranged for construction of another infiltration dam starting in November, and discussed practical issues on bulldozer starter problem.
   - M. Kipkeu was very explicit about the continuing water problems in the park and outside. A lot of negotiation has to be done continuously in order to prevent major water related conflicts.

2. *Visit to site with gully erosion*
   - As a result of deforestation and drought, some spectacular gully erosion is occurring at several places. Gully head is situated where forest stops. The gully head visited was about 6 m wide and 2 m deep and is extending for up to a few km. The soil is potentially fertile but very erosive due to lack of ground cover and drought.

3. *Seasonal river Kitenden: reconnaissance of riverbed and suitable dam sites*
   - We walked up the riverbed for about 1-2 km until the start of a deeply incised valley. The valley is characterized by a lot of bedrock outcrops and is suitable for a series of sub-surface water dams. The source of the river is in Tanzania, on the northern slopes of Mount Kilimanjaro. This catchment could therefore be very suitable to combine the Tanzanian and Amboseli interventions in the framework of the REAL project. Especially as Kitenden river is located in the wildlife corridor between Mount Kilimanjaro and Amboseli National Parks. The corridor is very important to allow wildlife to migrate especially during periods of severe drought, but its functioning is being hindered by different interests: wildlife, agriculture, livestock and problems of coordinating a corridor common to 2 countries. One of the alleviating factors would be to improve water availability and diminish pressures on existing water points.

4. *Borehole with broken lister pump*
   - This water point was being installed in the 80s by ?? and has recently broken down. Water was pumped up from a depth of 70 m using a diesel driven lister pump and it was pumped into a reservoir serving standpipes for human consumption. A concrete cattle trough was installed for livestock to drink from.
   - Alternative solution to rehabilitate this water point are:
     - KWS is thinking of putting a windmill on it (but they have no budget),
     - WCT has requested the TU delft students to investigate possibilities of using donkey power

5. *Infiltration dam downstream on Kitenden river, for seasonal and river water*

- The infiltration dam is designed to harvest runoff water to enable the re-hydration of an area of 25 ha so that reforestation can be established.
- The experimental infiltration dam was completed in April 2002. It consists of 4 parallel stone walls (in 3 parts: fine stone, medium stone, boulder rock) of different lengths with different sized silt traps in between. Behind the infiltration system is an open reservoir bounded by a (rehabilitated) earth dam. The intake channel is on Kitenden river.
- The idea is to move the filtration structure to a neighbouring area after rehydration into natural maintenance is completed (through reforestation, as filtration is then carried out by trees, and scrubs + grass for filtration).
- Construction was done by KWS and WCT, using a bulldozer for digging the silt traps, excavating the earth dam and carrying the material for the filters. Local Masai people were contracted to lay the infiltration walls. Cost of the dam is estimated to be 15,000 USD excluding WCT costs.
- So far the dam has captured 4 showers, which fell in April. Livestock and wildlife has been reported to drink from the reservoir. It is to early to fully evaluate the performance of this experiment. Monitoring will be continued. The local Masai people are interested in constructing a new dam as soon as possible.

6. *Meeting at KWS with Michael L. Kipkeu and Simon Musyoki (warden)*
   - Amboseli National Park was created in 1974 inside the Game reserve. It covers an area of 394 km2 whereas the game reserve extends over 3,800 km2. On creation, the local Masai people were promised water supply points outside the park but they were never installed. Therefore, Masai people continue entering the park with their cattle herds, especially in periods of drought.
   - The existing water system so far is a pumped system with a pipeline of 90 km, and it serves some points on the park boundaries. But due to a technical problem at the source, there has been no water at all for the last 2 months. Masai livestock is intensively using the Amboseli park water points. KWS is now organizing emergency water deliveries with water tanks.
   - Apart from the pumping system, there are a few boreholes that have been installed by some donor agencies, but without paying attention to ownership, so most of these points are out of order.
   - The game reserve consists of several group ranches on which land ownership has been shifted from communal to individual titles. There is also a concession area.
   - The group ranches are invited to share the task of supporting the wildlife with KWS. This is done through extending the animal range (creation of conservation areas outside the park like bird and rhino sanctuaries, ...), sharing the benefits with the local communities, protecting the migration corridors and sharing responsibilities in managing the wildlife.
   - In some of the group ranches, there are irrigation schemes. Conflict of interest have to be managed and are even more complicated as Ministry of Agriculture is also involved.
   - A General Management Plan for the region will be established. This will be a UNESCO biosphere action where KWS will be one of the stakeholders. This is surely a long process (10 years??) because it aims satisfying all actors involved.
   - In the meanwhile, there are some initiatives to undertake joint actions with the Tanzanian counterparts. Meetings are organized so that local villages can discuss common issues.
   - KWS is interested in the REAL project because it is action-oriented. So much research has been done so far but KWS is almost never receiving copies of reports. Relevant documents and data concerning water and socio-economic issues are therefore not readily available. For the socio-economic data, an update and special focus on the REAL project area is essential as socio-economic and environmental conditions are changing rapidly.
   - Prof Shishira will investigate the data availability on the Tanzanian side of the catchment (both in terms of socio-economic and land assessment data) and will then propose a strategy to fill in the data gaps. Protos will assist the process of building a community participation plan at distance and throughout 2 field missions, the first will probably take place in Jan -Feb. 2003.
   - KULeuven will make an inventory of the spatial information available (land cover, land use, hydrology) for the Kenyan side.

7. *Amboseli elephant research project (camp site and offices)*
   - Cynthia Moss, an American elephant expert, is working on elephant survey since more than 20 years. They are concentrating on the monitoring and the movements of elephants within and outside the national park. They plan to develop a GIS system to store and analyze spatial information. This is still in the setting up phase. Maybe there is an opportunity for cooperation to share land cover and land use information.

- Some reflections:
  - Can you mobilize community participation to work on dam structures in an area serving national Park interests? Yes, dam constructions are outsed n.p. to the benefit of the humans, livestock and wildlife populations
  - How to reconcile the conflicting interests in the corridor?
  - How to deal with project means and research purposes (and work on a few dams in one catchment) and KWS and Masai people needs. KWS stressed the importance of improving humidity conditions at several catchments (in order to avoid over concentration)

8. *Meeting with Belgian engineers working at PolyGIS, Nairobi Polytechnic*
   - Paul Campling met up with Ziggy Vanlishout (from Belgium) and Hellen Wandabwa (from Kenya), who work at the PolyGIS initiative set up in Nairobi Polytechnic at the Dept of Surveying and Mapping. PolyGIS was started in 1998, and an extension of the project is expected to start in January 2003. PolyGIS is supported financially by VVOB (Technical Assistance from the Flemish Government), and there are presently two Belgians working there for the past 4 years: Ziggy Vanlishout and An Notenbaert. The following website gives a good overview of the PolyGIS project: http://www.ddl.org/figtree/pub/proceedings/nairobi/wandabwa-TS18-3.pdf
   - We discussed the possibility of Nairobi Polytechnic students doing their final year projects within the framework of the REAL project. The students are principally trained in land surveying, which would be very complementary to the more thematic work of TU Delft and KU Leuven students. The periods when Nairobi Polytechnic students can do field work are April and August (ie. during their holidays). The PolyGIS lab is well equipped with computers and GIS paraphernalia (digitizing, plotting, GPS equipment). Ziggy will investigate whether VVOB can support Kenyan students to do some fieldwork. In principle Ziggy and Hellen were very enthusiastic that students could be involved in a real life project (excuse the pun). The details still have to be worked out as well as the financial implications.
   - PolyGIS also runs extra-mural day time or evening short courses in GIS, which could be of interest to SASOL staff.
   - Concerning aerial photographs – Paul was given two sources:
     - Photomap (a private company in Nairobi, carrying out aerial photograph surveys, but also with an archive of aerial photographs). Tel 726027, Fax: 726028 Email photomap@form-net.com
     - Survey of Kenya (Thika Road)

9. *Visit to Survey of Kenya to enquire about aerial photographs*
   - Paul Campling visited Survey of Kenya to enquire about aerial photographs for the two case study areas. He met Mrs Jen (responsible for aerial photograph enquiries) and Mr. Sammy Muyanga (from Air Survey Dept).
   - The procedure for receiving aerial photographs and topographic maps (1:50000) is to write a letter (two copies) to the DOD asking for permission to use aerial photographs, citing the reasons. There is a search cost of 300 Ksh (c. 4 US Dollars) and each photograph costs 500 Ksh (c. 6.5 US Dollars). I asked whether Prof GC Mutiso could write the letter, and this was encouraged. Mr. Sammy Muyanga is from the area and knew very well about ground water dams of SASOL.
   - With Mr. Sammy Muyanga we checked availability of photographs for the two case study areas:
     - Ikanga Topographic Map (164/1 - Kitui case study) – full coverage from 2 surveys
       - 1967? 1:20,000 scale black and white
       - 1980 1:20,000 scale colour.
       - The number of photos points on the topographic map covering the R. Ngonga catchment (source to case study dam) is 8. So probably not more than 20 photos would be needed. The scale is only suitable for the catchment study (regional scale), rather than the dam study (local scale).
     - Rongai Topographic Map (left 42/3 – Amboseli case study) – full coverage from 1 survey (1:20,000). Date is pre-independence and aerial photographs are not held by Survey of Kenya (probably held in Tanzania).

10. *Other contacts by telephone*
    - The following people were contacted by phone or email.
      - Dr Suzy Serneels, Remote Sensing Specialist at ILRI (International Livestock Research Institute). She is on leave in Belgium, and is due to give birth – image availability can be discussed in Belgium.
      - Mr Steve Jackson, UNEP (tel: 623332) was not available but a message was left on his voicemail, that contact would be pursued by email.
      - Amboseli elephant research project Nairobi Office – no answer.

Annex III Documents produced during the workshop

WP2 PERFORMANCE GROUP

	Quality	Water handling for domestic and agricultural use (including livestock)	Improvements on domestic and agricultural water use (gender angle)	Implement and monitor
WHAT	Chemical, biological, physical, user perception	Sanitation and hygiene; Different actions related to different uses, Source management, (task to list), in historic perspective; user perception	Check previous and current water quality, access and control, use pattern, perceived quality, Changes in time, Desk study, Relate to WP3	List what is working List what improvements are required List tasks
WHERE	In 3-5 communities; From water source to household level; Community boundary delineation; Selection criteria + selection Nairobi; Water point of last resort	As A	Idem	
WHO	Students; User groups (gender angle) Water technicians; Sasol staff Nairobi staff?; Reference lab	Students User groups Sasol staff Nairobi staff	Idem	
WHEN	ASAP; Repeated in different seasons, on a continuous basis during the project	See A	Idem + emphasis on year 2	Year 2 and 3

	2002	2003	2004	2005
January		TOR STG Perf2	Recommendations dam design	
February		Protos: community participation, gender		
March		STG Perf 2; Sampling	Sampling	Sampling
April		STG Perf 2		
May		STG Perf 2		
June		STG Perf 2; Sampling Final draft for deliverables D4a, b, d	Sampling	Sampling
July		Dam Amboseli Deliverables D4a, D4b, D4d	Dam construction Kitui and Kilimanjaro Final draft for deliverables D4c, D4d	Final report
August		Workshop for all: Recommendations TOR dam design, TOR STG 3, TOR implementation	Deliverables D4c, D4d Final TOR STG 4	Final workshop
September	Figuring out for sampling STG Perf 1 Draft TOR STG Perf 2	Sampling STG Perf 3	Sampling STG Perf 4	
October	STG Perf 1	STG Perf 3	STG Perf 4	
November	STG Perf 1	STG Perf 3	STG Perf 4	
December	Sampling	Sampling	Sampling	

OPERATIONAL PLAN FOR THE PARTICIPANTS OF WORK PACKAGES 3 AND 4

	What	When	Where	Who	Why
WP3					
KULeuven	Inventory of satellite (spatial and topographical) info in Europe and in Kenya:	Oct-December 2002	Belgium	Paul and colleagues of ICRAF, students of Nairobi	
	Digitizing of topographical map for the case study (contours and major settlements):	Oct-December 2002	Belgium	Belgian students, if possible matched with Nairobi students	
	Locate the aerial photographs of the 1950s and inform about price to get them.	Oct-December 2002	Belgium	Paul and Sasol and WCT	
	Hydrological survey	Feb-may 03	Kitui	student TU Delft	
	GIS activities: -Preparation -Field work	July to September 03: - july 03 - aug-sept 03	Belgium Kitui	Belgian/Kenyan students	Rainfall data analysis, topography, deriving a digital elevation model, location of the dams, contributing area to the dams Fieldwork and topo sequence approach: land uses, crop systems and erosion
	Mission to guide students	July 03	Kenia	Paul	
	Participation in Tanzania meeting	July-aug 03	Tanzania	Paul	
	Data interpretation and report writing	Nov-dec 03	Belgium	Paul	D5a and D5b
	GIS activities: -Preparation -Field work	July to September 04: - july 04 - aug-sept 04	Belgium Amboseli	Belgian/Kenyan students	Rainfall data analysis, topography, deriving a digital elevation model, location of the dams, contributing area to the dams Fieldwork and topo sequence approach: land uses, crop systems and erosion
	Data interpretation and report writing	Nov-Dec 04	Belgium	Paul	D5b and D5d
	Writing final report	July 2005	Belgium	Paul	D5
SASOL	Evaluate base line study		Kitui	Sasol with KUL students	
	Construction Kitui: technical and social engineering	June-Oct 04	Kitui		D5c
WCT	Construction Amboseli dam: technical and social engineering	Jun-Oct 03	Amboseli		
	TU Delft students during construction	June-august 03	Amboseli		Evaluation of design before start building
WP4					
University Dar Es Salaam	Literature Survey focusing on development activities and water related issues in Kilimanjaro area	Oct-dec02	Tanzania		Lessons learned covering development activities and water related issues
	Identification of a specific project site in Kilimanjaro area to be done in collaboration with District officials and on the basis of literature survey.	Jan 2003	Kilimanjaro		A Report of the site selected and criteria used to select it

	Community Participation Plan - Stakeholder identification and analyses - Identification of stakeholders' concerns regarding water related issues a	Jan-Feb. 03	Kilimanjaro	In collaboration with Protos	Community Participation Plan
	Preparation of Study Design in collaboration with all stakeholders (To be done with stakeholders)	Apr-may 02	Kilimanjaro		Comprehensive Study Design for the project in Kilimanjaro
	Integrated Participatory Resource Assessment	June-July 03	Kilimanjaro		D6b
	Use assessment results to adapt the criteria design	Aug 03	Kilimanjaro		Criteria of Designs for Dams
	Preparation of Progress Report as per REAL proposal		Kilimanjaro		Progress Reports
	Participatory water retaining structure designs	Oct03-feb04	Kilimanjaro		Designs for Water Retaining Structures developed through participatory processes
	Construction of one Water Retaining Structure - Mobilization of labor force - Mobilization of materials	June-oct04		Together with WCT	Construction Report D6c
	Preparation of Progress Report as per REAL Proposal				Progress Report
	Monitoring and Evaluation of the performance of Water Retaining Structure	Nov03-aug05			Monitoring and Evaluation Report D6d and D6
Protos	Evaluation of existing community structures and ownership performance on existing dams	Jan-feb02	Kitui Kilimanjaro	Anne Coutteel	D6a
	Training of local partners on ownership and participatory integrated management	July 02	Kitui Kilimanjaro	Anne Coutteel	
	Participation in meeting in Tanzania	July-aug 02	Arusha		
WCT	Construction Kilimanjaro dam: technical and social engineering	June 04	Kilimanjaro		

Annex IV Literature

As a general rule, interesting literature will be sent to DUT (Maurits Ertsen) who has to arrange that copies are made available to all participants.

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Re-hydrating the Earth in Arid Lands (REAL)

Systems research on small groundwater retaining structures under local management in arid and semi-arid areas of East Africa.

EC-Fifth Framework Programme
ICA4-2001-10191

Technical Annex

April 2002

TUDelft

Re-hydrating the Earth in Arid Lands (REAL)

Systems research on small groundwater retaining structures under local management in arid and semi-arid areas of East Africa.

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Technical Annex

April 2002

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Contents

1. Title

Re-hydrating the Earth in Arid Lands. Systems research on small groundwater retaining structures under local management in arid and semi-arid areas of East Africa

Proposal acronym **REAL**
Region **Kenya and Tanzania**

2. Introduction

Soil and water conservation is a high priority in the drier areas of sub-Saharan Africa. Storage of water from the rainy season to the dry season, or even from wet years to dry years, is highly important. Many projects and policies implemented to improve the conditions of land and water in the areas failed because they did not recognise the location specificity of conservation problems and solutions in sub-Saharan Africa and the inapplicability of imported methods without adaptation. Approaches that do try to take into account local conditions (material and immaterial) have come to the front, under the umbrella concept of participatory design, as in Kitui District in Kenya. Groundwater dams have come to assume a central role in the Kitui programme of water development. They can store sufficient quantities of water for livestock and minor irrigation as well as for domestic use. If properly sited and built, dams can be a welcome water source. There are also unfortunately many examples of groundwater dams which have not been successful. A number of aspects have to be dealt with to find out whether a groundwater damming solution is adequate for a certain region:

1) The hydro-geological conditions at the sites have to be known. Proper investigations have to be carried out, but as the dams and the volumes of water usually are relatively small, costs of research should be kept to a minimum. Thus, investigations have to be simple too.
2) Caution is also needed when the construction itself is considered. As costs should be kept low, the choice of materials, building methods etcetera, is limited. At the same time, the dam should have a certain quality, and be durable to withstand water pressures and sediment loads.
3) The importance of local management is recognised nowadays as a prerequisite for long-term use of the facilities. Local management does not start after construction of the dam, but during the design and construction.
4) The quality of water can be poor unless there is an adjacent well from which the filtered water can be drawn, and the burden of transporting the water can be heavy.
5) The performance of existing groundwater dams in different regions provides at least starting points to consider the application of the water technology in new areas.

3. Objectives

The general objective of the research project is

to clarify the relations between local practices and theoretical approaches, by focusing on the design, management and performance of small groundwater retaining structures on a communal level in semi-arid regions in two African countries, Kenya and Tanzania, linking both the individual and the community as theory and practice, resulting in guidelines for participatory design of small water retaining structures in semi-arid regions world-wide.

The main product in which this general objective will be materialised is:

A manual describing how to employ an integrated, participatory design approach applicable in other regions for comparable small water retaining structures will be produced.

Other, supporting scientific and technological objects to reach general objective and main product are specified. At the end of the research project:

1. A systems' perspective on design, management and performance of small water retaining structures in semi-arid areas is developed;

2. The performance of existing small water retaining structures, including aspects concerning hydraulics, hydrology, water use and health, is clarified and a participatory small water retaining structures management approach has been established;
3. Experiences with a participatory design, construction and management approach for small water retaining structures in two pilot areas have been documented;
4. Staff, students and local communities involved have participated in experiential learning exchanges in workshops, field visits, formal education and networks;
5. The results of the project have been disseminated through the manual, 3 yearly reports, 3 scientific papers and the conference proceedings of a final conference.

4. Work plan

A Introduction

The project work plan is based on a number of connected elements. The project focuses on an existing participatory approach for the construction of small water structures, mostly groundwater dams in combination with shallow wells. Both existing as new situations in which the chosen constructions have been designed and/or are in use will be studied. Some through a literature survey, some through field visits, others through participatory design, construction or research. The study into the performance of groundwater dams focuses on the constructed dams formulates recommendations for management and supports the implementation of these recommendations. Integration and testing of results is studied through the construction of a few new dams, in other areas in Kenya and Tanzania. Throughout the whole project, participating members will meet three times at a workshop. A final conference, during which the design manual is presented and discussed, will conclude the project.

Next to documenting existing practice, the project will use an action oriented research approach by organising and studying the implementation processes of new water structures in three other areas, two of which are in Kenya and one in Tanzania. On these three sites new dams will be constructed, based on the Kitui approach, but improved and extended both with the first results of the performance analysis and the specific expertise of the different partners in the project and the work packages. All areas are located in the semi-arid zone, and differ from each other regarding certain aspects. They are:

- Kitui, Kenya. Focus in this region will be the construction of a technically improved dam taking into account specifically the future land use of the population, impact on the water system and influences from other elements in the environment, notably other structures and peri-urban areas;
- Amboseli, Kenya. Focus in this region will be how to take into account the design, construction and management for dams for different target groups (notably farmers, pastoralists and wildlife) and aspects of multiple use of water retaining structures;
- Ngorongoro, Tanzania. Focus in this region will be on the question how to establish a participatory, integrated approach in an area with relatively little experience with water retaining structures and participatory design and construction.

B Work packages

The project is divided into four work packages. Three of them are both geographically and thematically defined, one work package has the specific aim to integrate the contributions from the other packages see annexes for detailed description of the work packages).

Work package	*Central goals*	*Final products*
1 Integration	▪ To monitor project progress ▪ To administer all project activities and finances ▪ To integrate project findings into a design manual	▪ Program evaluation report ▪ Small water structures manual ▪ Final conference proceedings
2 Performance	▪ To evaluate management and use of existing dams ▪ To give recommendations for future design and management of dams	▪ Management and use of existing structures
3 Integrated design in Kenya	▪ To determine the influence of user demands on design issues ▪ To give recommendations for future design and construction of dams	▪ Design report for new structures in Kitui and Amboseli, Kenya
4 Integrated design in Tanzania	▪ To test the approach and recommendations for user participation in integrated design ▪ To give recommendations for future design and construction of dams	▪ Design report for new structures in Ngorongoro, Tanzania

Work Package No.	Work package title	Lead contractor No.	Persons-Months	Start Month	End Month	Deliverable No.
W1	Program integration	1	14.4	0	35	D1, D2, D3
W2	Performance	4	20.2	0	35	D4
W3	Integrated design in Kenya	3	9.2	0	35	D5
W4	Integrated design in Tanzania	5	26.0	0	35	D6
	TOTAL		69.8			

C Deliverables

The main product will be a manual for participatory design of small water retaining structures. The results from the packages will be an important input for the manual during the process of establishing the manual, but it is expected that the work packages themselves will yield much more interesting results which would not directly fit into a manual-like document. Therefore, the project aims at a sub-set of deliverables in the shape of final reports per work package.

Del. No.	Main deliverable title	Sub-del. No.	Sub-deliverable title	Delivery date
D1	**Program evaluation report**			**35**
		D1a	Yearly report I	11
		D1b	Yearly report II	23
		D1c	Yearly report III	35
D2	**Small water structures manual**			**35**
		D2a	Position paper on participatory design of small water structures	0
		D2b	Paper on technical issues in dam design	11
		D2c	Draft manual	23
D3	**Final conference proceedings**			**35**
D4	**Management and use of existing structures**			**35**
		D4a	Report on relationships between dam water use and improvement in hygiene	11
		D4b	Report on water quality and possible relationships with patterns of water sources management and use	11
		D4c	An implemented plan for improvements by the user groups	23
		D4d	Recommendations for design and construction	23
D5	**Design report for new structures in Kitui and Amboseli, Kenya**			**35**
		D5a	Report on relationships between design of dam and land use by target groups	11
		D5b	Report on hydrology and possible relationships with patterns of water sources management and use	11
		D5c	Three dam designs	23
		D5d	Recommendations for design and construction	23
D6	**Design report for new structures in Ngorongoro, Tanzania**			**35**
		D6a	Community participation plan	11
		D6b	Integrated, participatory resource assessment	11
		D6c	Participatory water retaining structure design and construction	23
		D6d	Recommendations for design and construction	35

5. Role of participants

The consortium consists of participants which together share experience and knowledge on:

a) Design issues, including technical, management and participatory aspects;
b) Performance, including hydrological, water use (agricultural and domestic) and health aspects;
c) Education, including training of students, staff and farmers;
d) All are involved in the integration of science and practice, or in other words research and water development.

These four fields constitute the work packages (a,b specific, and c,d overall).

	Participant	*Country*	*Knowledge*	*Position*
1	**Delft University of Technology**	Netherlands	Design issues Education	University
2	**IRC**	Netherlands	Water use performance Health	Research insitute
3	**Catholic University of Leuven**	Belgium	Agriculture and hydrology Education	University
4	**SASOL**	Kenya	Design issues Water development	NGO
5	**University of Dar es Salaam**	Tanzania	Resource management Education	University
6	**Amsterdam University**	Netherlands	Education Sustainability issues	University
7	**Westerveld Conservation Trust**	Kenya/the Netherlands	Design issues	NGO
8	**Protos**	Belgium	Water development projects	NGO
9	**Nairobi University**	Kenya	Water use performance Education	University

6. Training and exchange of scientists

During the workshops, project participants will exchange results and ideas. During the research, scientists will work together in the field, and train each other. PhD- and MSc-students from participating universities are encouraged to take part in the project within their formal education and training program. These students will work together in teams on specific issues, with supervision from participating members.

7. Dissemination activities

Sharing results is the central aim of the project. Within the project sharing information and expertise is the driving force behind the activities. One of the aims of the project is to share the results and findings with many other institutions and organisations world-wide, which are active in the field of water projects and/or which are interested in participatory design approaches. This sharing, or dissemination of the results, to other institutions has four levels:

- *The consortium as a whole.* The manual is explicitly directed at a broad outside audience of organisations working in water development. The final conference, during which the manual is presented, will be an opportunity for many people from outside the consortium to share their own experiences and first reactions on the manual with project participants. The resulting proceedings will find their way all over the world.
- *The individual participants.* For some of the participants, notably the NGO's, results will be used in structuring development-aimed activities. For the universities, the result will be brought into the study program, first in existing courses, but eventually the project could be the catalyst to develop new courses and educational projects for their graduates.
- The *spin-off products*. It is common practice in the scientific world to publish results of research in regular media, like conference proceedings and journals. The consortium partners

will stimulate each other to publish interesting in-between findings in relevant media. The universities within the consortium are most used to this type of publishing, and depend on it considerably, therefore they will trigger this type of dissemination. All partners, however, will be involved.

- The *general audience and interested institutions* will be informed in general about the project and its' progress by a web-site.

Annex I Work Package 1, Program integration

Work package number :	WP1						
Relative start month [1] :	0						
Participant number:	1						
Person-months per participant:	14.4						

1 Month 0 being the start of the project.

Objectives

- To monitor project progress
- To administer all project activities and finances
- To integrate project findings into a design manual
- To inform the world outside the consortium about the project activities

Description of work

The program integration work package has three main responsibilities. A first responsibility is the administration of project activities, monitoring of financial issues and keeping in contact with the EU. A second responsibility will be the contact with the world outside the consortium, through a web-site and other communication channels. Most time, however, will be devoted to the integration of the different activities of the project. The integration works along three lines:

- A string of documents will be produced which step by step integrate the results of other work packages into a design manual. The documents are discussed in workshops, and drafts are sent to participants for comments and additions. The set-up of the workshops is co-ordinated, and workshop reports are produced.
- A line of integration is to inform all participants what is going on in the project, especially in the months between workshops. At the same time, it will be necessary to ask information from participants regularly.
- Furthermore, the different design activities in the field within work packages 3 and 4 will be monitored in the respective areas by a number of short evaluation missions.

Deliverables

D1 Program evaluation report
a) Yearly report 1, including proceedings of workshop 1
b) Yearly report 2, including proceedings of workshop 2
c) Yearly report 3, including final program evaluation
D2 Small water structures manual
a) Position paper on participatory design of small water structures
b) Paper on technical issues in dam design
c) Draft manual
D3 Final conference proceedings

Milestones and expected results
Month 0 Starting workshop (in Kenya)
Month 11 Second workshop (in Tanzania)
Month 23 Third workshop (in Kenya, optional)
Month 35 Final conference (in the Netherlands)

Month 0 Position paper (50 pages) on starting workshop (D2a)
Month 11 Paper on technical issues in dam design (D2b)
Month 11 Yearly interim report 1 (D1a)
Month 23 Draft manual, including literature review (D2c)
Month 23 Yearly interim report 2 (D1b)
Month 35 Final manual D2 (D2)
Month 35 Yearly, final report 3 (D1c) and final evaluation (D1)
Month 35 Conference proceedings (D3)

Annex II Work Package 2, Performance

Work package number :	WP2						
Relative start month [1] :	0						
Participant number:	2	4	6	9			
Person-months per participant:	4.0	2.1	6.2	7.9			

1 Month 0 being the start of the project.

Objectives

- To evaluate management and use of existing dams
- To give recommendations for future design and management of dams

Specific goals

- To assess the (biological) quality of the water at all points between source and cup;
- To investigate the water handling and source management practices for domestic and agricultural water use and relate these to the water quality conditions found through testing;
- To determine any improvements achieved in comparison with previous conditions in domestic and agricultural water use;
- To assist the user groups to plan and implement any further improvements if necessary and monitor the effect on water quality conditions, management and use.

Description of work

This is the most intensive work package of the project, as it requires a large amount of data analysis and –processing (although WP3 shows a higher number of man months but this is caused by the low fee/hour of UDSM). The research approach opted for this is one, whereby international and national consultants and farmer groups (male and female) work together in carrying out the research, using a participatory research design on water use and quality evaluation and management. The project will use a case study approach in 3 to 5 communities that represent the various conditions in the area. Knowledge of the water sources and their management is required to draw conclusions on progress achieved so far and possible areas for further development. The study will consist of testing of the water quality at the various relevant points from source to cup and in a sufficiently large sample to warrant conclusions. The assessment of management and water use patterns will be done through a participatory study using Participatory Rural Appraisal tools, which has the advantage of leading to increased capacity of the water users to monitor their water source. The research will further triangulation technical / scientific research for chemical and biological data with user perceptions of water quality in relation to water management and use patterns. A research project will be designed on water quality evaluation and management within which a gender angle will be integrated as one of the social variables. Existing farmer groups (water users) will be selected to become partners in the participatory research. The following components are foreseen:

- Preliminary planning of the research. Refining the research programme together with the stakeholders. The fieldwork starts by developing the PRA tools with water user groups, to ensure ownership of the results.
- Comparative field data collection of water sources in different social and natural environments. Assessment of local patterns of management and use, including the effect of gender and socio-economic differences on use and management. Parallel academic / technical sample collection for reference material to verify relevance of the results obtained. Water quality measurement at the source and at the point of use.
- Planning of improvements, if needed, and monitoring of impacts on human practices and water quality parameters. A workshops to disseminate the results and to promote acceptance of recommendations in the Kenyan water sector.

Deliverables

D4 Water use and health

a) Report on relationships between dam water use and improvement in hygiene.
b) Report on water quality and possible relationships with patterns of water sources management and use.
c) An implemented plan for improvements by the user groups.
d) Recommendations for design and construction

Milestones and expected results

Month 11 Field work reports (D4a, D4b,)
Month 11 Recommendations (D4d)
Month 23 Draft report D4c and D4d
Month 35 Final report D4

Annex III Work Package 3, Integrated design in Kenya

Work package number :	WP3						
Relative start month [1] :	0						
Participant number:	3	4	7				
Person-months per participant:	2.4	4.6	2.2				

1 Month 0 being the start of the project.

Objectives

- To determine the influence of user demands on design issues
- To give recommendations for future design and construction of dams

Specific goals

- To design and construct a total of three groundwater dams in the Kitui and Amboseli regions
- To define a checklist on land evaluation components of design
- To integrate land evaluation aspects into the design approach and manual
- Defining and implementation of a land evaluation survey for designing water harvesting systems, including land use, soil, topography, and hydrological issues in the areas

Description of work

The existing approach is tested and improved by extending the activities to other parts of Kitui district, with different soils and gradients and in different social structures. Besides these already challenging circumstances, two other typical difficulties will be encountered. In view of the out-migration of a large section of the able-bodied men in search of employment, communal work will be harder to organise. A second problem, in relation to the expansion of towns, is increasing water pollution. This problem is increasingly becoming important, as most riverbeds without pollution problems have already been used. Furthermore, new dams will be constructed in another Kenyan region, the Amboseli region, close to the Kilimanjaro, backdrop to an area where the pastoral Masai and their cattle live together with the wildlife. Although the Masai are in a way caretakers for the wildlife in Amboseli too, the establishment of wildlife reserves did take away rich lowlands and drought refugees. The present day Amboseli National Park was established about forty years ago as a sanctuary for the remaining elephants. The park embraces two large, spring-fed swamps, in a region that receives only 12" (300 mm) of rain a year. For the pastoralists, however, water availability has become a serious problem, especially since the droughts of the 1990's. Given the success of groundwater dams in another national park (Tsavo East), the research project will include this area to study the implications of dam development in such circumstances. In short, this work package will answer the question how the existing approach can be extended and integrated with issues on future land use of target groups, impact on the water system and influences from other elements in the environment, notably other structures and peri-urban areas. The following components are foreseen:

- A short literature survey on land evaluation aspects, together with the preparation of study design and instruments (maps, land and hydrological survey). Refining the research programme together with the stake holders. The fieldwork uses PRA with water user groups, to ensure ownership of the results.
- Comparative field data collection of available water sources. Assessment of local patterns of intended use (respectively farming, pastoralism and wildlife), including effects of gender and socio-economic positions.
- Design and construction of three dams (one in Kitui, two in Amboseli).
- Intensive monitoring of design, construction, management and use process during the project.

Deliverables

D5 Design report for new structures in Kitui and Amboseli, Kenya

a) Report on relationships between design of dam and land use by target groups.
b) Report on hydrology and possible relationships with patterns of water sources management and use.
c) Three dam designs
d) Recommendations for design and construction

Milestones and expected results

Month 11 Reports on land use (D5a) and hydrology (D5b)
Month 11 Criteria and starting points for design
Month 23 Dams constructed (D5c), first draft recommendations (D5d)
Month 35 Final report D5

Annex IV Work Package 4, Integrated design in Tanzania

Work package number :	WP4						
Relative start month [1] :	0						
Participant number:	5	7	8				
Person-months per participant:	19.3	2.2	4.5				

1 Month 0 being the start of the project.

Objectives
- To test the approach and recommendations for user participation in integrated design
- To give recommendations for future design and construction of dams

Specific goals
- To implement a participatory community approach in preparing design and construction activities
- To implement a participatory, integrated resource assessment in the design process
- To design and construct a groundwater dam in the Ngorongoro region

Description of work

In order to test the participatory approach in an environment with relatively less experience with water retaining structures, but with the need to develop them, the activities in this work package centre around the design and construction of a small water retaining structure in the Ngorongoro area. Ngorongoro is a microcosm of East Africa. The land of the Masai, of their cattle, of the fauna, this protected area is located in the Great Rift Valley. The area is managed by the Ngorongoro Conservation Area Authority NCAA) and they try to balance the needs of the wild animals, the local Masai people and their domestic stock and the general natural environment. The research project focuses on the Arusha Region, west of Mount Kilimanjaro, on the plateau above the Great African Rift. It is an area, as the regions in Kenya, in which the demands from several target groups can be distinguished (including urban development related to tourism, wildlife, farming and pastoralists). As water development activities, and participatory approaches in particular, are a new phenomenon in this area, the work package concentrates on one design. Using the known Kitui-approach as a starting point, the ins and outs of the approach will be studied and if necessary adapted to the local conditions. This will provide valuable input for the other activities of the project, notably the manual. The following components are foreseen:

- A short literature study on development activities in the region, especially on water related projects.
- The preparation of study design and instruments (maps, land and hydrological survey). Refining the research programme together with the stakeholders. The fieldwork uses PRA with water user groups, to ensure ownership of the results.
- As the participatory approach is new, a training component of local partners is vital in the work package. Training sessions on ownership and empowerment in relation to participatory integrated water management are planned.
- Comparative field data collection of available water sources. Assessment of local patterns of intended use (farming), including the effect of gender and socio-economic positions.
- Design and construction of one, water retaining structure.
- Intensive monitoring of design, construction, management and use process during the project.

Deliverables

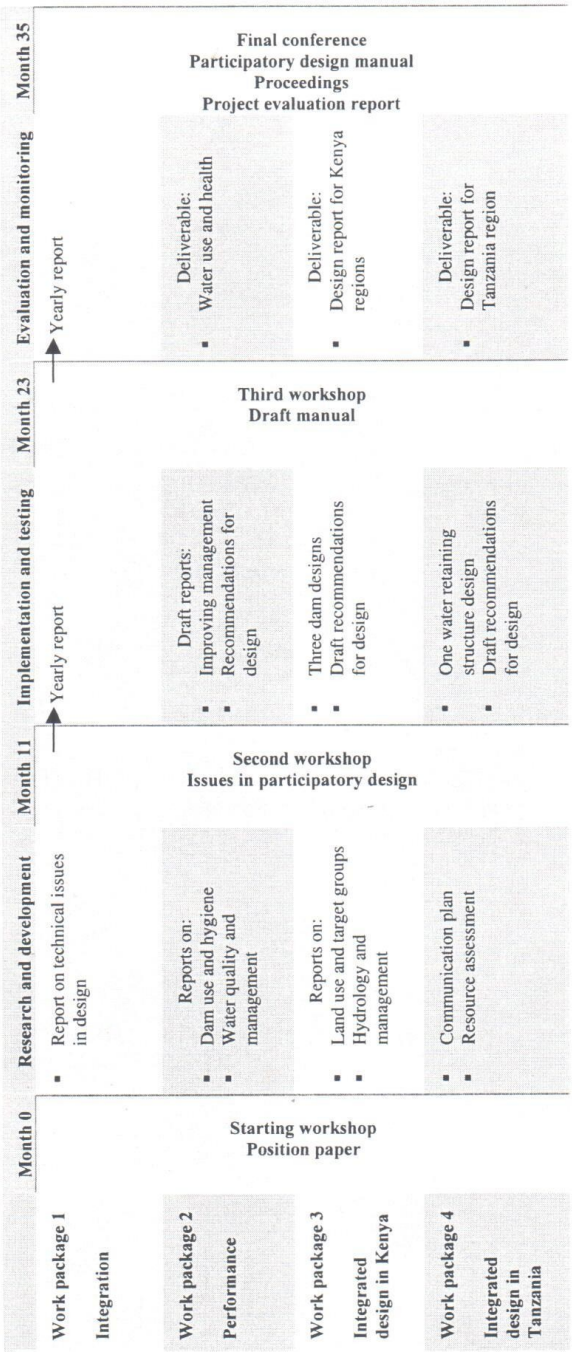
D6 Design report for new structures in Ngorongoro, Tanzania

a) Community participation plan
b) Integrated, participatory resource assessment
c) Participatory water retaining structure design and construction
d) Recommendations for design and construction

Milestones and expected results

Month 11 Reports on community participation (D6a) and resource assessment (D6b)
Month 11 Criteria and starting points for design
Month 23 Water retaining structure constructed (D6c)
Month 35 Recommendations (D6d) and final report D6

Annex V Work packages planning chart



Re-hydrating the Earth in Arid Lands (REAL)

Systems research on small groundwater retaining structures under local management in arid and semi-arid areas of East Africa.

EC-Fifth Framework Programme
ICA4-2001-10191

Contract Preparation Forms

June 2002

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Project Full Name	Systems Research on Small Groundwater Retaining Structures under Local Management in Arid and Semi-arid Areas of East Africa				
Project Acronym (2)	REAL		**Project No (3)**	ICA4-2001-10191	
Call Identifier (4)	ICFP501A4PR03				
Research Programme (5)	INCO-Dev				
Thematic Priorities (5)	INCO-2001-b.ii-2				

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A1.	Project Administrative Overview (1)				
Thematic Priorities (5)	INCO-Dev - INCO-2001-b.ii-2				
Type of Action (6)	RS				
Project Full Name	Systems Research on Small Groundwater Retaining Structures under Local Management in Arid and Semi-arid Areas of East Africa				
Project Coordinator (7)					
Title (Dr, Prof., ...)	Drs			Gender (8) M/F	F
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Country Code (14)	NL	Country Name (14)	Netherlands		
Telephone No (15)	31 15 2782127	Fax No. (15)	31 15 2781179		
E-mail	t.twickler@cicat.tudelft.nl				

Project Abstract (maximum 1000 characters) (16)

The research focuses on the (semi-) arid areas in Kenya and Tanzania. Within a setting of demanding natural circumstances growing pressure on natural resources and difficult economic conditions including rural-urban migration, there is an urgent need to improve the rural and semi-irban local conditions. In Eastern Kenya, in the Kitui and TSavo regions, several sucessf groundwater structures were built in the last six years. The project will investigate the different parameters for success of the Kenyan systems with respect to technological possibilities sustained by social, economic, organisational and managerial factors of the communities and local government. The outcome is tested parallel in the Tanzanian area. Results in both area will lead to the production of a manual for design, operation and maintenance of small water retaining structures with focus i local management and community participation.

Duration in months	36	Total Eligible Costs in euro (17)	521,028	EC Contribution requested in euro (18)	401,000
Keywords (19)	b.ii-2, c.iv, a.iv	ACP			

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A2. Project Summary (20)

Objectives (maximum 1000 characters)

To clarify the relations between local practices and theoretical approaches, by focusing on the design, management and performance of small groundwater retaining strcutures on a communcal level in semi-arid regions in two African countries, Kenya and Tanzania, linking both the individual and the community as theory and practice, resulting in guidelines for participatiry design of small water reatining structures in semi-arid regions around the globe. Specific objectives are: 1) clarification and further implementation of the participatory design. Construction and management appraoch for small water reatining structures in the research area; 2) clarification of the performance of small water retaining structures; 3) development of a system's perspective on design, management and performance; 4) development of a participatory design approach applicable in other regions for comparable structures; 5) education and training of staff, stduents and local communities involved; 6) dissemination.

Description of work (maximum 2000 characters)

The project focuses on an existing participatory appraoch for the construction of small water structures, mostly groundwater dams in combination with shallow wells. A study into the performance of groundwater dams focuses on the constructed dams in Kitui area, formulates recommendations for dam and water management and supports the implementation of these recommendations. Throughout the whole project, participating members will meet three times. A final conference, during which the design manual is presented and discussed, will conclude the project. PhD and MSc students from participating universit are encouraged to take part in the project within their formal education and training programme. Next to documenting existing practice in an extensive performance work packge, the project will use an action oriented research appraoch by organising and studying the implmentation processes of new water structures in 3 other areas (2 in Kenya and 1 in Tanzania). On these three sites new dams will be build based on the Kitui approach, but improved and extended with the first results of the performance analysis and the specific expertise of the different partners in the project and its work packages. All areas are located in the semi-arid zone. The project is divided into 4 work packages:
1) Integration WP, goal: monitoring of progress, project coordination and integration of scientific output.
2) Performance WP, goal: Evaluation of management and use of dams and recommendations
3) Integrated Design in Kenya WP, goal: influence of user demands and recommendations on design in Kenya
4) Integrated design in Tanzania, goal: test approach for user participation and recommendations on design and construction in Tanzania

Milestones and expected results (maximum 500 characters)

Main milestones are the 4 central workshops (kick-start, 2 progress and 1 final conference) and the 3 in between meetings needed for monitoring of progress and tuning and scheduling of tasks. The main deliverable after 3 years is the Manual for Participatory Design on Small Water Retaining Structures. Each Work Package will deliver a final report which is the building stone for the end product.

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A3. Cost Summary in Euro (21) (part 1/2)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Number of person/months (29)	Personnel Costs (29)	Durable Equipment (29)	Subcontracting (29)	Travel and Subsistence (29)	Consumables (29)	Computing (29)	Protection of Knowledge (29)	Subtotal part 1/2 (30)
CO	1	(25)	TUD	7.8	46,433	0	8,000	12,500	0	0	0	66,933
CO	1	(26)	Co-ordination	6.6	39,207	0		7,000	0	0	0	46,207
CO	1	(27)	Total Co-ordinator costs	14.5	85,640	0	8,000	19,500	0	0	0	113,140
CR	2		IRC	4.0	38,751	0	0	11,900	0	0	0	50,651
CR	3		KULRD-SADL	2.4	20,820	0	0	6,088	2,500	0	0	29,408
CR	4		SASOL	6.7	19,956	0	0	15,200	0	0	0	35,156
CR	5		UDSM	19.3	18,757	0	0	16,800	0	0	0	35,557
CR	6	2	UvA	6.2	19,924	0	0	6,640	0	0	0	26,564
CR	7	1	WCT	4.4	25,803	0	0	20,664	0	0	0	46,467
CR	8	3	Protos	4.5	20,658	0	0	7,250	0	0	0	27,908
CR	9	4	UoN- Unesco	7.9	22,509	0	0	7,639	0	0	0	30,148
TOTAL (31)				69.8	272,818	0	8,000	111,681	2,500	0	0	394,999

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A3. Cost Summary in Euro (21) (part 2/2)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Subtotal of part 1/2 (30)	Other Specific Project Costs (29)	Overhead Costs (29)	Total Costs (32)	Costs Basis : FC/FF/AC (29)	% Requested from the Community (29)	Requested Contribution from the Community (29)	Adjusted Contribution from the Community (33)	Advance payment (33)
CO	1	(25)	TUD	66,933	0	37,146	104,079	FF	50.00	52,039	52,039	
CO	1	(26)	Co-ordination	46,207	0	31,366	77,573	FF	50.00	38,786	38,786	
CO	1	(27)	Total Co-ordinator costs	113,140	0	68,512	181,652	FF	50.00	90,825	90,825	
CR	2		IRC	50,651	0	7,751	58,402	FC	50.00	29,201	29,201	
CR	3		KULRD-SADL	29,408	0	5,882	35,290	AC	100.00	35,290	35,290	
CR	4		SASOL	35,156	10,000	4,064	49,220	AC	100.00	49,220	49,220	
CR	5		UDSM	35,557	10,000	2,279	47,836	AC	100.00	47,836	47,836	
CR	6	2	UvA	26,564	0	2,126	28,690	AC	100.00	28,690	28,690	
CR	7	1	WCT	46,467	10,000	0	56,467	AC	100.00	56,467	56,467	
CR	8	3	Protos	27,908	0	3,907	31,815	AC	100.00	31,815	31,815	
CR	9	4	UoN- Unesco	30,148	0	1,508	31,656	AC	100.00	31,656	31,656	
TOTAL (31)				394,999	30,000	96,029	521,028		76.96	401,000	401,000	0

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191	Year No:	1

A4. Yearly Cost Summary in euro (part 1/2) (34)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Number of person/months (29)	Personnel Costs (29)	Durable Equipment (29)	Subcontracting (29)	Travel and Subsistence (29)	Consumables (29)	Computing (29)	Protection of Knowledge (29)	Subtotal part 1/2 (30)
CO	1	(25)	TUD	2.6	15,022	0	2,000	5,000	0	0	0	22,022
CO	1	(26)	Co-ordination	2.2	12,685	0		3,500	0	0	0	16,185
CO	1	(27)	Total Co-ordinator costs	4.8	27,707	0	2,000	8,500	0	0	0	38,207
CR	2		IRC	1.3	12,813	0	0	3,200	0	0	0	16,013
CR	3		KULRD-SADL	0.9	7,500	0	0	3,026	1,000	0	0	11,526
CR	4		SASOL	2.2	6,472	0	0	4,500	0	0	0	10,972
CR	5		UDSM	6.5	6,257	0	0	5,600	0	0	0	11,857
CR	6	2	UvA	2.1	6,400	0	0	2,210	0	0	0	8,610
CR	7	1	WCT	1.5	9,063	0	0	6,875	0	0	0	15,938
CR	8	3	Protos	1.4	6,563	0	0	2,750	0	0	0	9,313
CR	9	4	UoN- Unesco	2.7	8,081	0	0	1,951	0	0	0	10,032
TOTAL (31)				23.4	90,856	0	2,000	38,612	1,000	0	0	132,468

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191	Year No:	1

A4. Yearly Cost Summary in euro (part 2/2) (34)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Subtotal of part 1/2 (30)	Other Specific Project Costs (29)	Overhead Costs (29)	Total Costs (32)	Costs Basis : FC/FF/AC (29)	% Requested from the Community (29)	Requested Contribution from the Community (29)	Adjusted Contribution from the Community (33)
CO	1	(25)	TUD	22,022	0	12,018	34,040	FF	50.00	17,020	17,020
CO	1	(26)	Co-ordination	16,185	0	10,148	26,333	FF	50.00	13,167	13,167
CO	1	(27)	Total Co-ordinator costs	38,207	0	22,166	60,373	FF	50.00	30,187	30,187
CR	2		IRC	16,013	0	2,563	18,576	FC	50.00	9,288	9,288
CR	3		KULRD-SADL	11,526	0	2,305	13,831	AC	100.00	13,831	13,831
CR	4		SASOL	10,972	10,000	1,887	22,859	AC	100.00	22,859	22,859
CR	5		UDSM	11,857	10,000	1,093	22,950	AC	100.00	22,950	22,950
CR	6	2	UvA	8,610	0	689	9,299	AC	100.00	9,299	9,299
CR	7	1	WCT	15,938	6,000	0	21,938	AC	100.00	21,938	21,938
CR	8	3	Protos	9,313	0	1,304	10,617	AC	100.00	10,617	10,617
CR	9	4	UoN- Unesco	10,032	0	502	10,534	AC	100.00	10,534	10,534
TOTAL (31)				132,468	26,000	32,509	190,977		79.3	151,503	151,503

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191	Year No:	2

A4. Yearly Cost Summary in euro (part 1/2) (34)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Number of person/months (29)	Personnel Costs (29)	Durable Equipment (29)	Subcontracting (29)	Travel and Subsistence (29)	Consumables (29)	Computing (29)	Protection of Knowledge (29)	Subtotal part 1/2 (30)
CO	1	(25)	TUD	2.6	15,473	0	2,500	5,000	0	0	0	22,973
CO	1	(26)	Co-ordination	2.2	13,065	0		3,500	0	0	0	16,565
CO	1	(27)	Total Co-ordinator costs	4.8	28,538	0	2,500	8,500	0	0	0	39,538
CR	2		IRC	1.4	13,125	0	0	4,500	0	0	0	17,625
CR	3		KULRD-SADL	1.3	11,400	0	0	2,468	1,000	0	0	14,868
CR	4		SASOL	2.2	6,652	0	0	4,500	0	0	0	11,152
CR	5		UDSM	6.4	6,250	0	0	5,600	0	0	0	11,850
CR	6	2	UvA	2.1	6,656	0	0	2,215	0	0	0	8,871
CR	7	1	WCT	1.6	9,351	0	0	7,712	0	0	0	17,063
CR	8	3	Protos	2.3	10,506	0	0	2,750	0	0	0	13,256
CR	9	4	UoN- Unesco	2.6	7,214	0	0	2,188	0	0	0	9,402
TOTAL (31)				24.7	99,692	0	2,500	40,433	1,000	0	0	143,625

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191	Year No:	2

A4. Yearly Cost Summary in euro (part 2/2) (34)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Subtotal of part 1/2 (30)	Other Specific Project Costs (29)	Overhead Costs (29)	Total Costs (32)	Costs Basis : FC/FF/AC (29)	% Requested from the Community (29)	Requested Contribution from the Community (29)	Adjusted Contribution from the Community (33)
CO	1	(25)	TUD	22,973	0	12,378	35,351	FF	50.00	17,675	17,675
CO	1	(26)	Co-ordination	16,565	0	10,452	27,017	FF	50.00	13,508	13,508
CO	1	(27)	Total Co-ordinator costs	39,538	0	22,830	62,368	FF	50.00	31,183	31,183
CR	2		IRC	17,625	0	2,625	20,250	FC	50.00	10,125	10,125
CR	3		KULRD-SADL	14,868	0	2,974	17,842	AC	100.00	17,842	17,842
CR	4		SASOL	11,152	0	1,004	12,156	AC	100.00	12,156	12,156
CR	5		UDSM	11,850	0	593	12,443	AC	100.00	12,443	12,443
CR	6	2	UvA	8,871	0	710	9,581	AC	100.00	9,581	9,581
CR	7	1	WCT	17,063	4,000	0	21,063	AC	100.00	21,063	21,063
CR	8	3	Protos	13,256	0	1,856	15,112	AC	100.00	15,112	15,112
CR	9	4	UoN- Unesco	9,402	0	470	9,872	AC	100.00	9,872	9,872
			TOTAL (31)	143,625	4,000	33,062	180,687		77.1	139,377	139,377

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191	Year No:	3

A4. Yearly Cost Summary in euro (part 1/2) (34)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Number of person/months (29)	Personnel Costs (29)	Durable Equipment (29)	Subcontracting (29)	Travel and Subsistence (29)	Consumables (29)	Computing (29)	Protection of Knowledge (29)	Subtotal part 1/2 (30)
CO	1	(25)	TUD	2.6	15,938	0	3,500	2,500	0	0	0	21,938
CO	1	(26)	Co-ordination	2.2	13,457	0		0	0	0	0	13,457
CO	1	(27)	Total Co-ordinator costs	4.8	29,395	0	3,500	2,500	0	0	0	35,395
CR	2		IRC	1.3	12,813	0	0	4,200	0	0	0	17,013
CR	3		KULRD-SADL	0.2	1,920	0	0	594	500	0	0	3,014
CR	4		SASOL	2.3	6,832	0	0	6,200	0	0	0	13,032
CR	5		UDSM	6.4	6,250	0	0	5,600	0	0	0	11,850
CR	6	2	UvA	2.1	6,868	0	0	2,215	0	0	0	9,083
CR	7	1	WCT	1.3	7,389	0	0	6,077	0	0	0	13,466
CR	8	3	Protos	0.8	3,589	0	0	1,750	0	0	0	5,339
CR	9	4	UoN- Unesco	2.6	7,214	0	0	3,500	0	0	0	10,714
TOTAL (31)				21.7	82,270	0	3,500	32,636	500	0	0	118,906

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191	Year No:	3

A4. Yearly Cost Summary in euro (part 2/2) (34)

Participant Role (22)	Participant No (23)	Assistant to Contractor No (24)	Participant Short Name (28)	Subtotal of part 1/2 (30)	Other Specific Project Costs (29)	Overhead Costs (29)	Total Costs (32)	Costs Basis : FC/FF/AC (29)	% Requested from the Community (29)	Requested Contribution from the Community (29)	Adjusted Contribution from the Community (33)
CO	1	(25)	TUD	21,938	0	12,750	34,688	FF	50.00	17,344	17,344
CO	1	(26)	Co-ordination	13,457	0	10,766	24,223	FF	50.00	12,111	12,111
CO	1	(27)	Total Co-ordinator costs	35,395	0	23,516	58,911	FF	50.00	29,455	29,455
CR	2		IRC	17,013	0	2,563	19,576	FC	50.00	9,788	9,788
CR	3		KULRD-SADL	3,014	0	603	3,617	AC	100.00	3,617	3,617
CR	4		SASOL	13,032	0	1,173	14,205	AC	100.00	14,205	14,205
CR	5		UDSM	11,850	0	593	12,443	AC	100.00	12,443	12,443
CR	6	2	UvA	9,083	0	727	9,810	AC	100.00	9,810	9,810
CR	7	1	WCT	13,466	0	0	13,466	AC	100.00	13,466	13,466
CR	8	3	Protos	5,339	0	747	6,086	AC	100.00	6,086	6,086
CR	9	4	UoN- Unesco	10,714	0	536	11,250	AC	100.00	11,250	11,250
TOTAL (31)				118,906	0	30,458	149,364		73.7	110,120	110,120

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A5. Coordinator's Banking Information (35)

(This information is only used for EU payment procedure)

Financial Co-ordinator (=holder of the bank account)

Participant Role (22):	CO	Participant No (23):	1	

Financial Co-ordinator's name (=holder of bank account)

Organisation Legal Name	Delft University of Technology

Address

PO Box	5		
Street Name and Number	Julianalaan 134		
Post Code	2628 BL	Cedex	0
Town/City	Delft		
Country Code	NL	Country Name	Netherlands

Banking Information

Name of Bank	ABN AMRO

Address

PO Box (11)			
Street Name and Number	Martinus Nijhofflaan 1		
Post Code	2624 ER	Cedex (13)	
Town/City	Delft		
Country Name	the Netherlands		

SWIFT CODE (36)	ABNANL2A
Sort Code	TU Delft, SBS
Account Number (37)	54.30.86.186

Date	
Financial Co-ordinator's signature (38)	
Stamp (39)	

Please enter information in cells marked:

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	9	Assistant to Contractor No (24):	4
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	University of Nairobi- UNESCO Chair				
Short Name (45)	UoN- Unesco				
Legal Regist'tion No.(46)	CAP210-1972		VAT No. (47)		
Activity Type (48)	HES	Legal Status (49)	GOV	If PRC Specify (50)	
Business Area (51) - NACE	80	User Supplier (52) (U/S)	U	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)	30197				
Street Name and Number	Harry Thuku Road, 4th floor, Gandhi wing				
Post Code (12)			Cedex (13)		
Town/City	Nairobi				
Country Code (14)	KE	Country Name (14)	Kenya		
Organisation details (55)					
Year (56)	2001				
Annual turnover (57)	N/A	Ann. Balance Sheet Total (58)	N/A	Total R&D Expenditure (59)	N/A
Number of employees (60)		S6	Number of R&D personnel (61)		D4
Number of researchers and engineers (62)		E4	Number of female R&D personnel (63)		F2
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	University of Nairobi- UNESCO Chair				
PO Box (11)	30197				
Street Name and Number	Harry Thuku Road, 4th floor, Gandhi Wing				
Post Code (12)			Cedex (13)		
Town/City	Nairobi				
Country Code (14)	KE	Country Name (14)	Kenya		

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)			Gender (8) M/F	
Function (70)				
Family Name				
First Name				
Telephone No (15)		Fax No. (15)		
E-mail				
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)			Gender (8) M/F	
Function (70)				
Family Name				
First Name				
Telephone No (15)		Fax No. (15)		
E-mail				
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Prof.		Gender (8) M/F	F
Function (70)	researcher			
Family Name	Bahemuka			
First Name	Judith Mbula			
Telephone No (15)	254 2 245898	Fax No. (15)	254 2 245898	
E-mail	uonunesco@iconnect.co.ke			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Prof.		Gender (8) M/F	F
Function (70)	researcher			
Family Name	Bahemuka			
First Name	Judith Mbula			
Telephone No (15)	254 2 245898	Fax No. (15)	254 2 245898	
E-mail	uonunesco@iconnect.co.ke			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.
*** Please attach business card if available**

Date (DD/MM/YYYY)	
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
Automatically calculated that can be overwritten
Automatically calculated cells are marked:

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RESEARCH DIRECTORATES GENERAL
SHARED COST RTD CPF FORM

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	9	Assistant to Contractor No (24):	4

Personnel costs and overheads (74)

Categories of staff to work on the project (75):

1:	sr researcher
2:	jr researcher
3:	
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	5
For All partners enter your budgeted annual increase in rates here	

Personnel Costs (76) Year 1 / **Overhead Costs (77) Year 1**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	144	36.12	5,201		0.00
2:	240	12.00	2,880		0.00
3:			0		0.00
4:			0		0.00
Total Personnel costs year 1:			8,081	Total overhead y 1:	0

Personnel Costs Year 2 / **Overhead Costs Year 2**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	120	36.12	4,334		0.00
2:	240	12	2,880		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 2:			7,214	Total overhead y 2:	0

Personnel Costs Year 3

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	120	36.12	4,334		0.00
2:	240	12	2,880		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 3:			7,214	Total overhead y 3:	0
Total Personnel costs:			22,509	**Total Overhead**	0
Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78):					AV
Base year for the rates is: (yyyy)			2001		
Number of productive hours per year (79)			1680	Overhead Percentage	0.0%

Personnel Costs (76) Year 4 / **Overhead Costs (77) Year 4**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		36.12	0		0.00
2:		12	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0

Personnel Costs Year 5 / **Overhead Costs Year 5**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		36.12	0		0.00
2:		12	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)

Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2.8	2.8	2.8	0.0	0.0	8.3

For additional cost participants (80) (Hours)

Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics	80	80	80			240
2: Technicians						0
3: Other (scientific/technic	40	40	40			120
Total hours	120	120	120	0	0	360

Have you used 7.2 Bis 17 Y	N

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	9	Assistant to Contractor No (24):	4

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
3 progress meetings			451	688	2,000			3,139
field trips			1,500	1,500	1,500			4,500
Carry Forward from expansion sheet? Y/N	N	Total	1,951	2,188	3,500	0	0	7,639

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		10,534	9,872	11,250	0	0	31,656
%EU Contribution Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution	OK for AC	10,534	9,872	11,250	0	0	31,656
		OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98):	KES	Conversion Rate to EURO (99):	70.7922

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	502	470	536	0	0	1,508

Please enter information in cells marked:
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	9	Assistant to Contractor No (24):	4

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	1,464
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	1,344
Of which number of female hours (total number of female hours on the contract):	360

Link of subcontractor(s) (64,66)		
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):		N
Nature of link:		

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		N
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
Y	Legal documents establishing organisation (102)	**Annex attached**
N	Annual reports and balance sheets (103)	**No annex attached**
N	Organisation structure (104)	**No annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	8	Assistant to Contractor No (24):	3
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	Projectgroep voor technische ontwikkelingssamenwerking- vzw				
Short Name (45)	Protos				
Legal Regist'tion No.(46)	5914/77		VAT No. (47)		
Activity Type (48)	OTH	Legal Status (49)	PNP	If PRC Specify (50)	
Business Area (51) - NACE	93	User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)					
Street Name and Number	Limburgstraat 62				
Post Code (12)	9000		Cedex (13)		
Town/City	Gent				
Country Code (14)	B	Country Name (14)	Belgium		
Organisation details (55)					
Year (56)	2000				
Annual turnover (57)	T1	Ann. Balance Sheet Total (58)	B1	Total R&D Expenditure (59)	R1
Number of employees (60)		S3	Number of R&D personnel (61)		D2
Number of researchers and engineers (62)		E2	Number of female R&D personnel (63)		F2
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	Projectgroep voor technische ontwikkelingssamenwerking vzw				
PO Box (11)					
Street Name and Number	Limburgstraat 62				
Post Code (12)	9000		Cedex (13)		
Town/City	Gent				
Country Code (14)	B	Country Name (14)	Belgium		

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)			**Gender (8) M/F**	M
Function (70)	President			
Family Name	Moyersoen			
First Name	Boudewijn			
Telephone No (15)	(32 - 9) 225 27 93	**Fax No. (15)**	(32 - 9) 225 66 07	
E-mail	info@protos.be protosbe@xs4all.be			
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)			**Gender (8) M/F**	M
Function (70)	Vice-President			
Family Name	Maes			
First Name	Luc			
Telephone No (15)	(32 - 9) 225 27 93	**Fax No. (15)**	(32 - 9) 225 66 07	
E-mail	info@protos.be protosbe@xs4all.be			
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Ir.		**Gender (8) M/F**	M
Function (70)	Coordinator			
Family Name	Lambrecht			
First Name	Stephan			
Telephone No (15)	(32 - 9) 225 27 93	**Fax No. (15)**	(32 - 9) 225 27 93	
E-mail	info@protos.be protosbe@xs4all.be			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Ir.		**Gender (8) M/F**	M
Function (70)	Coordinator			
Family Name	Lambrecht			
First Name	Stephan			
Telephone No (15)	(32 - 9) 225 27 93	**Fax No. (15)**	(32 - 9) 225 27 93	
E-mail	info@protos.be protosbe@xs4all.be			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.
*** Please attach business card if available**

Date (DD/MM/YYYY)	25/01/2002
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	8	Assistant to Contractor No (24):	3

Personnel costs and overheads (74)

Categories of staff to work on the project (75):

1: Engineer Stephan Lambrecht
2: Engineer Anne Coutteel
3:
4:

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	14
For All partners enter your budgeted annual increase in rates here	2

Personnel Costs (76) Year 1				Overhead Costs (77) Year 1	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	75	37.50	2,813		0.00
2:	120	31.25	3,750		0.00
3:			0		0.00
4:			0		0.00
Total Personnel costs year 1:			6,563	Total overhead y 1:	0

Personnel Costs Year 2				Overhead Costs Year 2	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	28	38.25	1,071		0.00
2:	296	31.875	9,436		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 2:			10,506	Total overhead y 2:	0

Personnel Costs Year 3				Overhead Costs Year 3	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	12	39.015	468		0.00
2:	96	32.5125	3,121		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 3:			4,389	Total overhead y 3:	0
Total Personnel costs:			20,848	**Total Overhead**	0

Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78):	AV
Base year for the rates is: (yyyy)	2001
Number of productive hours per year (79)	1680 Overhead Percentage 0.0%

Personnel Costs (76) Year 4				Overhead Costs (77) Year 4	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		39.7853	0		0.00
2:		33.16275	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0

Personnel Costs Year 5				Overhead Costs Year 5	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		40.591206	0		0.00
2:		33.826005	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)

Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2.3	2.3	0.8	0.0	0.0	5.5

For additional cost participants (80) (Hours)

Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics						0
2: Technicians						0
3: Other (scientific/technic	16	16	16			48
Total hours	16	16	16	0	0	48

Have you used 7.2 Bis 1? Y	N

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	8	Assistant to Contractor No (24):	3

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
Progress meetings			1,500	1,500	500			3,500
Field work Tanzania			1,250	1,250	1,250			3,750
Carry Forward from expansion sheet? Y/N	N	Total	2,750	2,750	1,750	0	0	7,250

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		10,617	15,112	6,086	0	0	31,815
%EU Contribution Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution	OK for AC	10,617	15,112	6,086	0	0	31,815
		OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98)	EUR	Conversion Rate to EURO (99)	1

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	1,304	1,956	747	0	0	3,907

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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	8	Assistant to Contractor No (24):	3

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	675
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	627
Of which number of female hours (total number of female hours on the contract):	512

Link of subcontractor(s) (64,66)	
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):	N
Nature of link:	

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		Y
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
Y	Legal documents establishing organisation (102)	**Annex attached**
Y	Annual reports and balance sheets (103)	**Annex attached**
Y	Organisation structure (104)	**Annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	7	Assistant to Contractor No (24):	1
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	Westerveld Conservation Trust				
Short Name (45)	WCT				
Legal Regist'tion No.(46)	41217177		VAT No. (47)	not applicable	
Activity Type (48)	OTH	Legal Status (49)	PNP	If PRC Specify (50)	
Business Area (51) - NACE	93	User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)					
Street Name and Number	Flevolaan 34				
Post Code (12)	1399 HG		Cedex (13)		
Town/City	Muiderberg				
Country Code (14)	NL	Country Name (14)	Netherlands		
Organisation details (55)					
Year (56)	2000				
Annual turnover (57)	T1	Ann. Balance Sheet Total (58)	B1	Total R&D Expenditure (59)	R1
Number of employees (60)		S1	Number of R&D personnel (61)		D1
Number of researchers and engineers (62)		E1	Number of female R&D personnel (63)		
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	Westerveld Conservation Trust				
PO Box (11)	46100				
Street Name and Number					
Post Code (12)			Cedex (13)		
Town/City	Nairobi				
Country Code (14)	ke	Country Name (14)	Kenya		

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	Master in Law		Gender (8) M/F	F
Function (70)	Boardmember, administrator, secretary			
Family Name	Van Westerop			
First Name	Marianne Gerarda			
Telephone No (15)	31 294 261457	Fax No. (15)	31 294 262080	
E-mail	mg.vanwesterop@ncd.nl			
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)			Gender (8) M/F	M
Function (70)	Chairperson, researcher/designer, projectmanager			
Family Name	Westerveld			
First Name	Peter			
Telephone No (15)	873 762067847	Fax No. (15)	873 762067849	
E-mail	peterwesterveld@cs.com			
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)			Gender (8) M/F	M
Function (70)	Chairperson, researcher/designer, projectmanager			
Family Name	Westerveld			
First Name	Peter			
Telephone No (15)	873 762067847	Fax No. (15)	873 762067849	
E-mail	peterwesterveld@cs.com			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Master in Law		Gender (8) M/F	F
Function (70)	Boardmember, administrator, secretary			
Family Name	Van Westerop			
First Name	Marianne Gerarda			
Telephone No (15)	31 294 261457	Fax No. (15)	31 294 262080	
E-mail	mg.vanwesterop@ncd.nl			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.

*** Please attach business card if available**

Date (DD/MM/YYYY)	01/02/2002
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
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EUROPEAN COMMISSION
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GENERAL
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	7	Assistant to Contractor No (24):	1

Personnel costs and overheads (74)	
Categories of staff to work on the project (75):	
1:	researcher/designer/local projectmanager
2:	project manager NL
3:	
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	0
For All partners enter your budgeted annual increase in rates here	

Personnel Costs (76) Year 1				Overhead Costs (77) Year 1		
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	128	36.00	4,608		0.00	
2:	88	50.63	4,455		0.00	
3:			0		0.00	
4:			0		0.00	
Total Personnel costs year 1:			9,063	Total overhead y 1:	0	
Personnel Costs Year 2				**Overhead Costs Year 2**		
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	136	36	4,896		0.00	
2:	88	50.625	4,455		0.00	
3:		0	0		0.00	
4:		0	0		0.00	
Total Personnel costs year 2:			9,351	Total overhead y 2:	0	
Personnel Costs Year 3						
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	104	36	3,744		0.00	
2:	72	50.625	3,645		0.00	
3:		0	0		0.00	
4:		0	0		0.00	
Total Personnel costs year 3:			7,389	Total overhead y 3:	0	
Total Personnel costs:			25,803	**Total Overhead**	0	
	Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78)				AV	
Base year for the rates is: (yyyy)			2000			
Number of productive hours per year (79)			1680	Overhead Percentage	0.0%	

Personnel Costs (76) Year 4				Overhead Costs (77) Year 4	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		36	0		0.00
2:		50.625	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0
Personnel Costs Year 5				**Overhead Costs Year 5**	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		36	0		0.00
2:		50.625	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)						
Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	4.8	3.6	3.6	0.0	0.0	12.0

For additional cost participants (80) (Hours)						
Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics	100	100	100			300
2: Technicians	100	100	100			300
3: Other (scientific/technic	200	200	200			600
Total hours	400	400	400	0	0	1,200

Have you used 7.2 Bis ? Y	N

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	7	Assistant to Contractor No (24):	1

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
flights and accommodation	2,210	2,332	1,772			6,314
overland transfers per Landcruiser 4x4	4,665	5,380	4,305			14,350
Carry Forward from expansion sheet? Y/N N Total	6,875	7,712	6,077	0	0	20,664

Computing costs (Euro) (91)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N N Total			0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
constructions costs Amboseli	6,000	4,000				10,000
						0
						0
Carry Forward from expansion sheet? Y/N N Total	6,000	4,000	0	0	0	10,000

Protection of knowledge (Euro) (94)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		21,938	21,063	13,466	0	0	56,467
%EU Contribution Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution	OK for AC	21,938	21,063	13,466	0	0	56,467
		OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98)	EUR	Conversion Rate to EURO (99)	1

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	0	0	0	0	0	0

Please enter information in cells marked:
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GENERAL
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	7	Assistant to Contractor No (24):	1

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	1,216
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	1,216
Of which number of female hours (total number of female hours on the contract):	248

Link of subcontractor(s) (64,66)		
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):		N
Nature of link:		

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		Y
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
Y	Legal documents establishing organisation (102)	**Annex attached**
Y	Annual reports and balance sheets (103)	**Annex attached**
Y	Organisation structure (104)	**Annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
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RESEARCH DIRECTORATES GENERAL
SHARED COST RTD CPF FORMS

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	6	Assistant to Contractor No (24):	2
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	Universiteit van Amsterdam				
Short Name (45)	UvA				
Legal Regist'tion No.(46)			VAT No. (47)	NL800943223B01	
Activity Type (48)	HES	Legal Status (49)	GOV	If PRC Specify (50)	
Business Area (51) - NACE	80	User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)					
Street Name and Number	Spui 21				
Post Code (12)	1012 WX		Cedex (13)		
Town/City	Amsterdam				
Country Code (14)	NL	Country Name (14)	Netherlands		
Organisation details (55)					
Year (56)	2001				
Annual turnover (57)	N/A	Ann. Balance Sheet Total (58)	N/A	Total R&D Expenditure (59)	N/A
Number of employees (60)		S7	Number of R&D personnel (61)		D7
Number of researchers and engineers (62)		E6	Number of female R&D personnel (63)		F6
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		

Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	Expertisecentrum Duurzame Ontwikkeling, Universiteit van Amsterdam				
PO Box (11)					
Street Name and Number	Nieuwe Achtergracht 166				
Post Code (12)	1018 WV		Cedex (13)		
Town/City	Amsterdam				
Country Code (14)	NL	Country Name (14)	Netherlands		

EUROPEAN COMMISSION
RESEARCH DIRECTORATES GENERAL
SHARED COST RTD CPF FORMS

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FOR COMMISSION USE ONLY

Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	Prof. Dr.		Gender (8) M/F	M
Function (70)	Vice dean of Faculty of Science			
Family Name	Schram			
First Name	Andre			
Telephone No (15)	31 20 5257826	Fax No. (15)	31 20 6258843	
E-mail	aschram@science.uva.nl			
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)			Gender (8) M/F	
Function (70)				
Family Name				
First Name				
Telephone No (15)		Fax No. (15)		
E-mail				
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Dr		Gender (8) M/F	M
Function (70)	Director Expertisecentrum Duurzame Ontwikkeling			
Family Name	van Zonneveld			
First Name	Hans			
Telephone No (15)	31 20 5256234	Fax No. (15)	31 20 6258843	
E-mail	j.b.f.zonneveld@science.uva.nl			
Authorised contact person (73)				
Title (Dr, Prof., ...)	M.A.		Gender (8) M/F	F
Function (70)	Project co-ordinator			
Family Name	Wemmenhove			
First Name	Roos			
Telephone No (15)	31 20 5256268	Fax No. (15)	31 20 6258843	
E-mail	wemmenhove@science.uva.nl			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.
*** Please attach business card if available**

Date (DD/MM/YYYY)	07/02/2002
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	6	Assistant to Contractor No (24):	2

Personnel costs and overheads (74)

Categories of staff to work on the project (75):

1:	scientist
2:	
3:	
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	8
For All partners enter your budgeted annual increase in rates here	4

Personnel Costs (76) Year 1 / **Overhead Costs (77) Year 1**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	256	25.00	6,400		0.00
2:			0		0.00
3:			0		0.00
4:			0		0.00
Total Personnel costs year 1:			6,400	Total overhead y 1:	0

Personnel Costs Year 2 / **Overhead Costs Year 2**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	256	26	6,656		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 2:			6,656	Total overhead y 2:	0

Personnel Costs Year 3 / **Overhead Costs Year 3**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	254	27.04	6,868		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 3:			6,868	Total overhead y 3:	0
Total Personnel costs:			19,924	**Total Overhead**	0

Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78):

Base year for the rates is: (yyyy)	2001		
Number of productive hours per year (79)	1480	Overhead Percentage	0.0%

Personnel Costs (76) Year 4 / **Overhead Costs (77) Year 4**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		28.1216	0		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0

Personnel Costs Year 5 / **Overhead Costs Year 5**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		29.248484	0		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)

Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2.3	2.1	2.1	0.0	0.0	6.2

For additional cost participants (80) (Hours)

Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics	40	40	40			120
2: Technicians						0
3: Other (scientific/technical)						0
Total hours	40	40	40	0	0	120

Have you used 7.2 Bis 1? Y	N

Please enter information in cells marked:
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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	6	Assistant to Contractor No (24):	2

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
progress meetings	1,500	1,500	1,500			4,500
field trips	710	715	715			2,140
Carry Forward from expansion sheet? Y/N N Total	2,210	2,215	2,215	0	0	6,640

Computing costs (Euro) (91)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
						0
						0
Carry Forward from expansion sheet? Y/N N Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		9,299	9,581	9,810	0	0	28,690
%EU Contribution Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution	OK for AC	9,299	9,581	9,810	0	0	28,690
		OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98):	EUR	Conversion Rate to EURO (99):	1

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	689	710	727	0	0	2,126

Please enter information in cells marked:
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	6	Assistant to Contractor No (24):	2

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	886
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	886
Of which number of female hours (total number of female hours on the contract):	766

Link of subcontractor(s) (64,66)	
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):	N
Nature of link:	

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		Y
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
N	Legal documents establishing organisation (102)	**No annex attached**
N	Annual reports and balance sheets (103)	**No annex attached**
N	Organisation structure (104)	**No annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
Automatically calculated cells are marked:
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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	5	Assistant to Contractor No (24):	
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	University of Dar es Salaam				
Short Name (45)	UDSM				
Legal Regist'tion No.(46)	Act. 12 of 1970		VAT No. (47)	No VAT nr Often excempted to pay	
Activity Type (48)	HES	Legal Status (49)	GOV	If PRC Specify (50)	
Business Area (51) - NACE	80	User Supplier (52) (U/S)	U	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)	35091				
Street Name and Number					
Post Code (12)			Cedex (13)		
Town/City	Dar es Salaam				
Country Code (14)	TZ	Country Name (14)	Tanzania		
Organisation details (55)					
Year (56)	2001				
Annual turnover (57)	N/A	Ann. Balance Sheet Total (58)	N/A	Total R&D Expenditure (59)	N/A
Number of employees (60)		S7	Number of R&D personnel (61)		D6
Number of researchers and engineers (62)		E6	Number of female R&D personnel (63)		F3
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		

Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	Institute of Resource Assessment, University of Dar es Salaam				
PO Box (11)	35091				
Street Name and Number	n/a				
Post Code (12)	n/a		Cedex (13)		
Town/City	Dar es Salaam				
Country Code (14)	TZ	Country Name (14)	Tanzania		

EUROPEAN COMMISSION
RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	Professor		Gender (8) M/F	M
Function (70)	Vice Chancellor			
Family Name	Luhanga			
First Name	M.L.			
Telephone No (15)	255 22 2410700	Fax No. (15)	255 22 2410023	
E-mail	vc@admin.udsm.ac.tz			
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)	Professor		Gender (8) M/F	M
Function (70)	Director			
Family Name	Mwalyosi			
First Name	Raphael			
Telephone No (15)	255 22 2410144	Fax No. (15)	255 22 2410393	
E-mail	ira@udsm.ac.tz			
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Dr.		Gender (8) M/F	M
Function (70)	Associate Director			
Family Name	Sosovele			
First Name	Hussein			
Telephone No (15)	255 22 2410144	Fax No. (15)	255 22 2410393	
E-mail	sosovele@udsm.ac.tz			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Dr.		Gender (8) M/F	M
Function (70)	Associate Director			
Family Name	Sosovele			
First Name	Hussein			
Telephone No (15)	255 22 2410144	Fax No. (15)	255 22 2410393	
E-mail	sosovele@udsm.ac.tz			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.

*** Please attach business card if available**

Date (DD/MM/YYYY)	
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
Automatically calculated that can be overwritten
Automatically calculated cells are marked:

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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	5	Assistant to Contractor No (24):	0

Personnel costs and overheads (74)	
Categories of staff to work on the project (75):	
1:	Sr researcher
2:	Sr researcher
3:	Sr researcher
4:	Sr researcher

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	5
For All partners enter your budgeted annual increase in rates here	

Personnel Costs (76) Year 1				Overhead Costs (77) Year 1	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	235	6.92	1,626		0.00
2:	227	6.93	1,573		0.00
3:	224	6.93	1,552		0.00
4:	217	6.94	1,506		0.00
Total Personnel costs year 1:			6,257	Total overhead y 1:	0

Personnel Costs Year 2				Overhead Costs Year 2	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	234	6.92	1,619		0.00
2:	227	6.93	1,573		0.00
3:	224	6.93	1,552		0.00
4:	217	6.94	1,506		0.00
Total Personnel costs year 2:			6,250	Total overhead y 2:	0

Personnel Costs Year 3					
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	234	6.92	1,619		0.00
2:	227	6.93	1,573		0.00
3:	224	6.93	1,552		0.00
4:	217	6.94	1,506		0.00
Total Personnel costs year 3:			6,250	Total overhead y 3:	0
Total Personnel costs:			18,757	Total Overhead	0

	Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78):		AV
Base year for the rates is: (yyyy)	2002		
Number of productive hours per year (79)	1680	Overhead Percentage	0.0%

Personnel Costs (76) Year 4				Overhead Costs (77) Year 4	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		6.92	0		0.00
2:		6.93	0		0.00
3:		6.93	0		0.00
4:		6.94	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0

Personnel Costs Year 5				Overhead Costs Year 5	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		6.92	0		0.00
2:		6.93	0		0.00
3:		6.93	0		0.00
4:		6.94	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)						
Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	3.3	3.4	6.4	0.0	0.0	13.1

For additional cost participants (80) (Hours)						
Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics	700	700	650			2050
2: Technicians	200	200	250			650
3: Other (scientific/technical)						0
Total hours	900	900	900	0	0	2,700

Have you used 7.2 Bis 1? Y	N

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	5	Assistant to Contractor No (24):	0

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
meeting Kenya, Tanzania, Delft and local			3,500	3,500	3,500			10,500
DSA			2,100	2,100	2,100			6,300
Carry Forward from expansion sheet? Y/N	N	Total	5,600	5,600	5,600	0	0	16,800

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
contsruction costs of dams			10,000					10,000
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	10,000	0	0	0	0	10,000

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		22,950	12,443	12,443	0	0	47,836
%EU Contribution Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution	OK for AC	22,950	12,443	12,443	0	0	47,836
		OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98):	TSH	Conversion Rate to EURO (99):	795.3544

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	1,093	593	593	0	0	2,279

Please enter information in cells marked:
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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	5	Assistant to Contractor No (24):	0

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	5,407
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	5,406
Of which number of female hours (total number of female hours on the contract):	650

Link of subcontractor(s) (64,66)		
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):		N
Nature of link:		

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		N
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
N	Legal documents establishing organisation (102)	**No annex attached**
N	Annual reports and balance sheets (103)	**No annex attached**
N	Organisation structure (104)	**No annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	4	Assistant to Contractor No (24):	
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	Sahelian Soluctions Foundation				
Short Name (45)	SASOL				
Legal Regist'tion No.(46)	C.50265		VAT No. (47)		
Activity Type (48)	REC	Legal Status (49)	PNP	If PRC Specify (50)	
Business Area (51) - NACE	73	User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)	14333				
Street Name and Number	Isukuuni Place 1				
Post Code (12)			Cedex (13)		
Town/City	Nairobi				
Country Code (14)	KE	Country Name (14)	Kenya		
Organisation details (55)					
Year (56)	2001				
Annual turnover (57)	T1	Ann. Balance Sheet Total (58)	B1	Total R&D Expenditure (59)	R1
Number of employees (60)		S3	Number of R&D personnel (61)		D2
Number of researchers and engineers (62)		E2	Number of female R&D personnel (63)		F1
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	Sasol				
PO Box (11)	14333				
Street Name and Number	Isukuuni Place 1				
Post Code (12)			Cedex (13)		
Town/City	Nairobi				
Country Code (14)	KE	Country Name (14)	Kenya		

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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	prof.		Gender (8) M/F	M
Function (70)	Chairman of the Board of SASOL			
Family Name	Mutiso			
First Name	Gideon-Cyrus Makan			
Telephone No (15)	254 2 860772	Fax No. (15)	254 2 860771	
E-mail	muticon@wananchi.com			
~~Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign~~				
Title (Dr, Prof., ...)			Gender (8) M/F	
Function (70)				
Family Name				
First Name				
Telephone No (15)		Fax No. (15)		
E-mail				
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	prof.		Gender (8) M/F	M
Function (70)	Chairman of the Board of SASOL			
Family Name	Mutiso			
First Name	Gideon-Cyrus Makan			
Telephone No (15)	254 2 860772	Fax No. (15)	254 2 860771	
E-mail	muticon@wananchi.com			
Authorised contact person (73)				
Title (Dr, Prof., ...)	prof.		Gender (8) M/F	M
Function (70)	Chairman of the Board of SASOL			
Family Name	Mutiso			
First Name	Gideon-Cyrus Makan			
Telephone No (15)	254 2 860772	Fax No. (15)	254 2 860771	
E-mail	muticon@wananchi.com			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.
*** Please attach business card if available**

Date (DD/MM/YYYY)	
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	4	Assistant to Contractor No (24):	0

Personnel costs and overheads (74)	
Categories of staff to work on the project (75):	
1:	senior researcher
2:	junior researcher
3:	project manager
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	9
For All partners enter your budgeted annual increase in rates here	0

Personnel Costs (76) Year 1				Overhead Costs (77) Year 1		
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	50	36.00	1,800		0.00	
2:	176	12.00	2,112		0.00	
3:	80	32.00	2,560		0.00	
4:			0		0.00	
Total Personnel costs year 1:			6,472	Total overhead y 1:	0	
Personnel Costs Year 2				**Overhead Costs Year 2**		
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	55	36	1,980		0.00	
2:	176	12	2,112		0.00	
3:	80	32	2,560		0.00	
4:		0	0		0.00	
Total Personnel costs year 2:			6,652	Total overhead y 2:	0	
Personnel Costs Year 3						
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	60	36	2,160		0.00	
2:	176	12	2,112		0.00	
3:	80	32	2,560		0.00	
4:		0	0		0.00	
Total Personnel costs year 3:			6,832	Total overhead y 3:	0	
Total Personnel costs:			19,956	**Total Overhead**	0	
	Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78)				AV	
Base year for the rates is: (yyyy)			2001			
Number of productive hours per year (79)			1680	Overhead Percentage	0.0%	

Personnel Costs (76) Year 4				Overhead Costs (77) Year 4	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		36	0		0.00
2:		12	0		0.00
3:		32	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0
Personnel Costs Year 5				**Overhead Costs Year 5**	
Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		36	0		0.00
2:		12	0		0.00
3:		32	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)						
Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2.2	2.2	2.3	0.0	0.0	6.7

For additional cost participants (80) (Hours)						
Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics	60	60	60			180
2: Technicians	100	100	100			300
3: Other (scientific/technic	150	150	150			450
Total hours	310	310	310	0	0	930

Have you used 7.2 Bis 1? Y	N

Please enter information in cells marked:
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RESEARCH DIRECTORATES GENERAL
SHARED COST RTD CPF FORMS

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	4	Assistant to Contractor No (24):	0

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
3 progress meetings			500	500	2,200			3,200
field trips			4,000	4,000	4,000			12,000
Carry Forward from expansion sheet? Y/N	N	Total	4,500	4,500	6,200	0	0	15,200

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
construction of dams			10,000					10,000
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	10,000	0	0	0	0	10,000

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

			Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)			22,859	12,156	14,205	0	0	49,220
%EU Contribution	Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution		OK for AC	22,859	12,156	14,205	0	0	49,220
			OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98):	Ksh	Conversion Rate to EURO (99):	70.7922

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	1,887	1,004	1,173	0	0	4,064

Please enter information in cells marked:
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EUROPEAN COMMISSION
RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	4	Assistant to Contractor No (24):	0

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	1,863
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	1,863
Of which number of female hours (total number of female hours on the contract):	0

Link of subcontractor(s) (64,66)	
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):	N
Nature of link:	

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		N
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
Y	Legal documents establishing organisation (102)	**Annex attached**
Y	Annual reports and balance sheets (103)	**Annex attached**
Y	Organisation structure (104)	**Annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
Automatically calculated cells are marked:
Automatically calculated that can be overwritten

EUROPEAN COMMISSION
RESEARCH DIRECTORATES GENERAL
SHARED COST RTD CPF FORMS

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	3	Assistant to Contractor No (24):	
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	KATHOLIEKE UNIVERSITEIT LEUVEN Research & Development SADL				
Short Name (45)	KULRD-SADL				
Legal Regist'tion No.(46)			VAT No. (47)	BE419.052.173	
Activity Type (48)	HES	Legal Status (49)	PNP	If PRC Specify (50)	
Business Area (51) - NACE	80	User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	AC
Legal Address of the organisation (54)					
PO Box (11)					
Street Name and Number	Groot Begijnhof, Benedenstraat 58				
Post Code (12)	3000		Cedex (13)		
Town/City	LEUVEN				
Country Code (14)	B	Country Name (14)	Belgium		
Organisation details (55)					
Year (56)	2001				
Annual turnover (57)	N/A	Ann. Balance Sheet Total (58)	N/A	Total R&D Expenditure (59)	N/A
Number of employees (60)		S7	Number of R&D personnel (61)		D7
Number of researchers and engineers (62)		E7	Number of female R&D personnel (63)		F6
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	R&D Division SADL				
PO Box (11)					
Street Name and Number	Vital Decosterstraat 102				
Post Code (12)	3000		Cedex (13)		
Town/City	LEUVEN				
Country Code (14)	B	Country Name (14)	Belgium		

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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	Prof. Dr. ir.		Gender (8) M/F	M
Function (70)	Managing Director			
Family Name	Debackere			
First Name	Koenraad			
Telephone No (15)	(32-16) 32 65 08	Fax No. (15)	(32-16) 32 65 15	
E-mail	Miet.Lenaers@LRD.kuleuven.ac.be			
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)	Mr		Gender (8) M/F	M
Function (70)	Director			
Family Name	Van Dun			
First Name	Paul			
Telephone No (15)	(32-16) 32 65 08	Fax No. (15)	(32-16) 32 65 15	
E-mail	Miet.Lenaers@LRD.kuleuven.ac.be			
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Prof.		Gender (8) M/F	M
Function (70)	Head of Division			
Family Name	Van Orshoven			
First Name	Jos			
Telephone No (15)	(32-16) 32 97 47	Fax No. (15)	(32-16) 32 97 60	
E-mail	jos.vanorshoven@sadl.kuleuven.ac.be			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Mr.		Gender (8) M/F	M
Function (70)	Director			
Family Name	Van Dun			
First Name	Paul			
Telephone No (15)	32-16) 32 65 08	Fax No. (15)	(32-16) 32 65 15	
E-mail	Miet.Lenaers@LRD.kuleuven.ac.be			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.
*** Please attach business card if available**

Date (DD/MM/YYYY)	01/02/2002
Signature of authorised person	

If the Commission Number is not availabler(43)
please enter information in cells marked:
Please enter information in cells marked:
Automatically calculated that can be overwritten
Automatically calculated cells are marked:

Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

EUROPEAN COMMISSION
RESEARCH DIRECTORATES GENERAL
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Shared Cost RTD CPF Form – Form A7.2 1/2

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A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	3	Assistant to Contractor No (24):	0

Personnel costs and overheads (74)

Categories of staff to work on the project (75):

1:	Senior Researcher
2:	
3:	
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	20
For All partners enter your budgeted annual increase in rates here	

Personnel Costs (76) Year 1 / **Overhead Costs (77) Year 1**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	125	60.00	7,500		0.00
2:			0		0.00
3:			0		0.00
4:			0		0.00
Total Personnel costs year 1:			7,500	Total overhead y 1:	0

Personnel Costs Year 2 / **Overhead Costs Year 2**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	190	60	11,400		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 2:			11,400	Total overhead y 2:	0

Personnel Costs Year 3

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	32	60	1,920		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 3:			1,920	Total overhead y 3:	0
Total Personnel costs:			20,820	**Total Overhead**	0
Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78):					AC
Base year for the rates is: (yyyy)			2001		
Number of productive hours per year (79)			1750	Overhead Percentage	0.0%

Personnel Costs (76) Year 4 / **Overhead Costs (77) Year 4**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		60	0		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0

Personnel Costs Year 5 / **Overhead Costs Year 5**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		60	0		0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)

Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	0.9	1.3	0.2	0.0	0.0	2.4

For additional cost participants (80) (Hours)

Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics	12	12	12			36
2: Technicians						0
3: Other (scientific/technical)						0
Total hours	12	12	12	0	0	36

Have you used 7.2 Bis 1? Y	N

Please enter information in cells marked:
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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	3	Assistant to Contractor No (24):	0

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
computer software and maintenance			1,000	1,000	500			2,500
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	1,000	1,000	500	0	0	2,500

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
3 meetings and 2 field trips			3,026	2,468	594			6,088
								0
Carry Forward from expansion sheet? Y/N	N	Total	3,026	2,468	594	0	0	6,088

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		13,831	17,842	3,617	0	0	35,290
%EU Contribution Annual %age	100	100	100	100	100	100	100.0000
Total EC Contribution	OK for AC	13,831	17,842	3,617	0	0	35,290
		OK for AC	OK for AC	OK for AC	OK for AC	OK for AC	

Conversion rate used

Currency (98)	EUR	Conversion Rate to EURO (99)	1

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2,305	2,974	603	0	0	5,882

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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	3	Assistant to Contractor No (24):	0

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	383
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	383
Of which number of female hours (total number of female hours on the contract):	290

Link of subcontractor(s) (64,66)	
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):	N
Nature of link:	

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	y	
	If YES, Specify the most recent Commission Contract No.		
	GRD1-1999-10227		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		N
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N			
N	Legal documents establishing organisation (102)	**No annex attached**	
N	Annual reports and balance sheets (103)	**No annex attached**	
N	Organisation structure (104)	**No annex attached**	
If not attached, please specify most recent Research Programme contract number where supplied			GRD1-1999-10227

Please enter information in cells marked:
Automatically calculated cells are marked:
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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CR	Participant No (23):	2	Assistant to Contractor No (24):	
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	IRC International Water and Sanitation Centre				
Short Name (45)	IRC				
Legal Regist'tion No.(46)	chamb. Commerce 4115952		VAT No. (47)	NL 800441734801	
Activity Type (48)	REC	Legal Status (49)	PNP	If PRC Specify (50)	
Business Area (51) - NACE	73	User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	FC
Legal Address of the organisation (54)					
PO Box (11)	2869				
Street Name and Number	Westvest 7				
Post Code (12)	2601 CW		Cedex (13)		
Town/City	Delft				
Country Code (14)	NL	Country Name (14)	Netherlands		
Organisation details (55)					
Year (56)	2001				
Annual turnover (57)	T1	Ann. Balance Sheet Total (58)	B1	Total R&D Expenditure (59)	R1
Number of employees (60)		S3	Number of R&D personnel (61)		D3
Number of researchers and engineers (62)		E3	Number of female R&D personnel (63)		F2
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*		*Character of affiliation*	
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	International Water and Sanitation Centre				
PO Box (11)	2869				
Street Name and Number	2601 CW				
Post Code (12)			Cedex (13)		
Town/City	Delft				
Country Code (14)	NL	Country Name (14)	Netherlands		

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RESEARCH DIRECTORATES GENERAL
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	Mr.		Gender (8) M/F	M
Function (70)	Director			
Family Name	Visscher			
First Name	Jan-Teun			
Telephone No (15)	31 15 2192939	Fax No. (15)	31 15 2190955	
E-mail				
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)			Gender (8) M/F	
Function (70)				
Family Name				
First Name				
Telephone No (15)		Fax No. (15)		
E-mail				
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Mr		Gender (8) M/F	M
Function (70)	Head ITA			
Family Name	Toot			
First Name	Matthijs			
Telephone No (15)	31 15 2192941	Fax No. (15)	31 15 2190955	
E-mail	toot@irc.nl			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Mr		Gender (8) M/F	M
Function (70)	Head ITA			
Family Name	Toot			
First Name	Matthijs			
Telephone No (15)	31 15 2192941	Fax No. (15)	31 15 2190955	
E-mail	toot@irc.nl			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.

*** Please attach business card if available**

Date (DD/MM/YYYY)	
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CR	Participant No (23):	2	Assistant to Contractor No (24):	0

Personnel costs and overheads (74)

Categories of staff to work on the project (75):

1:	researcher
2:	
3:	
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	
For All partners enter your budgeted annual increase in rates here	

Personnel Costs (76) Year 1 / **Overhead Costs (77) Year 1**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	205	62.50	12,813	12.5	2,562.50
2:			0		0.00
3:			0		0.00
4:			0		0.00
Total Personnel costs year 1:			12,813	Total overhead y 1:	2,563

Personnel Costs Year 2 / **Overhead Costs Year 2**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	210	62.5	13,125	12.5	2,625.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 2:			13,125	Total overhead y 2:	2,625

Personnel Costs Year 3

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:	205	62.5	12,813	12.5	2,562.50
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 3:			12,813	Total overhead y 3:	2,563
Total Personnel costs:			38,751	**Total Overhead**	7,751

Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78):			AV
Base year for the rates is: (yyyy)	2001		
Number of productive hours per year (79)	1880	Overhead Percentage	20.0%

Personnel Costs (76) Year 4 / **Overhead Costs (77) Year 4**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		62.5	0	12.5	0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 4:			0	Total overhead y 4:	0

Personnel Costs Year 5 / **Overhead Costs Year 5**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		62.5	0	12.5	0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total Personnel costs year 5:			0	Total overhead y 5:	0

For all Participants with Subcontractors (Person months)

Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1: 1.3	Year 2: 1.3	Year 3: 1.3	Year 4: 0.0	Year 5: 0.0	Total: 4.0

For additional cost participants (80) (Hours)

Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics						0
2: Technicians						0
3: Other (scientific/technic	40	40	40			120
Total hours	40	40	40	0	0	120

Have you used 7.2 Bis 17 Y	N

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CR	Participant No (23):	2	Assistant to Contractor No (24):	0

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
progress meetings and field trips			3,200	4,500	4,200			11,900
								0
Carry Forward from expansion sheet? Y/N	N	Total	3,200	4,500	4,200	0	0	11,900

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		18,576	20,250	19,576	0	0	58,402
%EU Contribution Annual %age	50	50	50	50	50	50	50.0000
Total EC Contribution		9,288	10,125	9,788	0	0	29,201

Conversion rate used

Currency (98):	EUR	Conversion Rate to EURO (99):	1

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total

Please enter information in cells marked:
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EUROPEAN COMMISSION
RESEARCH DIRECTORATES
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SHARED COST
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CR	Participant No (23):	2	Assistant to Contractor No (24):	0

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	740
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	620
Of which number of female hours (total number of female hours on the contract):	300

Link of subcontractor(s) (64,66)	
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):	N
Nature of link:	

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	N	
	If YES, Specify the most recent Commission Contract No.		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		N
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
N	Legal documents establishing organisation (102)	**No annex attached**
N	Annual reports and balance sheets (103)	**No annex attached**
N	Organisation structure (104)	**No annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		

Please enter information in cells marked:
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191	

A6.1 Co-ordinator's direct co-ordination costs Personnel costs/overheads (part 1/2) (40)

Co-ordinator's Personnel co-ordination costs (41)

Categories of staff to work on the co-ordination:

1:	sr project coordinator
2:	
3:	
4:	

Personnel co-ordination Costs Year 1 / Overhead Costs Year 1

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	270	46.98	12,685	37.58	10,148.00	?Clear eith
2:			0		0.00	
3:			0		0.00	
4:			0		0.00	
Total co-ordination Personnel costs year 1:			12,685	Total overhead y 1:	10,148	

Personnel co-ordination Costs Year 2 / Overhead Costs Year 2

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	270	48.3894	13,065	38.7074	10,452.00	?Clear eith
2:		0	0		0.00	
3:		0	0		0.00	
4:		0	0		0.00	
Total co-ordination Personnel costs year 2:			13,065	Total overhead y 2:	10,452	

Personnel co-ordination Costs Year 3 / Overhead Costs Year 3

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	270	49.841082	13,457	39.868622	10,765.68	?Clear either fixed overheads or overhead rate column
2:		0	0		0.00	
3:		0	0		0.00	
4:		0	0		0.00	
Total co-ordination Personnel costs year 3:			13,457	Total overhead y 3:	10,766	
Total Co-ordination Personnel costs:			39,207	**Total Overhead**	31,366	

		Average increases per year in percent:	3
Number of productive hours per year (79):	1469	**For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here**	80

Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2.2	2.2	2.2	0.0	0.0	6.6

Overheads for additional cost partners	Year 1	Year 2	Year 3	Year 4	Year 5	Total

Have you used 6.1 Bis ? Y/N	N

Please enter information in cells marked:
Automatically calculated cells are marked:
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Personnel co-ordination Costs Year 4 / Overhead Costs Year 4

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		51.33631446	0	41.06468066	0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total co-ordination Personnel costs year 4:			0	Total overhead y 4:	0

Personnel co-ordination Costs Year 5 / Overhead Costs Year 5

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)
1:		52.87640389	0	42.29662108	0.00
2:		0	0		0.00
3:		0	0		0.00
4:		0	0		0.00
Total co-ordination Personnel costs year 5:			0	Total overhead y 5:	0

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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A6.2 Co-ordinator's direct co-ordination costs Other costs/overheads (part 2/2) (40)

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
3 progress meetings			3,500	3,500	0			7,000
								0
Carry Forward from expansion sheet? Y/N	N	Total	3,500	3,500	0	0	0	7,000

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total allowable direct co-ordination costs (96)		26,333	27,017	24,223	0	0	77,573
%EUContribution (97) Annual %age	50	50	50	50	50	50	50.0000
Total EC Contribution		13167	13508	12111	0	0	38786

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Legal information on the participating organisation					
Participant Role (22):	CO	Participant No (23):	1	Assistant to Contractor No (24):	
Registration No with the European's Research Programmes (43)					No reg no.
Organisation Legal Name (44)	Delft University of Technology				
Short Name (45)	TUD				
Legal Regist'tion No.(46)			VAT No. (47)	NL00/15.69.569.B01	
Activity Type (48)	HES	Legal Status (49)	GOV	If PRC Specify (50)	
Business Area (51) - NACE		User Supplier (52) (U/S)	S	Cost Basis (53) - (FC/FF/AC)	FF
Legal Address of the organisation (54)					
PO Box (11)	5				
Street Name and Number	Julianalaan 134				
Post Code (12)	2628 BL		Cedex (13)		
Town/City	Delft				
Country Code (14)	NL	Country Name (14)	Netherlands		
Organisation details (55)					
Year (56)	2000				
Annual turnover (57)	N/A	Ann. Balance Sheet Total (58)	N/A	Total R&D Expenditure (59)	N/A
Number of employees (60)		S7	Number of R&D personnel (61)		D6
Number of researchers and engineers (62)		E7	Number of female R&D personnel (63)		F6
Is your Organisation Independent (64) Y/N		Y			
If No, please indicate legal name(s) of owner(s) who own 25% or more (65)					
Is Your Organisation affiliated to any other participant(s) in the project (66)? Y/N					N
If Yes, please indicate Participant No, and character of affiliations(s) (D / I) (67)	*Participant No*	*Short Name*	*Character of affiliation*		
Address of the main Institute / Department / Laboratory carrying out the work (68)					
Institute/Department/ Laboratory Name (10)	Faculty of Civil Engineering- section Land and Water Management				
PO Box (11)	5048				
Street Name and Number	Stevinweg 1				
Post Code (12)	2600 GA		Cedex (13)		
Town/City	Delft				
Country Code (14)	NL	Country Name (14)	Netherlands		

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Project Acronym (2)	REAL	Project No(3)	ICA4-2001-10191

A7.1 Participant Profile/Information (1 form per participant) (42)

Authorised administrative official for the purpose of contract signature(69)				
Title (Dr, Prof., ...)	Drs Ing		Gender (8) M/F	M
Function (70)	Interim Director of Liaison Office TUD			
Family Name	Loos			
First Name	Andre			
Telephone No (15)	31 15 278 1055	Fax No. (15)	31 15 278 3100	
E-mail	liaison@tudelft.nl			
Second Authorised administrative official for the purpose of second signature(71) Indicate if Both must Sign				
Title (Dr, Prof., ...)			Gender (8) M/F	
Function (70)				
Family Name				
First Name				
Telephone No (15)		Fax No. (15)		
E-mail				
Scientific Person in charge of the project (72)				
Title (Dr, Prof., ...)	Prof. ir.		Gender (8) M/F	M
Function (70)	Head of Land and Water Management section			
Family Name	Brouwer			
First Name	Robert			
Telephone No (15)	31 15 278 4809	Fax No. (15)	31 15 278 5559	
E-mail	r.brouwer@ct.tudelft.nl or m.ertsen@citg.tudelft.nl			
Authorised contact person (73)				
Title (Dr, Prof., ...)	Drs		Gender (8) M/F	F
Function (70)	sr. project coordinator			
Family Name	Twickler			
First Name	Theresia			
Telephone No (15)	31 15 278 2127	Fax No. (15)	31 15 278 1179	
E-mail	t.twickler@cicat.tudelft.nl			

I certify that the information set out in forms A7.1 to A7.4 (Annex 2) is accurate and correct and that the estimated costs conform with the European Commission's allowable costs for RTD support and our normal cost accounting principles and reflect the costs expected to be incurred in carrying out the approved Annex 1 workdescription. I also confirm that our organisation is committed to participate to the above mentioned research project.

*** Please attach business card if available**

Date (DD/MM/YYYY)	
Signature of authorised person	

If the Commission Number is not availabler(43) please enter information in cells marked:
Please enter information in cells marked:
Automatically calculated that can be overwritten
Automatically calculated cells are marked:

Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

EUROPEAN COMMISSION
RESEARCH DIRECTORATES GENERAL
SHARED COST RTD CPF FORM

Shared Cost RTD CPF Form – Form A7.2 1/2

EN N 1 FP5RTD

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A7.2 Participant Profile/Information (1 form per participant) Personnel costs/overheads (42)

Participant Role (22):	CO	Participant No (23):	1	Assistant to Contractor No (24):	0

Personnel costs and overheads (74)

Categories of staff to work on the project (75):

1:	Sr researcher
2:	researcher
3:	
4:	

For Partners with Fixed Overheads (FF) or Additional Costs (AC) enter your % Overhead here	80
For All partners enter your budgeted annual increase in rates here	3

Personnel Costs (76) Year 1 / **Overhead Costs (77) Year 1**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	60	79.47	4,768	63.58	3,814.46	?Clear eith
2:	260	39.44	10,254	31.55	8,203.20	?Clear eith
3:			0		0.00	
4:			0		0.00	
Total Personnel costs year 1:			15,022	Total overhead y 1:	12,018	

Personnel Costs Year 2 / **Overhead Costs Year 2**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	60	81.8541	4,911	65.4874	3,929.24	?Clear eith
2:	260	40.6232	10,562	32.4965	8,449.09	?Clear eith
3:		0	0		0.00	
4:		0	0		0.00	
Total Personnel costs year 2:			15,473	Total overhead y 2:	12,378	

Personnel Costs Year 3

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:	60	84.309723	5,059	67.452022	4,047.29	?Clear either fixed overheads or overhead rate column
2:	260	41.841896	10,879	33.471395	8,702.56	?Clear either fixed overheads or overhead rate column
3:		0	0		0.00	
4:		0	0		0.00	
Total Personnel costs year 3:			15,938	Total overhead y 3:	12,750	
Total Personnel costs:			46,433	**Total Overhead**	37,146	

Hourly Rates are based on: Actual Salaries (AC) or Average Salaries (AV) (78): AV

Base year for the rates is: (yyyy)	2001		
Number of productive hours per year (79)	1489	Overhead Percentage	80.0%

Personnel Costs (76) Year 4 / **Overhead Costs (77) Year 4**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:		86.83901469	0	69.47558266	0.00	?Clear eith
2:		43.09715288	0	34.47553685	0.00	?Clear eith
3:		0	0		0.00	
4:		0	0		0.00	
Total Personnel costs year 4:			0	Total overhead y 4:	0	

Personnel Costs Year 5 / **Overhead Costs Year 5**

Staff Cat.:	Hours on Project	Hourly Rate (EURO)	Personnel costs (EURO)	Hourly overhead rate (EURO)	Overhead costs (EURO)	
1:		89.44418513	0	71.55985014	0.00	?Clear eith
2:		44.39006747	0	35.50980296	0.00	?Clear eith
3:		0	0		0.00	
4:		0	0		0.00	
Total Personnel costs year 5:			0	Total overhead y 5:	0	

For all Participants with Subcontractors (Person months)

Total number of person months worked on the project by all subcontractors for this participant.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						0
Number of person months	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	2.8	2.8	2.8	0.0	0.0	8.4

For additional cost participants (80) (Hours)

Categories of Permanent staff to work on the project:	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1: Academics						0
2: Technicians						0
3: Other (scientific/technical)						0
Total hours	0	0	0	0	0	0

Have you used 7.2 Bis 1? Y	N

Please enter information in cells marked:
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Project Acronym (2)	REAL	Project No (3)	ICA4-2001-10191

A7.3 Participant Profile/Information (1 form per participant) Other costs (42)

Participant Role (22):	CO	Participant No (23):	1	Assistant to Contractor No (24):	0

Durable Equipment costs (Euro) (81)

Description (82)	Month of purchase (project Month No (83)	Cost of purchase (Euro) (84)	Period of use (months) (85)	Depreciation period (months) (86)	% usage on the project (87)	Amount charged to project (Euro) (88)
						0
						0
						0
						0
						0
Carry Forward from expansion sheet? Y/N	N				Total	0

Consumable costs (Euro) (89)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Travel/Subsistance costs (Euro) (90)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
3 progress meetings, field trips			5,000	5,000	2,500			12,500
								0
Carry Forward from expansion sheet? Y/N	N	Total	5,000	5,000	2,500	0	0	12,500

Computing costs (Euro) (91)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Subcontracting/External Services costs (Euro) (92)

Subcontractors' names:	Country Code	Work Service	Cost Year 1	Cost Year 2	Cost Year 3	Cost Year 4	Cost Year 5	Total
G.Pichel	NL		2,000	2,500	3,500			8,000
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	2,000	2,500	3,500	0	0	8,000

Other significant project costs (Euro) (93)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

Protection of knowledge (Euro) (94)

Description:			Year 1	Year 2	Year 3	Year 4	Year 5	Total
								0
								0
								0
Carry Forward from expansion sheet? Y/N	N	Total	0	0	0	0	0	0

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Allowable Costs (96)		34,040	35,351	34,688	0	0	104,079
%EU Contribution Annual %age	50	50	50	50	50	50	50.0000
Total EC Contribution		17,020	17,675	17,344	0	0	52,039

Conversion rate used

Currency (98):	EUR	Conversion Rate to EURO (99):	1

For Additional Cost participants only: Overheads in EURO (95)

Overheads for additional cost participants percentage of all categories except	Year 1	Year 2	Year 3	Year 4	Year 5	Total

Please enter information in cells marked:
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Project Acronym (2)	REAL		Project No (3)	ICA4-2001-10191

A7.4 Participant Profile/Information (1 form per participant) (42)

Participant Role (22):	CO	Participant No (23):	1	Assistant to Contractor No (24):	0

Human resources information (100)	
Total person hours agreed for the proposed participation to the contract:	1,770
Of which researchers and engineers (RSE) person hours (total number of RSE hours on contract):	960
Of which number of female hours (total number of female hours on the contract):	810

Link of subcontractor(s) (64,66)	
Are any of the subcontractors linked to a contractor or associated contractor? (Y/N):	N
Nature of link:	

Financial and accounting rules used by the Participant (101)			
Has information on your organisation's cost accounting principles and systems (in particular for calculating the personnel costs and allocating overheads) already been supplied to the Research Programmes of the Commission?	Yes/No:	Y	
	If YES, Specify the most recent Commission Contract No.		
	ENK5-CT-2001-00517		
	If No		
	Annex on Financial and Accounting Rules attached: (Y/N)		N
	Annex on Overhead calculation attached: (Y/N)		N

Documents attached? Y/N		
Y	Legal documents establishing organisation (102)	**Annex attached**
N	Annual reports and balance sheets (103)	**No annex attached**
N	Organisation structure (104)	**No annex attached**
If not attached, please specify most recent Research Programme contract number where supplied		ENK5-CT-2001-00517

Please enter information in cells marked:
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http://pubwww.tudelft.nl/~frcicat/

Agricultural Marketing

Marketing opportunities for Kitui District in Kenya: Learning From the Dutch System

Sahelian Solutions
Emily K. Kiema
Mutinda Mungutí

TU Delft
Erik Siepman

The Netherlands, November 2002

Acknowledgements

The success of this project study depended on the support of several parties. First we thank NUFFIC for having funded the study. Special thanks go to Loes Minkman our contact person at NUFFIC.

We acknowledge:

1. Eng. Maurits Ertsen, our supervisor for the guidance and comments he gave during the progress of the project.

2. Maartje van Westerop for the contact mediation, discussions and moral support.

3. Henk Haring for numerous discussions and moral support.

4. Eng. W. Dijk for lengthy discussions and moral support.

5. Maaike Holland and Ylva de Haan our student affairs contact persons at TU Delft.

6. Erik Siepman for providing a bicycle and car and organizing interviews with farmers (mr. De Ruyter, mr. Droppert, mr. Van der Kooy) and Haluco

7. W. Star for contact mediation.

8. Marcelle van den Kommer for technical expertise support and arranging the Unilever interview.

9. Gemma Pfaff for moral support.

We are highly indebted to Prof. G-M Mutiso, Sam Mutiso and SASOL Foundation, our contact parties in Kenya.

Summary

This project paper focuses on the Dutch agricultural marketing and its possible application to Kitui district. In Holland, marketing mechanisms for agricultural products are: -

- The auction,
- The greenery
- Contract mediation
- Fair trade
- Organic farming

These marketing mechanisms cannot be wholly applied in Kitui because Kitui is structurally different from Holland in several aspects. In Kitui the farmers are small scale compared to the Holland scenario where most farmers are large scale. Infrastructure in Holland is quite well developed and this makes it possible for the transportation of products from the farms to the markets and eases the flow of market information from the farmer to the market and vice versa. In Kitui the infrastructures are not well developed and hence makes it difficult to transport products from the farm to the market especially during the wet season.

Labor in Holland is mechanized while in Kitui the labor is manual and mostly provided by the family and sometimes hired. In Kitui labor is very cheap which is an advantage to the farmers as this reduces the production costs.

Marketing of agricultural products in Kitui is organized individually and farmers sell their produce individually, unlike in Holland where farmers form farmer associations and the rest produce on contract basis. In our study therefore we recommended that the farmers should come together and pool their produce so that they can attract buyers or else search for market together and as a result buyers are ensured of a steady supply.

Quality control systems in Holland are well organized and this helps the Dutch farmers to keep their customers by providing them with high quality products. In our study we therefore recommend Kitui farmers to be trained on how they can produce quality products that can compete not only in the local market but can be able to meet the standards in the international markets.

For any meaningful agricultural activity, farmers should have adequate capital investment. To empower Kitui farmers we recommend that the financial institutions can be encouraged to come up with farmer friendly credit facilities.

Further research is needed with setting of scenarios as the objective so as to determine the quantitative and qualitative potentialities. This can be done in conjunction with partners who are being interested in the agro-business in Kitui. This can be in dried peas, cowpeas, green grams, beans and maize. It can also be in fresh and/or dried fruits and vegetables like mangoes, tomatoes and bananas.

TABLE OF CONTENT

1. INTRODUCTION

1.1 Positioning the study

Abstract.
Kitui is one of the arid and semi –arid districts in the eastern parts of Kenya. The district extends for roughly 200 km from the north to south and 120 km from east to west. The area is 20,555.74 square kilometers with a total population of above 640,304 people (the figures are for the 1989 census). The area experiences an average rainfall of 600 mm – 1000 mm per year. The rainfall fluctuations are sometimes so great that it is impossible to carry out meaningful predictions. Due to failures in rain the area is characterized by varying periods of drought and famine. Under such scenario a need of sustainable water supply crops up.

SASOL (Sahelian Solutions) Foundation.
SASOL is a non-governmental organization based in Kitui involved in local community development projects. For the last ten years through participatory approaches, a record of 323 sand dams has been achieved. Sand dams are water barricades across dry riverbeds, which trap and prevent water from going down stream. They are ground water reservoirs. Sand dams are advantageous over other means of providing water in the arid and semi-arid areas. They are cost effective and provide water for both production and domestic purposes. They are not prone to high rates of evaporation since the water is under sand. Also the water is not open for easy contamination and pollution..

Socio-Economic Impacts
The area has recorded great improvements in agricultural production. Yields have gone up while new varieties have been introduced. The area that was importing vegetables from other markets has now become a supplier of sukuma wiki (kale), tomatoes, onions etc. Grain production (maize, beans, pigeon peas, green grams, millet, sorghum etc) has also increased. Planting of fruit trees has also gone up with mangoes, oranges, lemons, passion fruit and avocados being the major potential fruits. Other kinds of soft and hard wood trees have also been propagated. Time used for searching water has reduced and converted to other social and/or economic activities. The trade offs and spill offs have led to improved health and education levels.

1.2 Objective and Approach

Due to lack of systemized sustainable marketing technologies the local farmers end up being exploited by middlemen and traders who take advantage of the situation. More still the farmers end up with losses due to waste, poor storage, poor means of transport, poor insemination of marketing information and lack of sustainable markets.
From the same premise we drew our interest to study the Dutch agricultural marketing mechanism, its great success and innumerable failures and be able to come up with a workable cost effective, and situation tailored marketing mechanism for Kitui district Kenya.
The approach constitutes literature review, Internet web search, field interviews and discussions with farmers, food industries, marketing experts and any other reliable person(s).

1.3 The Relations Between The Two Systems

Complicated and high technology equipments characterize the Dutch agricultural sector. The farming systems are of large scale and highly specialized. Most of the major steps are accomplished using machines. This can be realized in the stages of seed propagation, land preparation, planting, weed and pest control, nutrients application and harvesting. This is extended further to other additional requirements and processes like drying, value addition and packaging. Good infrastructures, roads and well-equipped and specialized transport companies explain the success of the logistics. Farmer associations, cooperatives, auctions and the Greenery link the farmer to the wholesalers and supermarkets and ultimately to the consumer. The link is a network of efficient and effective information flow.

The Kitui scenario is a situation whereby farming is of low scale and highly mixed type. Manual work and family labor contribute to the participation. Poor roads, poor transport means and poor communication means contribute to the logistics failures. This ultimately leads to poor markets and inadequate marketing information.

Comparing the two systems will show close relations in the mode of production whereby both are environmentally friendly, use low or no chemicals and fertilizers and have high potential for growth hence surplus for sale is eminent. This raises the need to learn from the Dutch agricultural marketing mechanism, get what can suit
Kitui and employ it there.

2. AGRICULTURE IN THE NETHERLANDS

2.1 Types Of Farming

The Netherlands is a leading agricultural producer and the third largest agricultural exporter in the world, after the United States and France. Statistically agriculture covers an area of 2 million hectares and in 1999 the total number of farms were reported to be 103,000.Although agricultural labor force is scarce, the sector employs 4% of the total labor force in the country.

The agricultural sector can be characterized in five types. Table 2.1 shows the types and respective percentages in total coverage.

TYPE	%
Cattle	56
Horticulture	21
Arable Farming	14
Fruit Growing	5
Mixed Farming	4

Table 2.1: Types of farming in the Netherlands[1]

Glasshouses or Greenhouses?

According to the Worldwide Directory of Agrobiologicals a glasshouse has been defined as a building fabricated largely of glass (or transparent plastic) supported by metal or wooden struts providing a light, enclosed and sometimes controlled environment for the growth of horticultural crops, soft fruit, salad vegetables, tomatoes, succulents, pot plants and cut flowers. Due to cost considerations in commercial productions, plastic tunnels may replace glasshouses. The structures provide warmth (with protection from frost) humid conditions enable the plants to be nurtured through provision of nutrients and possible supplementation of heat, light, carbon dioxide (tomatoes), mineral nutrition and micronutrients by thin film or foliar application. Unfortunately, the same conditions which favor good plants plant growth are also attractive to various insects and other plant pests and diseases.

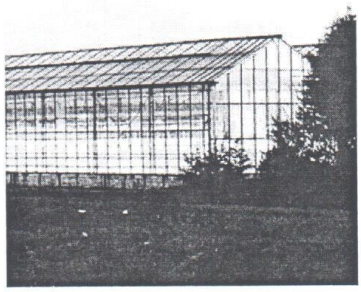


Figure 2.1: Glasshouse or greenhouse?

[1] Source: FAO/ITC/CTA 2001

Location

The agricultural areas between The Hague and Rotterdam popularly known as the westland and western part of the country around Amsterdam Airport are important for glasshouse production. There are also other large production areas in the east and southeast parts mostly in the North near Assen and the South near Eindhoven.

Crops

Glasshouse horticulture is responsible for a quarter of the total vegetable production in the Netherlands. The three main crops are sweet peppers, tomatoes and cucumbers. Other vegetables grown on a small scale are; radishes, aubergines, courgettes, chicory, lettuce, fennel and gherkins.

Fruits are also gown in glasshouses. The common fruits to get are; apples, pears, plums, cherries, strawberry, red currants, grapes, peaches and melons

Flori- culture, the cultivation of flowers is another sector that is flourishing under glasshouse farming. Roses, carnations, lilacs, and lilies are the common plants. The Dutch floricultural Wholesale Board is knowledge center, which provides information on the sector to interested parties and mediate between partners.

Organic Farming

Compared to the rest of Europe, The Netherlands has been lagging behind in organic farming. Since the early 1990's the government has been putting a lot of emphasis on organic farming. There has been increased financial and technical support to farmers willing to convert to organic farming from the traditional conventional agriculture. The major pivotal point is to reduce systems with negative environmental and bio-diversity impacts.

The main production area is in the center of the Netherlands covering the polders of the province of Flevoland (area around Lelystad) and the main producing cooperative is Nautilus with total land acreage of 5,000 hectares under production. Of the total 2 million hectares of agricultural land only 1.4% (27,820 hectares) is under organic farming. Also in spite of the government creating consumer awareness on the consumption of organic products only 1% of the total consumption is in organic products

In the beginning of the 1990's organic products were only sold through specialized shops. Consumers bought the products direct from the farm or through subscription. It was not until the second half of 1990's were these products introduced into the supermarkets. Until then the supermarkets were selling conventional agricultural products only. To combat the stiff competition displayed by the supermarkets the specialized organic products shop merged together and formed a chain of small supermarkets dealing with organic products only; the NWO (NatuurWinkel Organisatie)

The export market consumes more of the organic products with two thirds of the total produce being exported to England, Germany, Denmark and Sweden. Only a third of the organic produce is sold locally. The main local outlets are the supermarkets, green grocers, specialized shops, farmers' shops and subscription shops.

Figure 2.2: Labor is expensive in Holland, so farming is very mechanized even organic farming

Livestock breeding

The Dutch dairy sector is the main backbone of livestock keeping. Milk and other dairy products like cheese, butter, cream, yogurt, chocolate etc. Accompanying the dairy sector is the beef sector, which is the major supplier to abattoirs and meat processing industry. Sheep, pigs, poultry and goats form part of the livestock breeding.

Figure 2.3: Livestock in Holland with on the background a traditional barn

Fisheries

Marketing and Agriculture The main branches of commercial fishing in the Netherlands are sea and coastal fishing. There are also shellfish culture, freshwater fisheries and aquaculture. An efficient and modern fleet of trawlers and inshore vessels carries out sea and coastal fishing activities. The inshore fleet fishes for sole and plaice, cod, whiting, herring and shrimps in nearby fishing grounds, mostly in the central and southern part of the North Sea. From the economic viewpoint flatfish fishing is the most important branch of fisheries in the Netherlands.

The trawler fleet fishes for herring, mackerel and horse mackerel in the North Sea, and particularly in more distant water. Shellfish culture occurs largely in the waters of the province of Zeeland and in the Wadden Sea. Mussel culture is the most significant branch. Cockles are also fished commercially.

In the context of the Common Fisheries Policy of the EU annual catch quotas are allocated to prevent stocks from being depleted. The Dutch policy aims to improve a responsible fisheries based on sustainability. In implementing this policy the focus is on the distribution of responsibilities in fisheries between the industry and the government and on the relation between fisheries and nature.

2.2 General marketing Mechanism

Globalization, consumer concerns and increased competition press farmers and food producers to enhance product innovation and to seek more efficient production and distribution structures. Contract production and systems of vertical coordination are replacing spot markets.

[2]In the Netherlands, vertical integration in marketing of agricultural produce and products has taken the following forms: -

- Auctions
- The Greenery
- Organic farming
- Fair trade
- Contract farming

N.B: The above mechanisms will be discussed in detail in chapter 3.

Dutch Consumers

Increasing use of modern technologies in agriculture and food production and market saturation in affluent societies have led to a growing consumers´ interest in the methods used to produce food. More and more consumers pay attention not only to the product quality but also to the processes used in manufacture ("process quality"). They would like to know more about how their food has been produced. Many consumers are concerned about the production methods in modern agriculture and in the food industry. Against this background it is important to know how consumers perceive the production methods: What are public beliefs associated with the food production of today? What are the determinants of these beliefs and how do they affect consumer behavior?

The Dutch consumers are switching on to products that have been produced in conditions that are environmentally friendly; use less or no chemicals and fertilizers. Also much emphasis and support is put on production lines that protect humanity. Products from countries and/or companies that violate human rights are boycotted. Child labor and violation of labor laws is discouraged under such control.

The ability of retailers to deliver on their promises is a key issue for consumers in The Netherlands. This is particularly when it comes to factors such as pricing, return policies, and out of stocks. The retailers should ensure that there is adequate supply of the product(s) and rarely run out of stock. The importance that Dutch consumers place on values such as honesty and respect is apparent and understanding the importance of

[2] Source: Martinez and Reed, 1996

honest pricing is crucial for Dutch retailers that choose to focus on price as their primary attribute.

"We sell our products at honest and realistic prices, as well as focusing on very competitive special offers", Johan Van de Werken, head of marketing, strategy and research for supermarket operator C1000.

Dutch consumers are also sensitive to services like returns. They prefer to return unconditionally products they are unhappy about. The return should be quick and hassle free. In addition to this, the product(s) should be consistently of good quality and access oriented – easy to find.

The Dutch food market is relatively saturated and this will lead to a further concentration in the food wholesale and retail trade. It is clear that consumers benefit from the intense competition among supermarket owners. Dutch consumers react quickly to special offers and low prices. Special sales for meat, fruits and vegetables and cheese motivate consumers to hunt for a good buy and visit more than one supermarket.

In 1993 a popular topic in food retailing was "the environment" and in 1994 "price consciousness." Although in 1995 and 1996 "packaging and environment" is still an important issue, "fun shopping and adventure" appeal very much to consumers as well.

Case Study Albert Heijn

With about 700 shops and a market share of roughly 28 percent of the food and daily goods market, according to the "European Retail Handbook 2001/02,"

Albert Heijn is one of the leading Dutch retailers, so it's not surprising that it would be named as the favorite supermarket by close to one-third of the respondents in the Netherlands. The company believes that its success is based in large part on a corporate strategy that focuses first on experience and second on product.

The Albert Heijn experience is all about establishing a sense of closeness to consumers by providing them with answers to their everyday question: "What shall I eat today?" The company offers answers through such unique vehicles as its *AllerHande* in-store publication, which features information about products, Lifestyles and recipes using items sold in Albert Heijn stores. The retailer also offers an unusual savings account as part of its Bonus card program.

Instead of having a discount subtracted from their bill, customers can choose to open a savings account. The discount is then applied to the account, and customers can access their cash through the in-store kiosks. The retailer's secondary emphasis on product is supported by large assortments, high quality, innovative products, both low-end and high-end private labels, a strong focus on food safety, and a large selection of ready-made,
take-home meal solutions. To ensure that its product offering meets the ever-changing needs of consumers, Albert Heijn conducts what it calls "operation pit-stop" every three years to reset the store and category layouts.
Finally, Albert Heijn completes its strategic framework by maintaining market parity on the attributes of service, access and price. In terms of access, for instance, the stores maintain a consistency of layout, making it easy for shoppers to find what they need. And on price, the company provides value for the money, with prices that are not the cheapest but that are in accordance with Albert Heijn's image.

3. DETAILED DESCRIPTION OF MARKETING MECHANISMS

3.1 Auctions

Definition[3]

The auction market is whereby traders transact directly against the orders of other traders by communicating through a single centralized intermediary. Auctions form the most links between the grower and the glasshouse vegetable trade. Most of the growers in the Netherlands do not sell the products themselves, but belong to one of the auction cooperatives. Membership of the auction implies that the growers must sell all their products through the auction. This means that the product flows for fruit and vegetables are concentrated at the auction market, so an optimal price can be formed.

History

Before the formation of the auctions all farmers sold their products on the markets by themselves. The literature says that the first vegetable auction of the Netherlands was established in 1887. During the first decades of the 20th century each town or region with professional horticultural production set up its own auction. For instance field interviews suggest that in Pijnacker the first auction was formed in 1915 and the farmers used their boats to transport their produce to the auction. In those early years of auction history, the main reason to establish an auction was dissatisfaction among growers with traditional sales structures that were insufficiently equipped to exploit the opportunities of the growing demand in Western Europe [Van Stuijvenberg, 1977;Ter Woorst, 1987]. In 1934 an` auction law` was enacted, as part of government measures to alleviate the effects of the economic crisis. This law contained a legal obligation to use an auction for selling Dutch fresh produce. In 1945 the total number of fresh produce auctions reached its top with 162 [Fontein, 1987:202].

According to research done at the Erasmus Research institute of management [ERIM, 2002:126] it was found that after the Second World War, the number of auctions gradually declined, due to mergers of local and regional co-operatives. The most rapid decrease in total number of auctions occurred after 1965, when the auction law was abolished. In 1995,one year before the establishment of VTN/The Greenery, the total number of auctions had declined to 20. In 2001, only six independent co-operative auctions for fruits, vegetables and mushrooms remained.

Objective of the co-operative auction

The ultimate goal of the co-operative is to increase the income of its members. It does so by improving the market position of growers and enhancing the price determination process.

Functions and organization of the traditional auction co-operative

The main functions of the traditional auction co-operative were price determination, sales administration, logistics, and quality control.

All auctions were established as grower-owned co-operatives Growers were to gain by improving the sales process. The market position of the individual grower was weak because of the relatively small quantity he offered for sale, perishability of the products and his lack of market information. By collectively offering for sale the products of many growers and by using an auction as the price determination process, the working of the market between sellers and buyers is enhanced. In this case the market function of the growers farm is delegated to the co-operative auction. Because the market function is derived from the on-farm production function, growers maintain control over firm that organizes the auction. The sales process functions best if growers use the auction for their

[3] Horticulture in the Netherlands report, Ministry of Agriculture, Fishery and Nature Management

total production. Therefore, co-operative auctions have a statutory delivery obligation for their members, which come with decision-making rights over auction policies. All members of the co-operative hold these rights collectively. Consequently, the strong interest of growers in proper working of the auction, the involvement of a large number of growers, and the interdependency relationship between market function and production function made the grower-owned co-operative an efficient way of organizing the auction.

The auction clock and the auctioneer

The auctions have continued to improve as the production and competition increases. There are people who specialize with confirmation of the quality of the products brought to the auction. They use the sampling procedure, that is, they take some samples of the products check and record the situation of the product. The bidders [buyers] always go for the best and are ready to pay more for the best, however, if they are not careful they might end up in paying more for the good. With the Dutch auction decreasing bids [price start high and is gradually reduced], the bidders always choose how high to bid without knowing the others decision as it is the buyer who is supposed to react first.

Auction is a game whereby as the announced price is progressively lowered, the possibility of a gain emerges but the probability of securing the gain diminishes, as a result the product goes to the bidders who are risk averse as they are always anxious to win[4]. All in all the prices are determined by the price in the auction clock. Therefore, in this case for the fruit and vegetable customers especially the large supermarket chains, a large proportion of vegetables are now sold through their agents. Then the supermarkets can be sure of more or less constant price and are less dependent on daily fluctuations. The produce for green grocers and market and door-to- door traders also largely depend on the price at the auction clock.

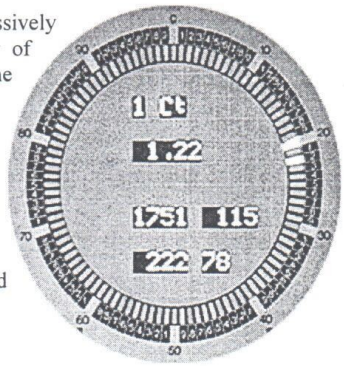


Figure 3.1: Auction clock, the numbers show the price, quantity, buyer and seller

Formation of the greenery[5]

	1970	1980	1990	1995
Growers of:				
Open field vegetables	34,166	16599	12,454	10,243
Greenhouse vegetables	13,583	7,862	5,652	4,686
Fruit	10,000	6,964	5,183	4,475
Mushrooms	1,100	823	853	704
Auctions	88	55	28	20
Auctions turnover (million euro)	1,790	1672	2,167	1668
Exporters	213	157	165	185

Table 3.1: Structural change in the Dutch vegetable and fruit industry[6]

[4] Eric van Heck, Erasmus University, Rotterdam. www.fbk.eur.nl
[5] www.thegreenery.nl
[6] Source: VTN [1996]

The Dutch horticultural sector enjoyed huge success for many years, export rose and the domestic consumption of fruits and vegetables increased year by year. The situation changed dramatically in the late 1980s leading to increased competition especially from Southern Europe, from the table above, it is clear that the auction turnover was still growing in the 1980s but then it fell from 2.1 billion euro in 1990 to 1.6 billion euro in 1995 therefore this shows that the auction had become inefficient in marketing the fresh fruits and vegetables, so the solution was to combine forces and as such in the year 1996 the Greenery international B.V was formed. It became the distribution, sales and marketing company of fresh produce and its shares are owned by the horticultural cooperative of horticultural food[7]. It was established after the merge of nine of the eleven auction houses dealing with fruits and vegetables and the central bureau of Dutch horticultural auctions. In the year 2001, it changed its name to the Greenery B.V.

Besides the already mentioned advantage in competition there are more reasons for a merger. Consumers ask for easier products like cut and packed lattice and supermarkets ask for packing with their mark on it. Supermarkets also want verse products, so it should be delivered in the right quantity. To achieve this communication is important between producers and buyers. The Greenery can supply a constant quantity every day and the buyers have only one contact address, which is very efficient. The last reason is that the promotion of vegetables and fruit is arranged by only one organization.

Organization of the Greenery

The Greenery is controlled by the central board of management with three members actively involved in operational implementation of business activities and a number of business units, which help in product collection, supply and processing in addition to the business activities. The business units are the greenery operations, the greenery UK, the greenery Netherlands and the greenery international.

The sales operations department that is a part of the business unit greenery operations manages the commercial organization of the greenery. This department harmonizes the activities of various components of the commercial organization. It also maintains close contact with representatives of growers from the various product groups so that the greenery gets the information it needs to make supply forecasts and set prices.

Objective of the greenery

The major objectives of the greenery are:

- To sell the products of 3000 member-producers.
- To draw their produce to the customers' attention.
- To ensure a healthy future for the Dutch food sector.

The greenery aims at becoming the final customers preferred supplier. It targets the large retailers in Europe, North America and Far East. It also targets whole business, hotels and catering industry and the food services business. Throughout the year it tries to provide its customers with a complete range of both domestically grown and imported vegetables, fruits and mushrooms. The greenery manages to attain its objectives because of its logistical organization and extensive marketing support, like promotion through advertisement, exhibitions, leaflets and organization of visits of foreign buyers.

[7] Voeding Tuinbouw Nederland, VTN

Success-factors

An important reason for the success of the Dutch auctions is the cooperative base:

1. The auction is of and for the members
2. The auction is intermediary between grower and trader, so it does not trade itself.
3. The auction anticipates accurately when the markets change. This requires vision and coordination of members and traders. Besides that creativity is needed to use new formulas to take advantage of the changes.
4. Auctions and members should trust each other. Therefore the auctions can react sharply on market-situations, but with the interest of the members in mind.

Roles of the Greenery

It plays a major role in the provision of market for the member growers. The member growers are always sure of ready and sustainable market for their fruits and vegetables. This is so because they cultivate all their products with great skills to satisfy the strict quality, environmental and food safety requirements. That is, according to the guidelines of the quality control systems.

The greenery also imports the products, which cannot be produced in the Netherlands probably due to the climatic circumstances. For instance tomatoes and pepper cannot be produced in winter so are imported during winter, exotic fruits also like pineapples cannot be produced in the Dutch farms hence are imported from the warm tropical countries. The greenery does not perform the importation itself but the member growers transport their products to the greenery where the buyers are ready to buy their products. Most of the tomatoes from Spain going to Germany first come to Holland, because of the logistical advantages of centralized distribution.

The greenery also exports to more than 60 countries with the European Union, Eastern Europe, North America and Japan, as are the most important markets.
It supplies a total range of fresh fruits, vegetables and mushrooms. In some cases in the overseas markets a number of special products are supplied such as pepper and vine-tomatoes and this is achieved by the method of tracking and tracing,

The greenery also develops quality control and certification systems for its grower members for instance harmonizing with the EUREPGAP system developed by European retailers, GZS [greenery quality system] and Milieukeur [environmental hallmark]. See also section 4.5.

Price determination in the greenery

The traditional auction used clock as the mechanism for price determination. However, for the greenery to respond to the changing demands from growers and customers, it has applied an alternative price determination mechanism. It has set up an internal agency for contract mediation to facilitate direct contracting between growers and wholesalers. The mediation agent brings together supply and demand, makes sure that essential information is transferred between seller and buyer, and makes the final deal on behalf of the grower. Contract mediation makes possible the proper rewarding for growers for specialties, as well as signaling special requirements to producers. For instance, on packaging and order size, in this case the greenery uses niche market compensation, that is, if a grower puts extra effort in packaging for a particular customer, he receives a bonus

on top of the market price. A seller using mediation still obtains the traditional advantages of the auction, like insurance against buyer default and the option of selling additional produce through the auction clock. Not only specialties but also more standardized products are sold through the mediation, particularly if customers demand large quantities. In this case products from various growers are combined into one lot, and the price received by the grower is a mix of the clock and the mediation price. As no individual price per grower can be paid, the incentive for growers may still be sub-optimal. The greenery is seeking the best combination of the mediation selling and clock selling. If most of the supply is sold by mediation, the price established by the auction clock might become more and more volatile. For this reason therefore, the greenery makes agreement with the growers that a certain minimum of total supply will be sold through the clock this is also to guarantee supply to buyers only purchasing through the clock. The product market advisory committee represents the growers in the greenery.

The greenery has also started to experiment with a third price mechanism: unilaterally setting a price, and inviting buyers to make a bid for specified quantities. Initially the Greenery used a rather rigid system of price setting. This was not successful, as prices paid to growers were eventually lower than competitors paid to their suppliers. Growers particularly those for cucumbers, complained about this system, and in order to regain control over sales, they formed an association and started to negotiate with the greenery about the price determination system to be used.

Shifting from the auction clock to other price determination mechanisms means that trust in the grower-greenery relationship becomes more important. Mediation requires a larger degree of trust of grower in the capabilities of the greenery personnel.

During the first years of greenery existence, trust was low, for several reasons. First while the auction clock resulted in a fully transparent price determination process, under the new mechanisms some secrecy was introduced to facilitate the bargaining process between buyers and the greenery sellers. Second, some negotiators of the greenery were inexperienced. Third, prices obtained for some products were actually lower than what could be obtained at other auctions. Fourth, the initial management of the greenery strongly emphasized their focus on servicing clients instead of servicing suppliers.

Logistics in the auction[8]

Logistics is the control of the transport of products. This is very important in the greenery mainly because of several reasons, like big transport volumes, labor-efficiency, time factor and quality maintenance since the food products are perishable and are the ones dealt with in the greenery. Here three aspects are important namely; sorting and storage of the products and standardization of the packing material.

The sorting of the produce is done, because the demand of products is different for each size and quality. The best prices are fetched if the different products are supplied separately. The grower sorts the products by the different categories and packs the produce and products in boxes; those boxes are then piled up on a pallet. In the auction different products are placed by category until they are sold.

Some products like potatoes and cabbage can be stored some time, before it is sold. Other products like cucumbers and tomatoes should be eaten as soon as possible. The quality of the products remains optimal under specific conditions of temperature and air-humidity. Usually the auctions arrange the storage-capacity. In logistical view the storage is used to connect the demand and supply quantities.

[8] From: 100 Years Auctions in Horticulture, edited by the Dutch organization of auctions.

Standardization appears in two stages: the packing and transportation stage. The farmers do the packing. Ten years ago some products were re-packed in the auction, so that the packing materials could be re-used. Nowadays the packing materials are not reusable, because it is expensive to re-pack the products and also to transport the empty packing materials back to the auction. The packing materials are owned by the auction and the farmer pays a fee for usage, so for one product quality all incoming products are packed in the same boxes or crates.

The pallet and lift truck have proved to be very important things in transportation. In all stages and product-types the same pallets-sizes are used, because then the size of a truck can also be standardized and the same case applies to the containers. Especially in sea-transportation the standard-size of containers has shown its value.

The future of the Greenery

The Greenery is facing challenges of changes on food safety and chain management due to the globalization of the economy. The process of globalization has affected the vegetable, fruit and mushroom sector as it has taken place in all the links of the chain, which has led to expansion through mergers, takeovers and participating interests, few sales at the auction and more sales through contracts. Therefore as a result of this the management of the greenery is structuring the company so that it can take full advantage of the new development by selling products in a closed chain. The closed chain therefore calls for direct lines between the final customer and the producer, this will then provide an ideal opportunity for closely harmonizing supply and demand in quantity and quality.

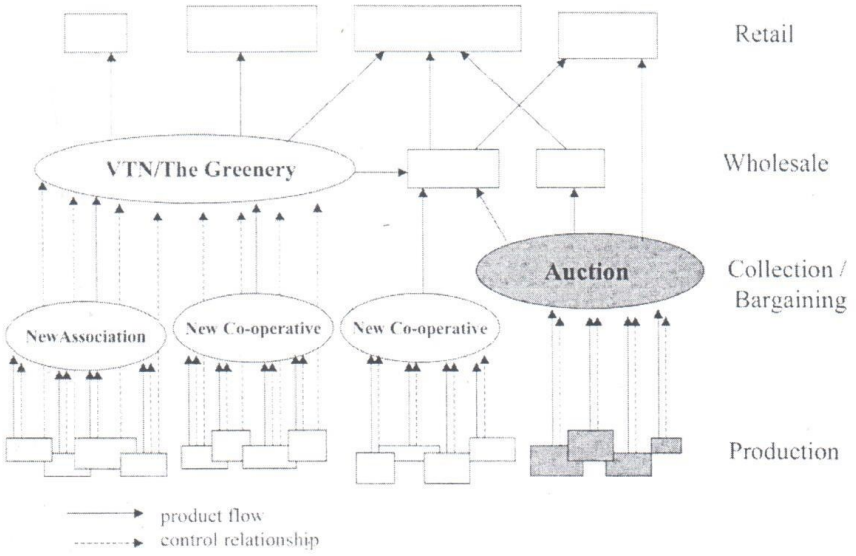


Figure 3.2: Position of the Greenery in the total horticultural chain. The main issue for the Greenery is whether they can persist the competition of alternative channels[9]

[9] Essays on Agricultural Co-operatives, Erasmus Research Institute of Management, Rotterdam

The greenery management is also trying to provide a range of services that are important in helping the company to face the challenges of the changes. Some of the services are:

- Right packaging
- Good logistics
- Professional marketing support
- Business certification
- Proper functioning of tracking and tracing system

However, to restructure the company the greenery requires extra funds, which have to come from the member growers. This has led to increase of the auction fee for the member growers that have made them feel that the greenery management is exploiting them. They also feel that they are not well represented in the greenery, this is because even though they still maintain the residual decision rights, their formal influence on the greenery operations is reduced. As a matter of fact the member-producers invested in the auction, but now the management restricts their authority of their own possessions. Some of the member growers therefore, are withdrawing from the greenery and instead form new cooperatives and are trying to make contracts to sell their produce. The withdrawal of the farmers from the greenery threatens the success of the greenery as its future lies in the hands of the member growers.

3.2 Organic farming in the Netherlands

History and Development of Organic Agriculture.

In the Netherlands two types of organic agriculture can be distinguished: biodynamic and ecological farming. The difference with conventional farming is that no chemicals are used as fertilizer or pesticide and animal welfare is guaranteed. The history of organic agriculture starts in 1926 with the first biodynamic farm in Zeeland, Loverendale.

In 1947 the Warmonderhof (http://www.warmonderhof.nl/warmhof/index2.htm) in Warmond established the first biodynamic agricultural school. In 1964 the first biodynamic advisor started working.

In the course of the sixties the ecological movement came into being. In contrast to biodynamic agriculture with its philosophical background ecological agriculture has social and environmental roots. Protection of the environment, being careful with natural resources, energy and a changing society are the most important objectives of ecological agriculture. The organic sector is slowly growing: in 1972 there were 85 organic farms and at the end of the eighties 359 farms.

In the nineties, organic agriculture receives more and more recognition and the organic sector becomes more and more professional. A new organisation for the entire sector was founded in 1992: Platform Biologica (www.platformbiologica.nl).

Also in 1992 the conversion regulation came into effect: farmers who wish to convert are subsidised by the state. Food surpluses, manure problems, the swine-fever, various food scandals (BSE, dioxin etc.) and falling prices in conventional agriculture resulted in more and more conventional farmers becoming interested in organic farming and in consumers demanding safe products. Research shows that organic farmers have a comparable - if not better - income than their conventional colleagues. Most farmers converting now opt for ecological farming. After some years of ecological management a number of farms choose for biodynamic agriculture.

In the Netherlands there is a growing consensus regarding the necessity for a more sustainable form of agriculture. In a country as densely populated and as intensively cultivated as the Netherlands an increase in organic agriculture is urgently needed to safeguard the environment for future generations and provide for healthy food-products.

Platform Biologica, the umbrella organisation for the organic sector, advocates the realisation of ten percent organic agriculture by 2010.

In 1996 the Ministry of Agriculture(http://www.minlnv.nl/) developed an action plan for organic agriculture. It is currently revising the action plan and now supports the ten percent goal. Yet it is still hesitant to invest sufficiently in conversion schemes.

The current Minister of Agriculture has proposed to stop the conversion schemes in 2002. That would make the Netherlands the only country in Europe that does not support financially farmers in conversion.

Statistical Development of Organic Farming

The organic share in the total agricultural surface in the Netherlands is relatively small. As of July 2001 1.47 percent of the total agricultural area was organically managed (see table).

In the nineties, however, the growth increased considerably. Between 1993 and 1997 an average of 60 farms per year converted. In 1998 and 1999 more than 200 farms converted per year, which is the equivalent in growth of more than 25 percent per year.

In the last two years the growth rate dropped to 14% in 2000 and 8% in 2001.

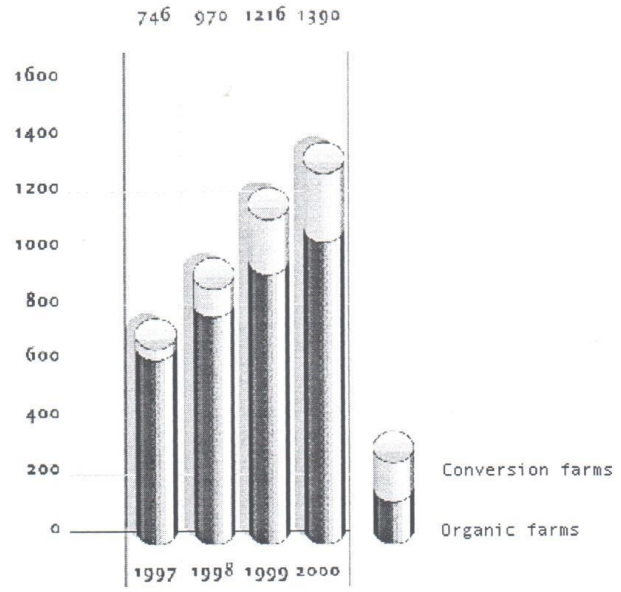
Number of organic farms	1436
Number of certified farms	1128
Number of farms in transition	308
% of total number of farms	1,53 (total number of farms = 93,820)
Hectares under organic management	29,393
% of total agricultural area	1,47 (total = 2 million ha)

Table 3.1: Dutch Organic Agriculture 2001 in Numbers[10]

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Farms	455	512	561	656	746	962	1,216	1,390	1436
Hectares	11,150	11,340	12,909	14,456	16,960	19,323	22,997	27,800	28,720

Table 3.2: Growth of organic farms and land under organic management 1993-2001

[10] Source: Skal / Blik



[11]Graph 3.1: Growth of the number of organic farms in the Netherlands 1997 to 2000

Market volume
The table below shows the yearly turnover of the organic market in The Netherlands.

Year	1999	2000	2001
Market turnover million euro	211	272	363,6

Table 3.3: Yearly turnover of organic market

42% of the organic products in the Netherlands are sold through food shops, 138,6 million Euro. In the last six years the increasing interest of the consumer has led to a yearly growth in turnover of the organic food shops of five to eight percent.
The number of farmers' markets - markets where only organic products are sold - has increased sharply during the last five years. The growing demand has also resulted in a remarkable growth in the number of organic processors.

The interest of supermarkets in organic products has sharply increased over the last years. Since Albert Heijn (AH) - the market leader in the Netherlands - introduced its own organic house brand at the beginning of 1998, sales through the supermarkets have risen sharply.
The market share of the supermarkets has grown in four years time from 19 to 45 percent (Dfl 330 million / 150 million Euro).
The other sales take place directly from the farm, at farmers' markets or via vegetable subscriptions (box schemes).

[11] Source: Platform Biologica

The "Vegetable Bag"
A subscriber to a vegetable box scheme receives a bag with freshly harvested vegetables and fruit every week. The bag contains mainly regionally grown seasonal vegetables and fruit. A vegetable box scheme can be arranged directly via organic farms or with organic food shops. These "vegetables bags" are very popular. While ten years ago it was an unknown phenomenon in the Netherlands, in 2001 45,000 households got their vegetables at a shop or a farm every week.

Consumers
Dutch organic consumers buy only organic vegetables, fruit, potatoes, dairy products, eggs, bread, cereals and beverages. In addition, 48 percent of the organic consumers purchase organic meat on a regular basis. In the last couple of years, sales of organic dairy products and vegetables increased about 30 percent. In 2001, an average Dutch supermarket had 56 organic food products in its assortment compared to 48 products in 2000. The number and range of organic food products is minor compared to the UK, Germany and Denmark, where organic food product lines in some major supermarkets number between 750 and 1,000.Dutch consumers are very price sensitive compared to consumers in certain other EU countries. In The Netherlands, organic food products sell at about a 20-50 percent premium over conventional products. The average Dutch consumer is not prepared to pay more than 5-10 percent extra. Therefore, Dutch food buying organizations increasingly import less expensive organic food products to be able to serve Dutch supermarket chains, which want to widen their product range. On the other hand, The Netherlands is an important exporter and re-exporter of organic (outdoor) vegetables, fruit and potatoes. More than half of its production is exported. The main export destinations are the United Kingdom with a 60 percent market share, Germany (20%), Denmark (10%) and Austria (10%). The Netherlands also exports large volumes of organic dairy products, mainly to Germany.

Reasons to Purchase Organic Food Products (%)
Worried by a series of food scares, certain Dutch consumers are trying organic foods. Over half of Dutch consumers occasionally buy organic food products. About half of these consumers purchase organic food products for health reasons. Others are attracted to them due to environmentally friendly production methods, no use of chemical plant protection products, taste, and food safety. About 35 percent of Dutch consumers do not buy organic food products because of higher prices relative to conventional products. Conventional products are purchased because of price, availability, appearance and wide product range. The Dutch Food Retail Organization (CBL) has forecasted that 10 percent of Dutch consumers will frequently eat organic food products by 2010.

Environmentally friendly	51%
Health	49%
Taste	41%
No use of chemicals	28%
Supporting organic agriculture	14%
Quality	12%
Animal welfare	10%

Table 3.4: Reasons to purchase organic food products[12]

The main consumers of organic food are people under 35 without children. People over 55 are less interested in organic food products, partly due to their lack of knowledge about organic food. Average Dutch organic food product consumers are women with

[12] Source: Platform Biologica, 2001

above average income and education. Of all consumers of organic foods 15 percent are termed "heavy buyers", 54 percent are "medium buyers" and 31 percent are "light buyers." The light and medium buyers are also called "part time organic consumers." Most "part time organic consumers" began by buying organic milk and have extended their organic shopping list since then. In 2000, 23.1 percent of all Dutch consumers bought organic dairy products. Heavy and light buyers purchase very different products. For example, 39 percent of the light buyers rarely buy organic bread, while 93 percent of the heavy buyers always eat organic bread.

3.3 Fair Trade

Introduction

This is the marketing mechanism whereby products from the producers are purchased at fair prices and under fair conditions. Fair trade organization was established in 1959 under SOS [save our source], later it became the SOS world trade. Since in 1994 it has been known as the fair trade organization and fair trade assistance. It handles assortment of 3000 products purchased from organization of craftsmen and farmers in Africa, Asia and Latin America. The assortment includes foodstuffs [like coffee, tea, rice, wine, chocolate, and peanut butter], handicraft, earthenware, crockery, utensils art etc

Objective of fair trade organization and fair trade assistance

It is to promote fair trade; by,

[a] Providing information through drawing attention to problems and abuses and provide solutions and also attempting to persuade politicians, businessmen and consumers that they should buy from the developing countries.

[b] Putting fair trade into practice by purchasing a broad assortment of products from craftsmen and farmers in Africa, Asia and Latin America and reselling them still in the third world shops, supermarkets and fair trade shops.

Principles of fair trade organization and assistance

- Eliminating the middlemen by doing the business directly with the producers
- Paying the producers in advance in order to bridge the period between sowing and harvesting.
- Fair trade assistance also provide producers with intangible support like commercial advice when they wish to improve their products and their production methods.
- Stimulating good working conditions and environmental awareness.
- No children exploitation and women should benefit proportionately from honest trade.
- Employees accompanied by guest experts from the region itself and from Europe travel through out the world in order to advise, train and support the producers developing products. This is to alert the producers on the current trends and the standards they have to meet and paramount matters to the exporters.

Business partners

The fair trade organization and fair trade assistance is active in the Netherlands and Belgium. They focus on the producers in Africa, Asia and Latin America who have no entry to export market and on companies with good social policies. They have had a long term relation with 90 producers in 30 countries and concluded a long term agreement in which the reciprocal rights and duties are defined and a close track of all developments of the trade partners are kept.

Consumers of fair trade products

For consumers in the Netherlands and in Belgium, the brand name fair trade offers the reassuring certainty that the products have been purchased according to the principles of fair trade and the producers receive everything they are entitled to. A Max Havelaar label has been created, primarily on the initiative of fair trade organization. The label enables the other businesses to offer the same certainty, and also guarantees that the products have been purchased directly and that a fair price has been paid for them. It is applicable to a number of product groups and all the fair trade products which fall into these groups has the label.

Fair trade organizations collaborate with many like-minded organizations that is, those that are for fair trade and in turn the world shops and fair trade shops are reaching hundreds of thousands of consumers who are supporting the fair trade. Below is the Max Havelaar label.

Figure 3.3: Max Havelaar label

The future of the fair trade organization and assistance

From this years [2002] annual review, they no longer limit their attention to the own trading partners but also to other organizations in the south and north which are focusing on the development and support of medium sized and small businesses so that they also benefit from advice and training given by the fair trade assistance and business consultants to strengthen the position of less experienced companies on the export markets.

Fair trade assistance is developing tailor-made workshops for groups of starting entrepreneurs and other interested parties. The workshops address important issues such as product development, quality management, logistics, marketing and financial management. Market information given is not only on fair trade organization but also about other potential buyers in the north. Participation in the workshop enables producers to assess themselves in several issues related to the marketing and exporting, basically on export readiness and entrepreneurship. Fair trade assistance therefore, is the stepping-stone to more professional working methods, by means of advice, training and net working thus local businesses are learning to survive on the world market.

Fair trade is funded by HIVOS and FMO [finance company for developing countries] plus donations from world shops, private individuals, organizations and the fair trade organizations.

3.4 Food and beverage imports and contracts

Trade
Dutch Wholesalers are buying lower priced imported organic food products to be able to serve Dutch supermarket chains, which want to widen their product range. This trend will depend on the stocks, quality and prices of Dutch organic food products. For example, there is a shortage of daily fresh glasshouse vegetables in The Netherlands at the moment. Therefore, The Netherlands is dependant on foreign organic fresh glasshouse vegetables. The Netherlands also imports potatoes, fruit, pork, beef, poultry products, cattle, and cattle feed, mainly from other EU countries.

Certification
"Skal" is the organization, which inspects and certifies sustainable agricultural production methods and products. The Dutch Ministry of Agriculture has appointed "Skal" as the sole organic inspection authority in The Netherlands. "Skal" closely examines the entire production process to ensure that it takes place as required by the EU organic regulations. If this is the case, "Skal" certifies the production method, and the product may carry the "EKO" quality mark. The "EKO" quality mark gives consumers the guarantee that the products meet the strict requirements for organic production.

Tariffs, regulations and quotas
Food imports are highly regulated for hygiene and quality reasons and it is worth getting confirmation from the authorities before shipping Agricultural products are protected by quota, managed by a licensing system. Import of specified products without a quota license is prohibited. Products include cereals, rice, beef and veal, sugar, isoglucose, oils and fats, seeds, milk and milk products, wine, processed fruit and vegetables and sheep buffalo and goat meat.

Food products of animal origin, including fish and honey, must be produced in a European Union (EU) approved establishment. There is EU and Dutch legislation covering almost every aspect of food production and sale. Careful investigation is required before offering any product for sale. Much of this legislation is based on due diligence, putting the onus for compliance on the manufacturer or producer. Legislation covers:

- Ingredients
- Label design and content
- Jar or pack size
- Additives
- Need for a Dutch or EU address
- Product descriptions and names
- Products of animal origin
- Packaging materials
- Claims made for the product

Market entry strategies

Dutch food retail share in 2000:

1. Supermarkets – 65 per cent
2. Speciality stores – 20 per cent
3. Other – 15 per cent

As in other European markets, food retailing in the Netherlands is dominated by a small number of large supermarkets. Dutch supermarkets include:

1. Albert Heijn owned by the global retail giant Royal Ahold
2. Edah, Konmar and Super de Boer, members of the Laurus Group
3. C1000
4. Independent supermarkets who are members of Superunie

Retail purchasing in the Netherlands is quite centralised, with buying groups selling to their supermarket of wholesale members. Many of these members retain some purchasing autonomy, but the buying groups are very powerful. Buying groups include Superunie, Trade Service Nederland (TSN) and Koop-Consult.

Unlike some markets, Dutch retailers do not have a system of listing fees. However, they will expect you to help them promote your products, which will include spending money on marketing activities.

Retailers buy both fresh and grocery products from specialist distribution companies, rather than direct from the producer. In order to save costs and streamline ordering, stores have been reducing the numbers of favoured suppliers. This further restricts distribution opportunities for smaller companies. Category management, rather than 'buying' is the norm with the large retailers and buying groups.

Some options for selling into the Netherlands are:

- Appoint a distribution partner to handle importing and customer liaison
- Manage the customer base from country of production and find a fulfilment company to warehouse and ship to the customers
- Set up an office in the Netherlands or another European Union country
- Send one of your staff to Europe as **a** representative
- Share distribution with another company – preferably with a synergistic product range
- Have your product manufactured in Europe, under licence

Marketing your products and services

Dutch stores try very hard to make the shopping experience enjoyable, and will look for products that help them attract and retain customers. If you can offer an innovative range, or help them plan a promotion, they will be more receptive to your products. Dutch consumers are interested in:

1. Quality – appearance, taste, provenance
2. Novelty – unique, innovative
3. Time and labour saving – prepared, ready-to-cook
4. Value

Dutch consumers are very discerning when it comes to packaging and presentation of the product. It is best to work with a local specialist to develop packaging or branding suitable for the market. Your distributor should be able to help. The wrong packaging or marketing will mean that the product won' t get listed with any larger stores, and that sales are likely to be restricted. Think carefully about your target consumer before presenting your products in the Netherlands. Do not assume that your Dutch consumer will have the same characteristics or habits as your own country consumers.

Because category management is common in Dutch supermarkets and buying groups, it is important to consider the following:

- What is the value to the retailer of listing your product
- How your product 'fits' in the current product offering
- Who the target consumers are
- Projected level of sales
- What the retail price will be
- What margins the retailer and distributor expect
- How you are going to promote the product?
- Are you willing to change the product ingredients or packaging to suit the retailer?
- Is an exclusivity deal appropriate?
- Are you ready to provide product samples?

You will need to tailor your presentation to each retailer in order to be successful. Visit as many stores as possible to build up a picture of the retailer's -consumer base and consider how your product fits their needs and aspirations. Research the market and your potential competitors thoroughly before making contact with customers. Take advice from your distributor. Dutch companies prefer to have brochures and product samples, rather than relying on websites for information. However, the use of Internet and email is high, and customers will use these.

4. ADDING VALUE TO AGRICULTURAL PRODUCTS

4.1 Introduction

Adding value to a product or raw material means taking it to at least the next stage of production. Each activity performed by the producer or any body to the product before it reaches the consumer should add value to that product. The producer, who is the farmer in this case, should put into consideration two aspects if he has to succeed in his farming business first the customer value and the second the creation of a value added product. This will help him as the manager of his farming business to search for new profit centers. As agricultural producers find it more difficult to make ends meet with diminishing profit margins from increasing input costs and shrinking commodity prices, more emphasis is being placed on adding value to those products with processing. Value-added agriculture does not, and probably never will, increase commodity prices, but it can add value to those products by performing activities usually performed by others. So the benefit comes from the value-added activity performed, not by increasing commodity prices. Another distinction is that the value added goes back to producers not agribusiness processors. Adding value to agricultural products is one strategy for improving community's well being, this is because consumers all over the world are seeking out farm-produced and regionally unique products[13].

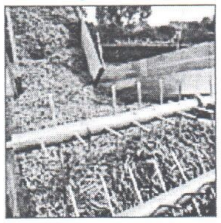


Figure 4.1: The French beans are being washed before they are put in a vacuum jar.

There are essential elements for success in the value added business that the farmer should put into consideration that is, beyond his planning and market research to know the customers, he is also supposed to be:

- Able to adapt to market changes.
- Open to exploring new ideas.
- Able to operate more as a resource manager than just a producer.
- Able to realize the importance of networking and the need to develop alliances.

4.2 The need for value addition

Value addition to agricultural products has proved to be very essential simply because the producer is not always the consumer of his products. Some value has to be added to the products to suit the consumer demands and also to add life to the product. Some farm products also are added value to get different products from the original produce. Value addition is also important because:

- It contributes to sustainability of the products
- It offers higher returns.
- It creates recognition for a farm meaning that many consumers will always go for the products from the farm hence increasing the competitive power of the farm.
- It opens new markets in the sense that composite products are made from one produce. For instance, ghee, cheese, yogurt, butter, powder milk are all obtained from value added milk.
- Expands market season in that some ways of value addition calls for preservation of the product. For instance under normal circumstances fruits cannot take two weeks after harvest, but when refrigerated they can even take more than two weeks.

[13] College of Agriculture and Life Sciences, New York, www.cals.cornell.edu

Ways of adding value to agricultural products

The value of farm products can be increased in several ways. Different farm products are added value differently. Examples of some of the ways of value addition are: cleaning, cooling, churning, hulling, grinding, extracting, smoking, labeling, distributing, adding information, education, entertainment.

4.3 Direct marketing as a value added opportunity for agriculture

Many producers are finding that if they sell their products directly to consumers, their profits significantly increase. Direct marketing does not require substantial capital investments or additional business development. It fits into theurban-development trends and consumer-demand trend for healthy food products in most regions of the world. There is growing consumer interest in locally grown food with information available about where the food came from and how it was produced. Direct marketing therefore requires producers to focus production around their market rather than produce a commodity. The underlying concept is that there is a difference between marketing and selling. It's possible to add value to products by direct marketing when producers assume the marketing functions traditionally done by others. By doing this, producers become price makers in their market, not price takers.

Direct marketing of fruits and vegetables can describe the market channels that are available to producers. To describe these market channels the alternatives have first been presented in figure 4.2.

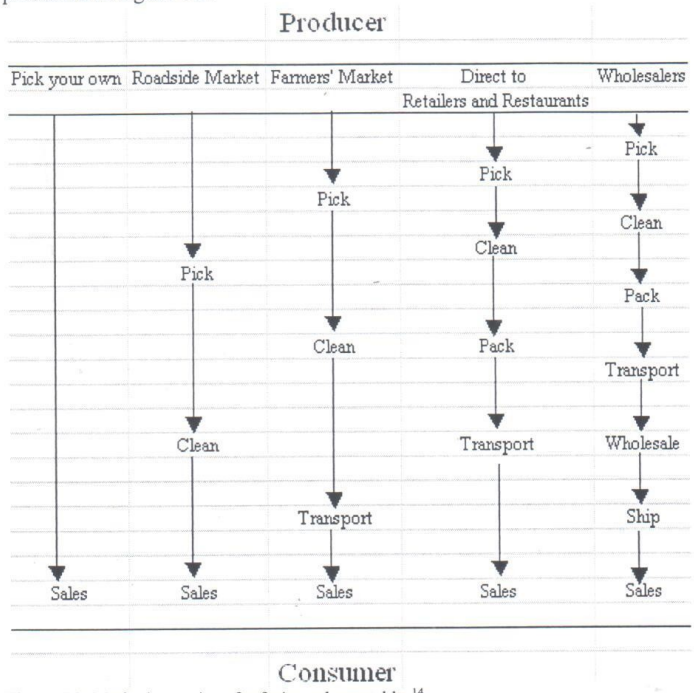


Figure 4.2: Marketing options for fruits and vegetables[14]

[14] Source: www.ohioline.ag.ohio-state.edu.

Wholesale Market
There are many steps in that market channel, including picking, cleaning, packing, transporting, possible broker services, wholesaling, shipping from wholesale to a retail outlet, and retail sales. Typically, the price retailers charge for products are at least two to three times higher than what is paid to the producer. Producers can market large quantities of product through this alternative, but their profit margin is very small. Because of fluctuating wholesale prices, at times producers sell their products below break-even prices.

Direct Sales to Restaurants and Retailers
Selling directly to restaurants or retailers eliminates at least two steps in the market channel, which adds to the value the producer receives for the products. A producer often also supplies transportation, which can be looked at as value-added service. Another feature of marketing directly to restaurants and retailers is that the price received is usually more stable, thus reducing price uncertainty.

Farmers' Markets
This direct-marketing alternative reduces the need for packing, which is a substantial cost reduction for producers. It provides a higher price because producers sell their products as a retailer. Price fluctuations are usually reduced or eliminated. For this marketing alternative, growers provide all of the steps from producer to the consumer, which adds value to their products. Selling through farmers' markets is flexible and is a good alternative for producers getting started in a suitable agricultural alternative or as an outlet for excess production.

Roadside Markets
This alternative eliminates the need for transportation because products are usually sold on the farm where they are produced. Again, growers provide all of the steps from producer to retailer, which increases the price and reduces price fluctuations, thus reducing price uncertainty. Roadside markets also give producers opportunities to further act as retailers by buying products wholesale and selling them retail. This phenomenon also gives roadside marketers an opportunity to expand their market beyond what they can grow themselves.

Pick-Your-Own
Consumers to the farm, pick the products themselves, and transport those products back to their home. The price received at a pick-your-own operation is often very close to the price consumers would pay for those products at a retail level. Consumers are willing to pay that price because of the freshness of the products and the on-farm experience that goes with it. Costs for the producer are significantly reduced, and the value added by this alternative is highest of all the marketing alternatives.

Agricultural Entertainment
Agricultural entertainment has become one of the most profitable ways to add value to a product and/or farm. School tours, petting zoos, festivals, and catered parties are just a few of the opportunities farmers are utilizing to add value to their products and generate income on their farm. In the case of agricultural entertainment, farmers are not only selling products they produce, they are charging admission to consumers who want to participate in the on-farm activities.

4.4 Processing as a way of value addition

Processing of crops is either done by extracting the valuable components from the crop or by producing composite products from it. It is always good to maintain the quality of the product during processing. It is either done for preservation purposes or to add value to the crop. For instance fruits like apples, mangoes, paw paws, oranges, lemons, are processed by extracting their fluid to obtain their respective fruit juices, which are further preserved to make them stay a bit longer. The juice after extraction is packed in bottles or cans or in packets, which then eases distribution and selling of the fruit juices. This is necessary because the fruit itself is easily attacked by the decomposing microorganisms.

Adding value to cereals can be done by processing the crop in steps. For instance maize after harvesting it is first shelled to remove the outer part of the maize comb then threshed to obtain the grains, in some communities the whole grain is added value by cooking but then the consumer does this, the other activities are done by the producer. The grains can be hulled to remove the outer cover of the grains then they are ground to obtain the flour, grain can as well be ground without hulling.

Processing can also do adding value to roots, for instance cassava. There are three marketing options of cassava after harvesting. First is direct marketing just after harvesting, this is the least complicated. The second one is temporally storage before marketing. This calls for preservation, the improved method developed by the natural resources institute [NRI] in UK is dipping the cassava in cold water immediately after harvesting and storing in sacks, wrapped in polyethylene to retain the heat, keeping off the ground and protecting them from direct sunlight. The third option is processing the cassava before marketing. The crop is first sliced into small pieces, dried and then ground into flour. All the three options depend on the consumer demands for cassava.

4.5 Quality control

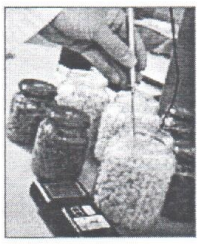
During processing quality has an important role. It can be viewed from two different sides: for our health it is important that our food is of good quality and it is important that the environment is not polluted during production. To achieve those two conditions there are different parties involved like the government and private institutions that set up quality labels. The government has made regulations that guaranty a certain quality, but some organizations want an increased quality standard and that is why they set up their own certification system.

Governmental regulations

Every step of the production process has its own ways of checking the quality of the products. During the growing of agricultural products the farmer has to register the usage of pesticides, nutrients and energy. This information is regularly checked by independent checking agencies. The government has made a list of chemicals that should not be used and the grower is not allowed to have these substances in his farm. Also the use of nutrients is restricted which means that the plants cannot be given more nutrients then they need to avoid the surplus to go to the surroundings. The next step in the production process is the market, for example an auction, where the quality is checked in different ways. Samples of the products are tested for residues of pesticides, as this should not be too much. The products are also checked for whether they are sorted in the right category of weight, seize, shape, colour and for properties like damage and freshness.

For the processing step norms are formulated for hygiene and for the quantity of ingredients that is put in the product. Products like vegetables and fruit do not have to be labelled, but processed products like milk, flour and canned vegetables are labelled. This label mentions different properties of the product:

- Weight and volume
- Storage life date, which means that quality is guaranteed until this date
- Ingredients
- Nutrition value: quantity of fat, protein, carbohydrate and vitamins.
- Additives like preservatives, colouring, flavouring and aromatic substances
- Production type like biological or genetic modificated.



The government wants to have quality control in each link of the production chain. This means that even the food of the animals is tested for components that could affect consumers' health. Every product can be traced in the chain, so if in the shop appears to be something wrong with a product, the responsible grower can be found. This makes all contributing parties very aware of the fact that they have to meet the governments' quality standards. The next section describes the possibility of certification as an instrument to guarantee the quality of a product.

Figure 4.3: The temperature of the maize is tested

Certification

The principle of certification can be made clear by the role it plays in society:

- Producers prefer distinction from colleagues/competitors with regard to the supplied (quality of) products.
- Buyers benefit from a guaranteed performance of the products and from reliable information about the product.
- Certification organizations, independent and without market interests, form the link between (the interests of) both parties: the production system is inspected according to agreed standards, contractually agreed with the producer and regularly inspected. The specifications and the area of application are laid down in a scope certificate that is available for the buyer as an informative document.

There are a lot of certification organizations for all kinds of product and standards. In this section we describe the Eurepgap and EKO certification to give an example of the way these labels are used.

Eurepgap[15]

EUREP, '**Eu**ro **Re**tailer **P**roduce Working Group', is a platform of leading retailers in Europe active in the retail business of the agricultural food industry. GAP stands for '**G**ood **A**gricultural **P**ractice', a minimum production standard for a good agricultural practice of horticultural products (e.g. fruits, vegetables, potatoes, salads, cut flowers, and nursery stock). EUREP uses GAP as production standard for the certification of good agricultural practice in the agricultural and horticultural industry. At this moment the GAP standard is being applied in fresh fruits and vegetables. All kinds of agricultural products for human consumption can be certified with this standard. Special standards for flowers, animal production, grain, coffee, and feed are in development. Eurepgap is based on the principles of risk prevention, risk analysis (among others through HACCP), sustainable agriculture by means of Integrated Pest Management (IPM) and Integrated Crop Management (ICM), using existing technologies for the continuous improvement of farming systems.

[15] www.skalint.com

The reason Eurepgap has been developed is that there has been an increase in consumer awareness concerning the quality of agricultural products. Consumers want to be sure that their food is being produced safely, environmentally friendly, and that the welfare of both animal and humans are in no way compromised. With Eurepgap consumers can be sure that every step of the primary production complies with international and national standards and regulations regarding safe production of their food. The Eurepgap certificate gives growers better market access, as its retail members see Eurepgap as minimum production standards. As such, the certification will enhance farmers' marketing position. To become a certified supplier the grower makes a contract with SKAL International. SKAL comes for an inspection of the farm and its working procedures. Certified farms are inspected at least once a year announced and there is a chance to be inspected unannounced. Every year is evaluated whether the previously issued certificate can be continued, has to be amended, or even has to be withdrawn.

EKO

The EKO quality symbol is an international quality symbol for organic products. It is used when raw materials originate from organic cultivation and are processed using organic methods. EKO is a certification mark. It is neither a cultivation mark nor a trademark. Skal certifies products, processes and inputs worldwide. Skal has been authorized as an international inspection and certification organization in the EU member states.

During the inspection the following techniques are used:

- Interview with for the production responsible persons;
- Inspection of fields, premises, processing equipment, storage, etc. ;
- Inspection of paperwork; bookkeeping, weighing tags, labels etc.;
- Samples taken for residue analysis.

Points of attention during inspections for farms:

- Cropping plan and rotation; acreage per crop;
- History of past 3 years of each field where organic products are grown (preceding crops; fertilization including the use of fertilizers; pest and disease management including the use of pesticides; weed control including the use of herbicides);
- Manuring and storage of manure;
- Origin of seed material and planting material;
- Weed control and pest- and disease control; also fertilizers and sprays used in conventional crops in the region are assessed;
- Harvest estimates;
- Storage facilities;
- Livestock holding on the farm (number of animals, housing/feeding practices);
- Bookkeeping of farm.

Points of attention during inspections for processing plants:

- Origin of organic raw materials; certificates;
- Storage of organic raw materials; separation and indication of organic and conventional raw materials;
- Recipe of organic products in case of mixing raw materials;
- Description of processing procedures and methods; separation organic/ conventional processing;
- Storage, conservation, conditioning of ready products; separation and indication of organic/conventional finished products;
- Packing materials and labelling of organic products;
- Cleaning procedures in processing plant;
- Quantitative verification of accounts and results (comparison of purchase and sales); bookkeeping system; invoices; weighing tags, labels.

Figure 4.4: A farmer is using chemicals in a greenhouse. The quantity he uses is restricted by regulations.

4.6 Case Study HAK company

Introduction

HAK is one of Europes' biggest vegetable and fruit processing producers. This is especially because of quality is very important for the company. HAK exports its fifty different products to over twenty countries, like Germany, Belgium and the Netherlands Antilles. HAK has in Holland a market share of over sixty percent in the market for vegetables in glass.

Sowing

The sowing of the land is done with high quality seeds, so HAK products have the right properties. The growers that HAK cooperates with are selected by strict standards about the way the grower exploits his land. This way a group of growers is formed which are known and cared for by HAK. During the growing process there is regularly contact between HAKs' agricultural expert and the growers. The time of harvesting is determined by HAK, by samples of the pieces of land. The criteria are the maturity of the plant, the optimal presence of important nutrients like minerals and vitamins and the circumstances for harvesting.

Harvest the crops

The harvest season starts every year halfway May with rhubarb, then spinach, broad beans, capucijners, peas and carrots in June and July. In August and September the French beans and maize are harvested. These products have to be processed as quickly as possible to keep the optimal quality and verseness. After those products the cabbage and apples are harvested. Their quality is not that fast decreasing as of the first products.

Processing

The time of harvesting until the moment the products are in the jar is averagely three hours. This way the vitamins, minerals and other nutrients are preserved in the best way. HAK does not use preservatives and does not add artificial coloring or flavorings. The different vegetables and fruit need to be processed in different ways. The apples are peeled and the end of the French beans is cut of. This means that in the HAK factory are about 18 small factories which are used each from three to eight weeks a year. In this period a stock is made of each product.

Checking

Quality controls come back in every stage of the processing. When the products arrive in the factory the entrance check is done. Criteria are the color, damages, sorting, mealyness, peelyness and taste. Before filling the product is inspected for visual abnormalities. After the sterilization process the final controller checks the quantity, color and weight of the products. Taste checks are performed everyday, those are called organoleptical tests. Finally the products are checked in HAK and external laboratories for vitamins and minerals. This system of quality control guarantees to give the consumer a very natural product of high and constant quality.

Conservation

Arable farming and horticultural produce cannot be stored too long without treatment and they should be harvested within a short time. The need for a good and broad food supply exists the whole year. The conservation of vegetables and fruit is the solution for this problem. Conservation means treatment to prevent decay or delay the decaying process. HAK conserves its products by heating. The vegetables are washed in advance and shortly cooked. After that the lid is put on the jar and the jar is heated for a certain time over hundred degrees. The duration of this sterilization process depends the type of vegetables. The vegetables can be stored for some years without loosing nutrients. Once the jar is opened the products can be stored a few days.

Environment

HAK is trying to grow the vegetables and fruit in a well-considered way. Together with growers and social organizations measures are taken to reduce the environmental pollution. For example the manuring of the land is exactly determined by the needs of the land. Growers also decreased the usage of chemicals with fifty percent in the last years. Since 1998 HAK also processes biological plants in the vegetables, which are grown without chemicals and fertilizers. A lot of materials are recycled in the factory and the glass of the jars is thinner and the lids need less steel. The wastewater of the factory is treated and HAK tries to reduce its energy consumption.

5. KITUI AGRICULTURE

5.1 Agro ecological Conditions

Although Kenya's semiarid lands share a tendency to have insufficient rainfall, agro ecological conditions vary considerably. Differences in population density and infrastructure base add to this diversity.

The Yatta plateau, an undulating plateau of about 1,100 m altitude, characterizes the western part of the district. The Mutito hills rise to the north of Kitui town while to the east the Mutito escarpment drops down to the lowlands of eastern Kitui.Soils in the region are generally deficient in nitrogen and phosphorous and have low organic mater content. Low infiltration rates and a susceptibility to sealing makes many of the area's soils vulnerable to erosion, particularly since the most intense rains come early in the growing season when ground cover is poor (Sketchley 1978)

The only permanent watercourses in Kitui are found along the borders. Within the district, most streams are ephemeral, and springs provide the main source of water. The district therefore is highly dependent upon rainfall. Across such ephemeral streams SASOL has been constructing sanddams through community participatory approaches. The bimodal distribution of the rainfall has its peak in October December and March –April. February is characterized by a short dry season while a longer one is in July-August. The October-December rains are the most important for agriculture, since they are generally heavier and better distributed for crop growth than the March -April rains. [1]Rains are highly variable, both on a year –to-year basis and between locations. The district is periodically afflicted by drought. The 1983-84 drought was severe and caused widespread crop failure and loses of livestock. The last several years however, have experienced unusually favorable rainfall, with consequent increase in agricultural production.

[1] Because of the long dry season between the end of the March- April rains and the beginning of the October-December rains, two-season crops such as pigeon peas and cotton are generally planted in October. The October-December rainy season, therefore, is usually referred to as the first season.

5.2 Production Patterns

Kitui agriculture is mainly subsistence-oriented, especially outside the Central and Kyuluni Divisions. Central Division farmers generally plant a substantial proportion of their land to food crops (maize, beans, pigeon peas, cowpeas, millet, sorghum, and cassava and green grams,). The surpluses are traded off particularly to the local traders and markets. Cotton and tobacco are grown to a lesser extend as cash crops. Livestock keeping is an integral part of the Kitui farming system. Livestock is kept for its products (meat, milk, manure, and hides), the services it provides (in particular plowing), and as a form of saving.

Horticulture is in its take off stage in the Central and Kyuluni and Mutomo Divisions with vegetable growing registering an upward mobility. Vegetables such as Karrella, Brinjals, Okra, Tulia Linda, Tindori and chilies are grown under irrigation along Athi River in Mutomo and Ikutha divisions. Other local vegetables such as tomatoes, sukumawiki (kale), cabbages, capsicums, onions, corianders, spinach and pepper are grown under rain-fed conditions district-wide. Fruit and tree planting is in the increase with mangoes, avocados, citrus, lemon and guava being the common varieties. Apiculture is spread all over the district with the Southern and Yatta divisions being the highest producers of honey. The increased horticultural production in the Central and Kyuluni Divisions can be attributed to the ground water storage projects (Sanddams) and natural resource management and conservation. The farmers use little or no chemicals and fertilizers. The underlying base is that this Divisions fall under the Upper Midland 4 agro ecological zone with a mean rainfall of 850 mm- 1000 mm.

According to the social economic study contacted in Kitui district farming was recorded to be the main household occupation and source of income.

The variations in household production patterns in various divisions and sub-locations can be traced to a number of reasons; differences in resource endowment, which can influence the rate of migration. In areas where land is productive, chances of migration during famines are minimal while the rates of migration in areas, which are less endowed with resources, are bound to be high. The possibility of returning home after a famine incidence is high for people from areas with high resource endowment.

5.3 Transport and Marketing Infrastructure

Kitui District is relatively poorly served by transport systems. In general Central and Northern divisions are better endowed than the rest of the district, having both more and better roads. In Central Division a tarmac road connects Kitui Town to Nairobi via Machakos and murram roads provide connections to the Thika-Garissa road, which crosses the northern part of the district, and to the rail line from Nairobi to Mombasa at Kibwezi.Most major markets are connected to Kitui town by murram or earthen roads. The rural access roads are only passable during the dry season since during the rains they become muddy and slippery. The Kitui – Kibwezi road is strategically important since it connects the district to Mombasa, a major harbor and potential market. Kisasi, Ikanga, Mutomo and Ikutha are major trading centers along the same Kitui –Kibwezi murram road.

Kitui Town is the most important urban center in the district. In addition, each location has a number of market centers. Markets are held periodically in each center, typically on weekly basis, although larger centers may have more frequent market days. Marketers of livestock and products such as honey and hides visit these markets to buy from farmers. Local merchants including butchers and grain brokers and agents also buy produce. Posho (grain meal) mills can be found in the vicinity of most market centers. Most centers have small-scale livestock markets and slaughter slabs at which animals are sold and slaughtered by local butchers.

5.4 Grain Market.

The common grains traded are maize, beans, cowpeas, pigeon peas, millet, sorghum, and green grams. Except pigeon peas which are traded fresh and dry, the rest are sold when dry

The most interesting thing in the grain market is the organizational factor. Few wealthy traders with numerous agents mostly control the markets like a cartel; the organization is informal but very powerful. Information flows between the traders are very high hence enabling them to control the diverse markets. The traders are either grain milling corporations, wholesalers or exporters. They provide capital to selective local traders and middlemen who purchase the grains from the farmers on their behalf. In most cases the local trader or agent establishes a store, which becomes the collection center. Often the major trader sends a big truck, which collects the grains from all the affiliated local traders and agents.

In this way the agents and the local traders set the buying prices. The farmer has no other alternative and loses his bargaining power. This leads to outward exploitation. This is aggravated by the fact that the household granaries (stores) have no adequate space and conditions to preserve the grains for long. More still the transport system is so poor and expensive that the farmer cannot be able to transport his produce to other distant markets where he can fetch better prices. The end result is that the farmer gets very little money and not be able to plough back some income as capital.

5.5 The Fruit and Vegetable Market

Fruits and vegetables are grown along sand dams, streams and traditional water sources. They are also grown as rain fed crops during the wet season. The farmers are individual growers with no established contact with other growers in the same line of production. Locally they are arranged in the open- air market for sale depending on the quantity demanded. The free market forces of demand and supply set prices depending on the quantity and quality one needs to buy. The arena is a mixture of both retail and wholesale business.

Mostly the sellers are middlemen who buy the products from the farm. Sometimes few farmers undertake the trade themselves. Besides local traders buying for local use and resale, they also buy for sale in distant markets where demand is high. Mombasa City provides a ready market for these fruits and vegetables.

Production is always seasonal with gradual levels of supply ranging from periods of scarcity to plenty. During the peak season the market is saturated with supply surpassing demand. The consequences are too hard to the farmer since the prices drop and the farmer sells the products at throwaway prices to savage the little he can. By the virtual perishable nature most them become stale and/or dry.

The contributing factors are: -

- Lack of appropriate storage facilities; -coolers and refrigerators
- Lack of alternative primary and/or secondary processing
- Poor market timing and information
- Limited markets
- Inadequate transport infrastructures

5.6 Future Product and Market Potentiality

Kitui District has a potentiality of producing market-driven varieties, quantities and qualities. The potentiality has so far not been fully exploited since there has been no initiative behind it. The District's potentiality when adequately exploited can become a local, regional and international supplier of fruits and vegetables and grains.

According to the district's social economic study contacted in 2000, the sand dam project has triggered the introduction of new crops and varieties. The vegetable farms and banana farms besides the streams depict this.

New crop/ activity	Participants (Global)	Wii	Kiindu	Ithumula
Spinach growing	10	8	6	15
Fishing	11	4	16	13
Sukuma wiki	44	64	6	60
Onions	6	8	6	5
Tomatoes	10	12	2	18
Ndania	4	0	8	5
Sugar cane	5	8	0	8
Arrow roots	1	0	4	0
Fruits	6	4	6	8
Other crop	5	4	7	5

Table 5.1:New Crops And Activities[2]

The project triggered new activities in the three catchments areas. The most prominent among these activities is Sukuma wiki growing. From the participants' global data, 44% of those interviewed reported Sukuma wiki growing as not only a new activity but to boot the crop is also new in the area, while 10% reported tomatoes and spinach growing in the project area.

In Wii, Kiindu and Ithumula catchments, it was reported by 64%, 6% and 60% of the participants respectively that Sukuma wiki growing is a key economic activity after the construction of the sand dams. Other respondents (both participants and non-participants) specifically mentioned spinach, sukuma wiki (kale), onions, tomatoes and ndania (coriander) as having been introduced in the project catchment area as can be observed in the table.Fishing which was uncommon in the area was also reported but is more pronounced in Ithumula and Kiindu catchment. This is a transient activity for when the dams fill with sand, the re will be no fishing.Sugar cane is becoming an important economic activity in Mbitini and Ngangani sub-locations. Growing of arrowroots is also picking up in most areas. Ngangani sub-location reported the highest (18) per cent among the reported cases of fruit growing as a new activity followed by Mbitini, 14%.

There is a need to carry out a feasibility study on the potentiality of mangoes in the Sand dam project areas. The agro ecological conditions are suitable for two different varieties of export mango i.e. Apple/Tommy Atkins and Ngowe varieties. Some of these mangoes can be found being sold alongside the Kitui -Machakos road. Currently the farmers are not producing at such optimal levels due to lack motivational initiatives and ignorance. We can say that the farmers are in the transition period from purely subsistence farmers to being commercial farmers. In such flight we should expect them to be ignorant and unaware of the potentiality they are sitting on. The traditional notion that there is no prospects for agriculture in marginal areas such as Kitui need to be erased from the minds of the people and policy makers. The tropical climate is favourable to many crops and with water farming is viable. Therefore the stress should be on provision of water for production purposes. Citing from the average rainfall of 600mm-1000mm each year, if such water is harnessed and stored as ground water then the whole scenario will be reversed.

Employing the four marketing mix of product, place, time and price in the right levels we will expect an upward mobility in vertical integration. Quantity and quality will improve rendering the products competitive in the internationals markets. The lateral integration will bring the farmers closer hence lessening the existing gap. The farmer power will be established with high possibilities of having equal share of controlling the markets with the traders. One change will lead to another and the system can stabilise within a shorter period than expected.

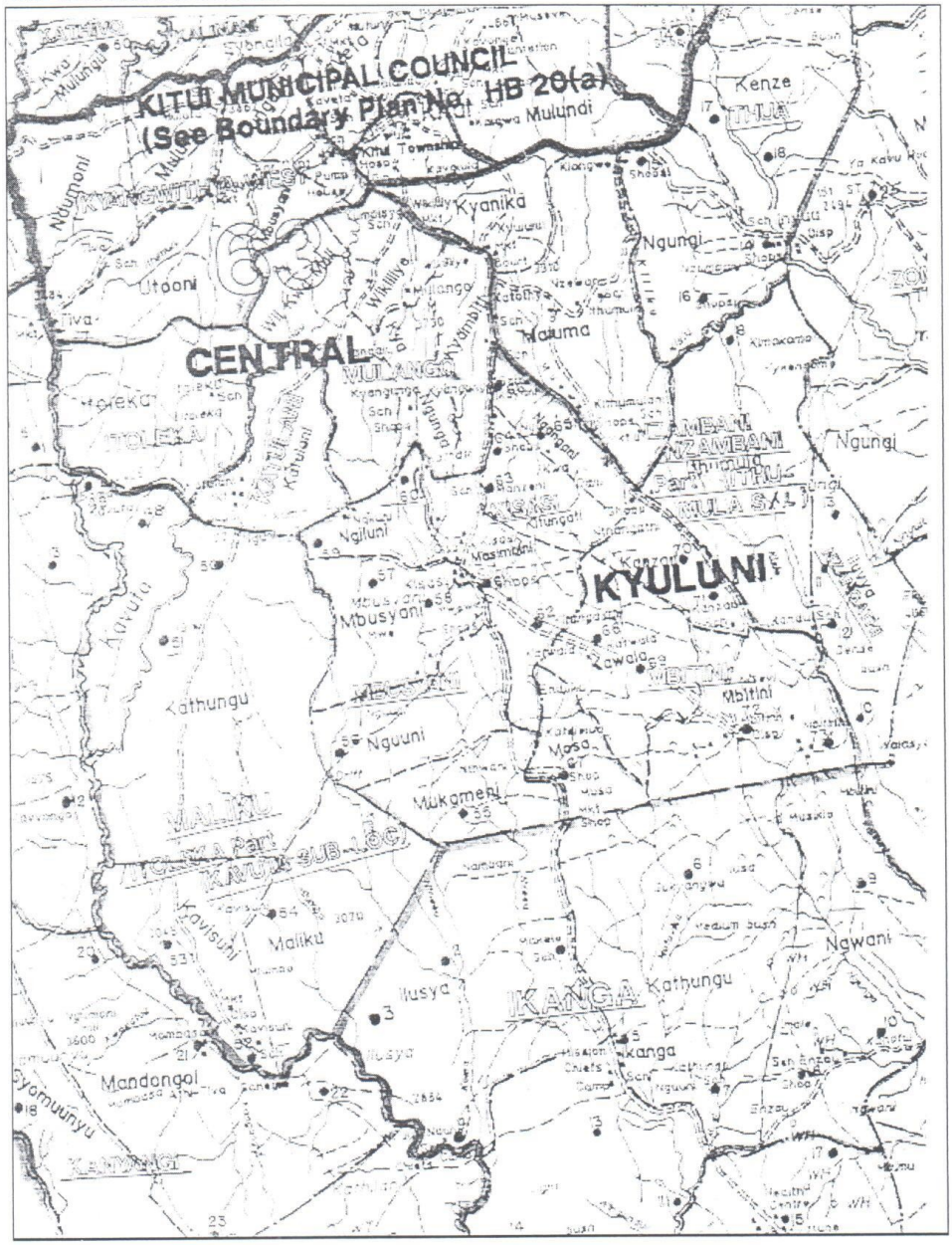
[2] KITUI SAND DAMS: SOCIAL AND ECONOMIC IMPACTS REPORT JUNE 2002

5.7 SASOL and Kitui Agriculture

SASOL is a local Non Governmental organization in Kitui district, whose programme is development of water resources. It is a rural development project and it conforms to the government's policy of district focus for rural development. Kitui district being one of the driest districts in Kenya, rains are seasonal and all the water is carried to the main rivers outside the district leaving the district dry shortly after the rains. This limits agricultural practices in the district. Scarcity of water in Kitui district has hindered development in the district in the sense that after the rainy season most of the time is spend on water, that is people have to walk long distance looking for water for their use and for their livestock. Kitui people only practice farming during rainy seasons hence they only have small-scale production that is just for their own consumption. The major objective of SASOL foundation therefore is to provide water to the kitui people.

To attain its objective SASOL has focused on three major things, first on improving the retention of ground water through installing barrages in sand rivers. This involves construction of barricades across the streams to capture the running water during rainy season so that the community can utilize it after the rains. Sanddams [barrages] are underground water storage reservoirs where by after the construction of the barricade the running water carries with it a lot of sand, which is stored upstream, and it is in this sand where the water is stored. Secondly the SASOL has focused on improving the availability of water through shallow wells. These are constructed to provide clean water for drinking and other household consumption. Thirdly, the focus is on improving the recharge of ground water through better land use and conservation. To achieve this SASOL staff organizes seminars and workshops and train the community on how they can utilize ground water and more so how to keep it free of contamination. The SASOL trains the community on the importance of toilets, establishment of tree nurseries, and also planting the crops which can utilize the under ground water

MAP 2: THE PROJECT AREA



5.8 Community participation in sand dam projects

The community participation is most outstanding in the implementation of SASOL activities. The people are first trained before the community is mobilized. The PRA[16] approach is used to facilitate the training. The community selects from 20 to 50 trainees, both men and women. Baseline information is collected to provide a point of reference for future comparison after developments. The baseline information constitutes the social setting of the community, resources available, time line showing the major events land use, soil fertility availability of food and the other important aspects of the community. This information helps the participants to know their own situation and understand their strengths and weaknesses. The problems facing the community are then identified and impact analysis carried out to determine the best development activity to be undertaken. The community mobilization then comes in, where the community is explained on what is expected of it and how it is supposed to participate. The community that would benefit from a new sand dam or a shallow well may comprise of two or three villages. The community elects a chairperson [often a woman] and a storekeeper. The chairperson works with the village headmen to assign tasks to the community members. The community arranges for the delivery, storage and recording of the materials purchased by the SASOL. The community provide labor; usually men carry out the heavier tasks like digging foundations, breaking rocks and hauling large stones. Women carry out other tasks like carrying water [if it is not available at the site while the dam is being constructed] and small stones, washing stones, mixing the sand and cement mortar and cooking food on the site of construction while the SASOL provides the artisan and the other materials which cannot be obtained locally like cement and reinforcements bars. Sand for construction is obtained locally from the site of construction. The community provides maintenance and accommodation for the artisan assigned to them by SASOL.

The sand dams have a long-term effect to the community as the stored water seep to the farmlands making it possible for cultivation. The construction of sand dams impedes downstream flow and recharges the riverbanks from which the water returns as the dry season proceeds. Scooping the sand and hence fetching water obtain the underground water in the sand dams. The community practice bucket irrigation to grow vegetables and fruits during the dry season. The communities have managed to produce enough for their family consumption and to serve the neighbouring communities outside the project area. Generally the availability of water from the sand dams has led to higher production hence the need to look for markets outside the district and abroad. Our study on marketing therefore becomes essential where we are going to design a better marketing possibility to limit the spoilages and losses to the farmers.

[16] Participatory Rural Appraisal

6. FUTURE ACTION AND POTENTIAL MARKET MECHANISMS

6.1 Introduction

Basing our arguments on the weaknesses of the Kitui marketing system and deriving from the successes of the Dutch system, various marketing channels can be applicable. See also figure 6.1. The channels can be simple or complex but the success will not explicitly depend on the nature of the simplicity or complexity. Therefore the choice of a channel will depend on weighing of different factors like:

1. The product.
    - What is the type of the products? Are they grains, vegetables and fruits or animal products?
    - What is the variety of the product? is it indigenous, exotic or hybrid?
    - What is the nature of the product? Is it highly perishable, long lasting, fresh or dry?
    - Do the products need further processing, storage, packaging and transportation?
2. The market.
    - What is the size of the market?
    - How is the market organized?
    - How can the market be reached/accessed?

3 The Infrastructure.

- Are the roads passable both in dry and wet seasons?
- Are transport facilities available
- Are there communication networks?

4 Capital investments.

- What is the amount of capital to be invested?
- Is the capital available?

5 Land

- What is the size of the land?
- What is the rent of land?
- What is the soil profile, texture and fertility.

6 Labor

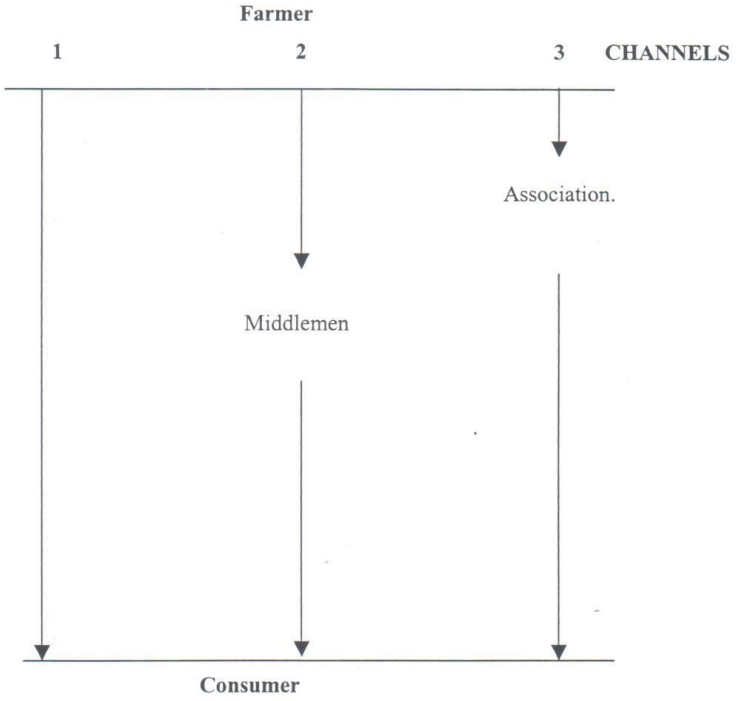
- Is labor available
- What is the wage of labor?

7 Government policy

- What is the agricultural policy in Kenya
- What is the law governing the setting up of industries?
- What are the import and export regulations
- Which quality control systems and institutions are in operation

Different channels can be employed simultaneously but also it is good to note that the longer the channel the higher the price. This is due to the fact the overhead costs increase with each extra step in the channel. The price burden can be pushed to the consumer or the farmer. The current market mechanism is free competition and when the price burden is pushed on to the consumer there is a tendency that the consumers will switch on to different relatively cheaper products Therefore to maintain the market the burden is pushed to the farmers who receive poor prices for their products.

Figure 6.1. Possible marketing channels between farmers and consumers



6.2 Descriptions

Channel 1 & 2 show individual selling while 3 shows cooperative selling. We will use the SWOT analysis to evaluate the channels.

Channel 1

In this channel the farmer sells the products directly to the consumer. The two have close contact and know each other better. Information flow is easy and short and negotiation is face to face. The channel is short and renders it to fewer overheads, which makes the price a bit good for the farmer.

This channel becomes weak when the farmer has to do investments in transport, storage and processing. It requires a lot of capital that cannot be available to many Kitui farmers. The farmer bargaining power is less since each farmer operates individually.

The available opportunities for this channel can be found in local market selling. For example a small-scale vegetable farmer can sell the vegetables to the neighborhood. It will also succeed in selling of produce, which will not need further processing. The farmers have a chance to start up small processing plants.

When competing farmers enter the market, saturation is possible due to the limited size of the accessible market. This will threaten the existence of this channel.

Channel 2

This channel shows farmers selling to second parties who in turn sell to consumers. The second parties can either be middlemen (dealers), industry or both. The dealers can be wholesalers, retailers, or supermarkets. When the produce is sold to the industry it is processed and sold to the consumers through the same dealers.

In most cases the dealers do the marketing functions and the farmer is left to concentrate in production. These functions are transportation, storage, market search, and actual selling. Therefore the farmer does not need to put much investment in these functions.

The weakness of this channel can be seen when the middlemen exploit the farmers without the farmers being aware. The middlemen would like to get the produce from the farmer at the lowest possible price since they want to maximize their profits. The farmer bargaining power is less since each farmer operates individually. Also the farmer does not get all the necessary marketing information.

The opportunities for farmers in this channel can be available when the consumers are far from the farmer. In this way the farmer does not need to travel or transport the produce long distances to reach the consumers but the middlemen do it. Also the industry can be set up near the farmers and the distance is shortened.

The success of this channel is threatened when farmer cooperatives compete against the individual farmers in the same market.

Channel 3

This channel shows that the farmers pool together their resources and form an association so as to perform the marketing functions collectively. These functions are logistics, storage, packaging, bargaining and quality control. In this way they increase their bargaining power and are in a position to control the market for their products. As an association the farmers are able to influence the determination of the price.

The weakness of this channel is that when the association grows the farmers tend to loose the control of the cooperative because the board of management controls it. There are chances of the cooperative being mismanaged because the staff unlike the farmers does not feel the need to be totally responsible.

The opportunities for association are that it is easy to get credit facilities since the credit providers can trust them more than individual farmers. It is also easy to lobby and pressurize the government to do investment in infrastructure. The association can also form an industry to process the produce. The association can be formed within the dam communities or between dam communities.

Conclusions

Although all these channels can be applicable to Kitui to some extend channel three is more suitable. This is because in the first and the second channels the farmers work individually and are exposed to more threats than when working collectively. In channel three the farmers work collectively and it becomes easier to get credit facilities, lobby and start a processing plant. Marketing functions like quality control, packaging, storage, transportation, information flow and selling become more centralized. Market search and research are done with much ease.

6.3 Value Addition Possibilities

In this section we describe for each product type, the alternative markets and related processing.

Cereals

Maize, sorghum and millet can be sold locally or regionally. The dehulling companies can buy the cereals from the farmers and transport them to the processing plants.

Beans

Cow peas, pigeon peas, green grams and beans can be sold when dry or fresh. They can be processed and preserved and sold locally and internationally.

Fruits

Fruits can be sold when fresh or dried. They can also be processed into fruit juice. The fruit products can be sold domestically or internationally. Mango, passion fruit, citrus, papaya, guava and avocado are the common fruits found in Kitui and have a great potentiality. This can be visualized in the figure below.

Vegetables

Cabbages, kale, tomatoes, brinjals, and sweet pepper can be sold fresh or when processed. Tomatoes can be processed into tomato puree, juice or be dried. These products can be sold domestically and/or internationally. This can be visualized in the figure below.

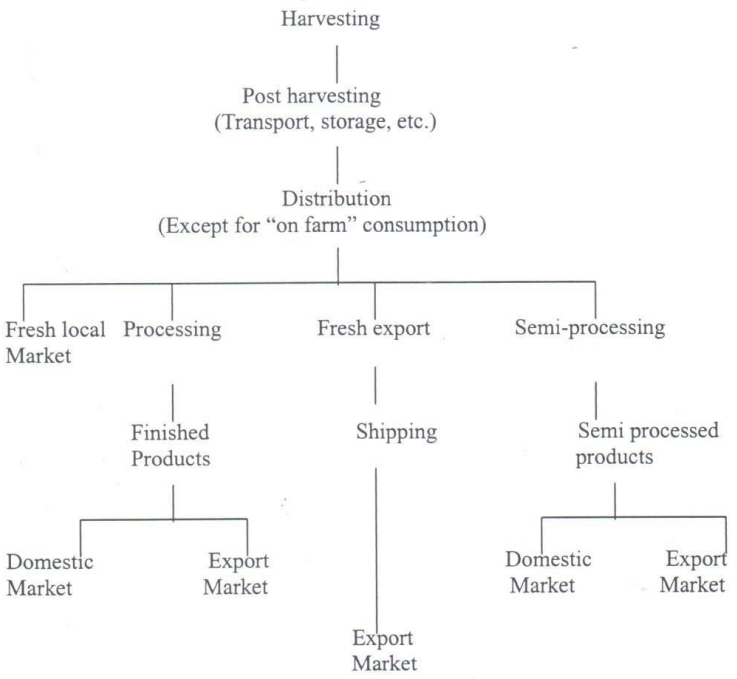


Figure 6.2: Fruits and vegetables-global marketing view

6.4 Alternative selling mechanism

Within the described channels the selling can be organized differently. We describe two mechanisms as alternative to the existing systems.

Contract farming

This is where the farmers produce on contract bases. The farmer produces a certain amount of his produce according to the agreement, if he happens to produce excess he has to find market for the extra. The contractors can be a processing plant, supermarket, consumer [taking a tender of supplying a produce to a school, hospital or children's home]. This channel assures the farmer of a ready and sustainable market for his produce till when the contract is over and he then can renew the contract if the services are to his satisfaction or else he looks for another contractor.

Auction

This is where the farmers come together and forms an auction cooperative so as to be able to sell their products at a centralized market. The farmers are supposed to transport their produce to the auction market .In the auction market the selling is done by a centralized medium. In this market the buyers meet with the farmers so that they can purchase their produce. The selling is done by gradually decreasing the price by the centralized intermediary or the auction clock and the highest bidder [the one who is ready to offer the highest price] is the one who buys the product. In the auction market the buyers can be dealers who buy and go to sell the products or agents of shops and supermarkets the since their aim is also to make profit they require high quality products and fair prices.

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6.5 Information flows

The success of the market depends partly on the flow of information. There should be a steady flow of information from the farmers up to the consumers and vice versa. When the information system is centralized it becomes easier for the flow. Pamphlets, the media, newspapers, seminars and advertisements are easy ways of passing information.

7. RECOMMENDATIONS

In this report we provided an overview of the Dutch agricultural marketing and of the situation in Kitui District. The Dutch system is too complex to be used directly in Kitui, but we found it useful to derive a system that is suitable for Kitui. This can be done by tailoring the complexity of the Dutch system to apply to the current situation in Kitui.

Farmers associations

- Encourage the farmers to form farmers associations to assure:
    - Steady supply of products for the market; industry and consumers
    - That they increase their bargaining power
    - That they can get credit facilities from the banks since the banks will trust associations more than individuals.
    - Knowledge sharing possibilities among the farmers.
- The farmers associations can arrange transport, storage, market search (find ready buyers and negotiate on price, quality and quantity), quality control, market information and training.
- The farmers associations can set up their own small-scale processing facilities.

Credit

- Cooperative banks, commercial banks and other small- scale supportive credit institutions should be encouraged to provide farmers with credit facilities at farmer-friendly interest rates.
- The development agencies should be encouraged to come up with credit proposals for the farmers.

Infrastructure

- The communities can come together to build and repair village feeder roads and paths.
- The development agencies and NGOs can supply electricity, communication and road networks, health and social facilities through participatory approach
- Sasol and other development agencies should continue building water projects for both domestic and production purposes.

Export

- The farmers should target local, national, international standards and find opportunities to sell their products.
- Export companies from Kenya or abroad have to look for possibilities in Kitui.

Value addition

Processing

- Encourage domestic and international investors to start up processing plants in Kitui so as to come closer to the farmers.
- Farmers can cooperate in making investments for processing and start small-scale local processors.

Kitui brand

- The possibility of setting up a quality brand should be investigated.

Training (seminars and workshops)
Training farmers on agricultural production and agricultural marketing is necessary for enlightenment since most of the farmers are not adequately educated.

Training providers
- Development agencies and NGOs
- The government
- Independent experts.

Agricultural production training topics
- Seed quality, variety and choice
- Crop types and growth requirements.
- Soil conservation
- Seasons and season timing.
- Harvesting and preservation.

Agricultural marketing topics
- Storage
- Quality control
- Market search and information.
- Targeting, segmentation and positioning.
- Value addition
- Future marketing potentials, research and development.

Further research
- Research on Kitui production capacity with respect to specific crop types, varieties and livestock types and breeds and their potential improvements. This overview can be used to improve the existing situation and to inform investors.
- Setting scenarios and researching on their marketing possibilities.
- Study comparable rural development processes in other countries.

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Ministry of Agriculture, Fishery and Nature Management, www.minlnv.nl

Netherlands Embassy Washington, www.netherlands-embassy.org

Ohio State University, College of Food, Agricultural and Environmental Sciences, http://ohioline.osu.edu

Platform Biologica, policy and promotion organization for organic farming and food, www.platformbiologica.nl

Skal International, organic inspection and certification organization, www.skalint.com

Swiss Research Institute of Organic Agriculture, www.organic-europe.net

The Greenery, auction in The Netherlands, www.TheGreenery.nl

Wageningen University of Agriculture, www.wau.nl

CLIMATE PACIFICATION

Manual for prosperity production

PILOT: MOUNT KILIMANJARO, PIVOT FOR INSTANT ENVIRONMENTAL ECONOMIC GROWTH

- Climate disturbances have increased the frequency and magnitude of global flood and drought cycles.
- A quarter of the world population is under direct threat, jeopardizing any continuation of economy.
- The global economic loss from weather upheaval has tripled to USD 1 billion per year in the last four decades.
- USD 200 billion invested in an increase of the world's continental water vapor flows to 140.000 cubic kilometer per year, reverts El-Nino extremes, climate warming and ocean level elevation into unprecedented abundance.
- The world's greatest civilizations all perished due to climate change in generation of sustained flood and drought regimes.
- A doubling of equatorial water vapor flows prevents flood and drought destruction at higher latitudes.

MOUNT KILIMANJARO: PIVOT FOR INSTANT ENVIRONMENTAL ECONOMIC GROWTH

Abstract

The land locked glacier altitude and adjacent depression in seasonal lake formation of Kilimanjaro-Amboseli, subject to desert generative bi-annual rainfall, incorporates the universal conditions to re-instate perennial precipitation, in generation of trans regional extension.

Deployment of 2.76 million cubic meter surface water, subject to 40% annual seepage and forest regulated evaporation, re-cycled by mountain elevation; dictates bi-annual extension in accommodation of additional rain season discharge.

Mount Kilimanjaro's hydrosphere saturation from bi-annual expanding bio-sphere rehabilitation, equilibrates in consequent extending pacified perennial precipitation.

Increasing, land mass recycled evaporation volumes, subject to improved evapotranspiration trajectories, generated from biosphere rehabilitation, are in reduction of global, atmosphere administered, vapor flows and El-Nino extremes.

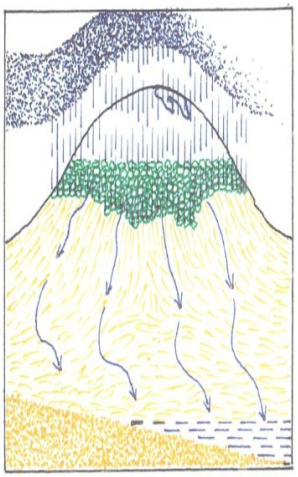
An increase in equatorial, land mass recycled rainfall, is reducing flood risks on higher latitudes.

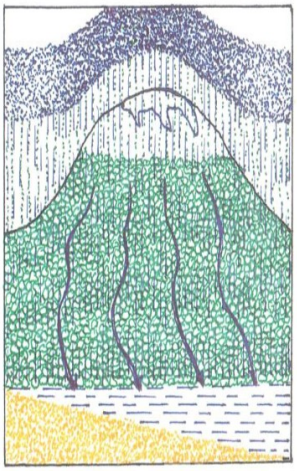
Improved evapotranspirational capacities on higher latitudes, reduce local wind storms and simultaneously facilitate desert combat, through extending pacified precipitation patterns, accommodated in re-curring recipient aquatic infrastructure.

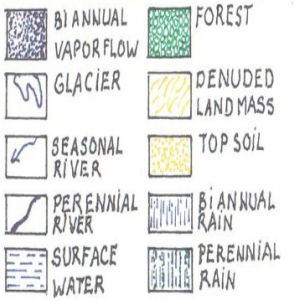
Expanding rain recipient and accommodating land mass, is in additional decrease of global El-Nino repercussions, nurturing climate cooling and ocean level depression, in generation of extending food production capacity, for the growing world population.

Climate disturbances have increased the frequency and magnitude of flood and drought cycles, directly jeopardizing a quarter of the world population and tripled the annual world economic loss to USD 1 billion in less than four decades.

Inter continental oriented low cost- high revenue, pilot development, of hydrodynamic extension into biosphere resuscitation, ignites rapid regional multiplication in culmination of world wide climate pacification.





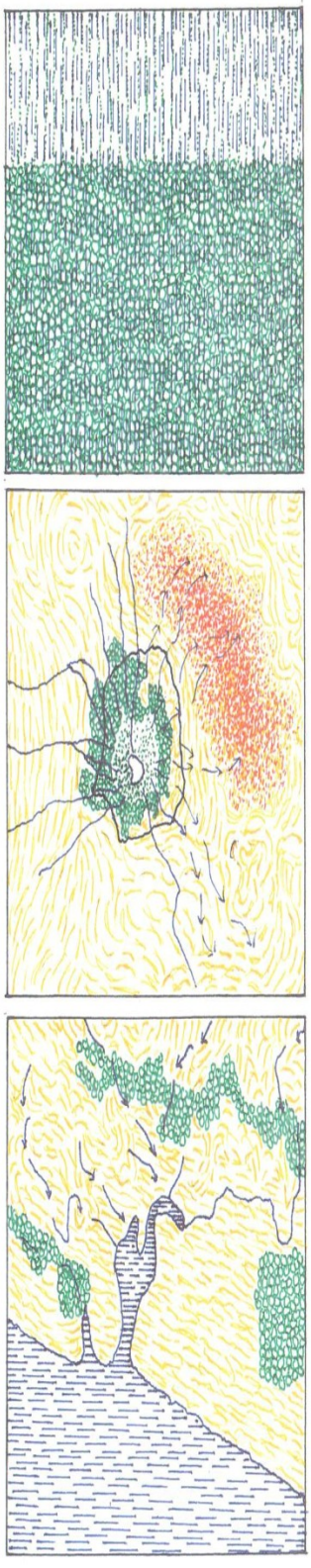


Transition from bi-annual rainfall into perennial precipitation

Less than a thousand kilometers west of Mount Kilimanjaro, the tropical rain forest climate of the Congo basin is characterised by almost constant heat, humidity and rainfall to an annual depth of 1500mm.
Plant growth takes place throughout the year resulting in luxuriant vegetation.
The solar heat causes daily evaporation from lakes and moist land mass.
The heated saturated air rises and cools at higher altitude into rainfall in almost the same area from which the moisture originates.

On the same latitude, towards East-Africa's major source of precipitation, the Indian Ocean; rainfall segregated in two rain seasons, drops from a 1000 to less than 400mm in regions affected by encroaching desertification.
Deforestation and consequent vegetation cover recession from the coast up to the continent's rain forested interior, diminished the year round landmass evapotranspiration capacity.
The region subsequently became entirely dependent on bi-annual rainfall prone to aggravating flood and drought cycle.
With an expected rise in water demand, subject to a 50% human population increase, a rehabilitation of the biosphere is required, in restoration of the region's evaporation potential and perennial precipitation.

Diversification of East Africa's unilateral dependence on bi-annual precipitation volumes from the Indian Ocean, requires accumulative storage capacity, nurturing perennial, in situ water recycling in expanse.
Foliage rehabilitation of intake and conduit trajectories in conjunction with extending afforestation of projected recipient land mass, generates a regulated bi-annual accumulation to regionally recycled evaporation volumes.
The (re) introduction of quadruple agriculture in restoration of indigenous tree canopy, supported with grafted fruit trees, shrubs and seasonal crop provide a hydrology sustaining culture and instant economic growth.



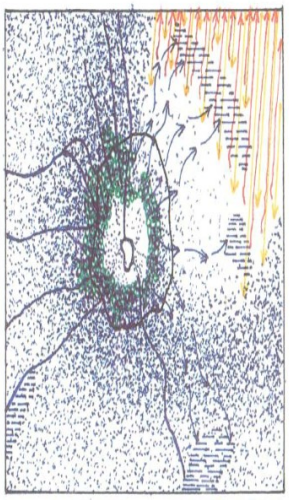
Mount Kilimanjaro's land mass elevation focussed on climate pacification

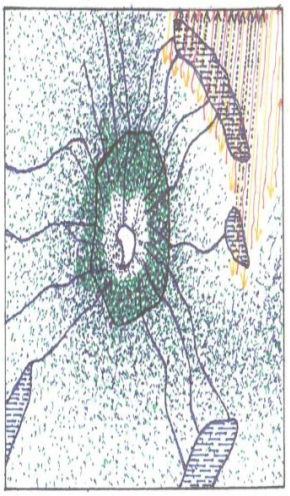
Mount Kilimanjaro's glacier is receding caused by insufficient bi-annual precipitation in conjunction with accelerated discharge of run off water instigated by deforestation of the surrounding low lands and the mountain's lower slopes.
Transition of the current, single layer, subsistence agriculture and pastoral occupation into commercial quadruple utilisation, will accumulate bi-annual rainfall required for extension, instigating perennial precipitation focussed around the mountain elevation.
Evaporation from the reforested region is cooled into rainfall by daily convection conducted and returned by Kilimanjaro's elevation to the same area from which the moisture originates.

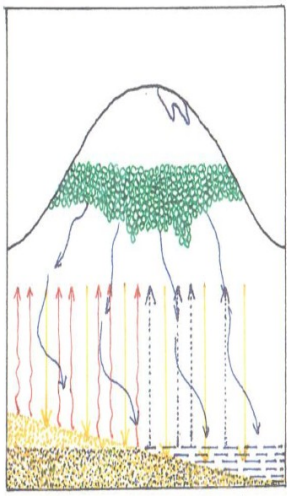
The glacier's frequent exposure to precipitation will consequently accumulate ice and snow formation in regulation of the mountain's discharge and rehabilitation of its aquatic storage capacity.
The astronomic monetary revenue discrepancy from subsistence land utilisation and quadruple agriculture, facilitates rapid self propelled expansion, instigating regional climate cooling and commercial termination of erosion.
The transition of matured erosion gullies into water collection capacity, through the deployment of sub-surface dams is a commercial viable utilisation for surface water collection and sub-surface water accumulation subject to favourable dimensions.

Amboseli: desertification through inundation

The Amboseli depression with an annual rainfall between 200 and 400mm, incorporates progressive desertification in physical confinement with however pivotal thermo and hydro dynamic consequences for the entire Kilimanjaro region.
Deforestation of Mount Kilimanjaro's lower slopes for seasonal crop cultivation, annihilated the medium and deep rooted hydrologic system, instigating accelerated aquatic discharge in ever depressing erosion, inaccessible for agricultural utilisation.
The thus created over-capacity of subsurface water, subjected to gravity, resurfaces in the Amboseli depression in elevation of the ground water table and swamp formation.







The format and quantity of the slopes' swept away debris, suffocates the vegetation on the flood plains, in siltation and consequent strangulation of the swamps bio-diversity. Amboseli's saturated water retention capacity in conjunction with the soil's crystalline segregation in reaction to humidification and de-hydration forces annual precipitation into the evaporational confinement of a seasonal lake.

Liberated and henceforth concentrated salination, re-activated by rain season flooding, prohibits sufficient vegetation recovery, accelerating decline.

Mount Kilimanjaro's perennial influx of consumable water in swamp formation, became the major surface water resource in generation of fodder with limited nutritional scope for cattle and wildlife.

Subject to the limitation in concentration of this perennial water and food resource, long distance and high density cattle circulation proves destructive for remaining grass occupation, accelerating desertification.

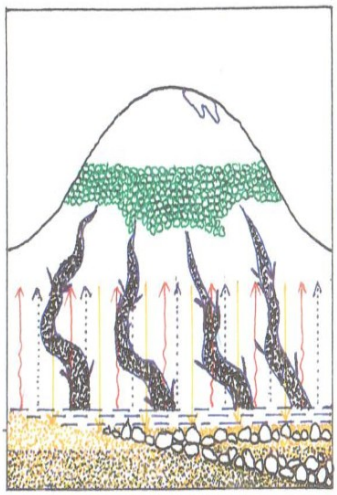
Amboseli's high pressure cell, generated by heat reflection, from denuded land mass, distorts Mount Kilimanjaro's retention capacity of the region's limited evaporation volume into north, north-westerly dispersion.

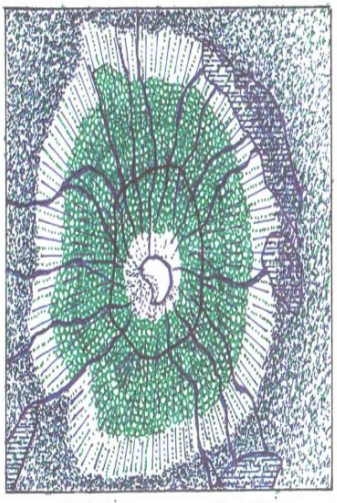
Afforestation of the depression's aquatic feeder zones, facilitated by water and soil conservation, stabilises disbursement, decreases daily temperatures in reflection, enhances regulated evaporation and generates grass, shrub and crop improvement, in dispersion of cattle, wildlife and human activities.

A subsequent increment in precipitation and regulated disbursement thereof, will improve vegetation cover in Amboseli's depression, in simultaneous de-salination through top soil penetration and a decreasing ground water table.

Kilimanjaro's hydrospheric perforation thus ceases, upon which the region's bi-annual rain water accumulation from the Indian Ocean's evaporation volume commences.

Quadruple agricultural deployment, surrounding a land mass elevation with dimensions such as Kilimanjaro, set a perpetual accumulative precipitation pattern in motion facilitating unhampered expansion in adjacent regions.



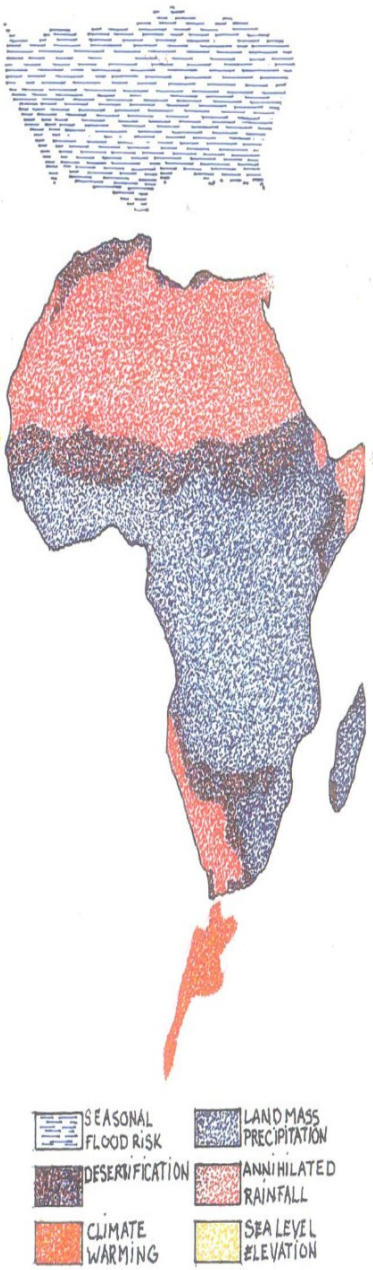


International cooperation in climate pacification

Eurasia's deforestation, instigated 13000 years ago by agriculture, need for building materials and energy supply, turned north-east Africa's stable recipient precipitation into an accelerated flood and drought cycle.
Some five thousand years ago, reduced evapotranspiration from Eurasia's deforested land mass turned the Sahara savanna into an expanding desert up to the present day. "Natural" disasters caused by deforestation, have increased the frequency and magnitude of flood and drought cycles directly jeopardizing 25% of the world population and tripling the annual economic loss to USD 1 billion in less than four decades.
The most frequent disasters in 1998, the year America and Asia were particularly hard hit, were windstorms (240) and floods (170), which together accounted for 85% of the total economic losses (Verstappen, H.Th 2001.)

Climate pacification is a global priority beyond race, religion or (development) status, in requirement of unprecedented international cooperation.
Subject to the magnitude and myriad nature of world wide, accelerating biosphere degradation, an effectively unified intercontinental or international approach remains a pipe dream in our contemporary constellation.
Deployment of pilot developments, beneficial on the local level with international status, in dis-entanglement of universal predicament, will dissolve the current (inter)national stalemate.

An increase in pacified and therefore erosion diminutive equatorial rainfall, is a reduction in flood risks on higher latitudes and an equivalent decrease of global El-Nino repercussions.
An increase of the evapotranspirational capacity on higher latitudes is in reduction of local wind storms and will simultaneously facilitate desert combat through re-appearing precipitation patterns, should recipient aquatic infrastructure be rehabilitated.
An increase in rain recipient and accommodating land mass is in equivalent decrease of global El-Nino extremes, nurturing climate cooling and ocean level depression.



Rehabilitation and tranquilization of existing and re-appearing aquatic infrastructure is in assembly of the breeding ground for trans-continental deployment of quadruple agriculture, generating global climate pacification.

The world currently produces enough food for everyone at the cost of accelerating bio-diversity destruction.

The majority of the world population simultaneously suffers from malnutrition and lack of sufficient potable water instigated by reactionary scarcity policies.

In conjunction with contemporary scientific approach, this majority is held in ever severe ransom subject to accelerating decline, in the absence of any comprehension with regards to a self sufficient production of water, food and bio-diversity.

Pilot projects re-instating the physical conditions for biosphere rehabilitation through hydrodynamic extension, form the simple cure for the current collision course, with instant economic growth and vascular climate pacification as a tangible result.

Kitenden dam, Amboseli Kenya: pilot into biosphere assembly

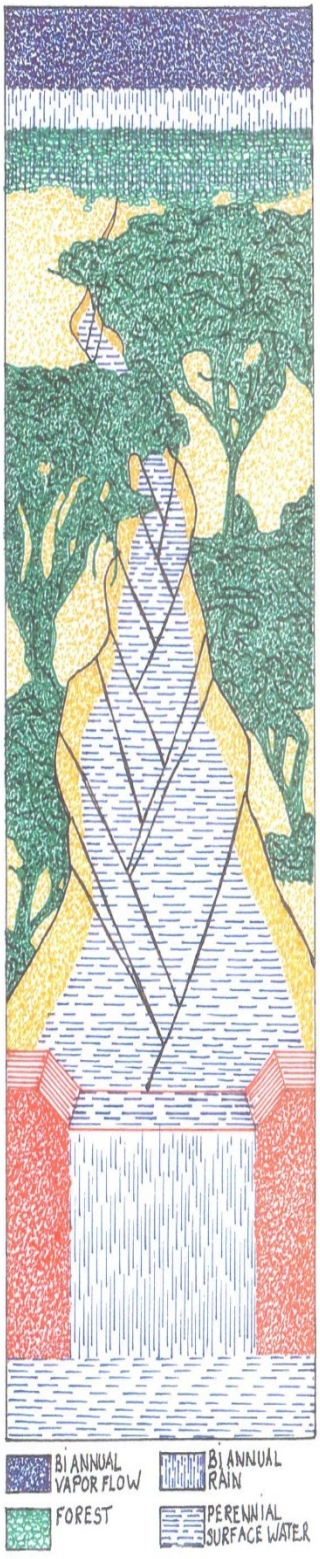
Less than fourty five square kilometers of canopy destruction, turned the Kitendeni river on Mount Kilimanjaro into a torrential seasonal stream, in ever deepening encroachment of the mountain's slopes.

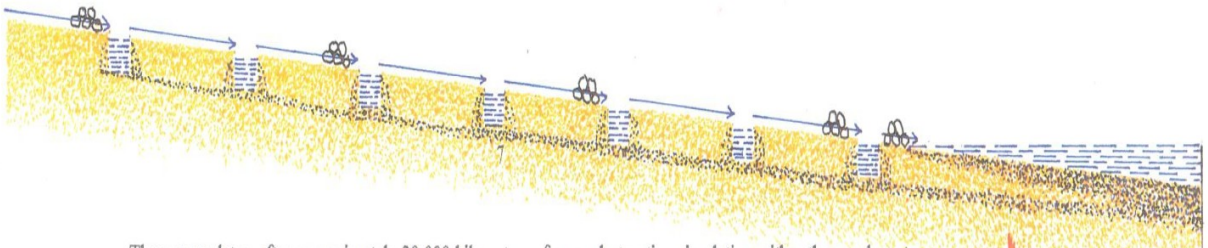
Soils and washed out vegetation from kilometers of erosion gulleys, in excess of several meters, are deposited in seasonal swamp formation of the Amboseli depression, subject to unabating evaporation in de-regulation and consequent salination.

The Kitenden dam in Kenya, beneficiary from Kitendeni river's silt laden discharge of Mount Kilimanjaro, has to be scooped every seventh year at a cost of USD 25000, pushing the surface water cubic meter price, from an initial USD 1.20 to a staggering 7 USD in the sixth year of operation.

Excessive and silt laden El-Nino flash floods, abruptly terminated the Kitenden dam's water collection capacity in 1998.

Three hundred people, their cattle and livestock were subsequently forced into a daily thirty kilometer walk to and from the nearest water supply in Amboseli National Park.





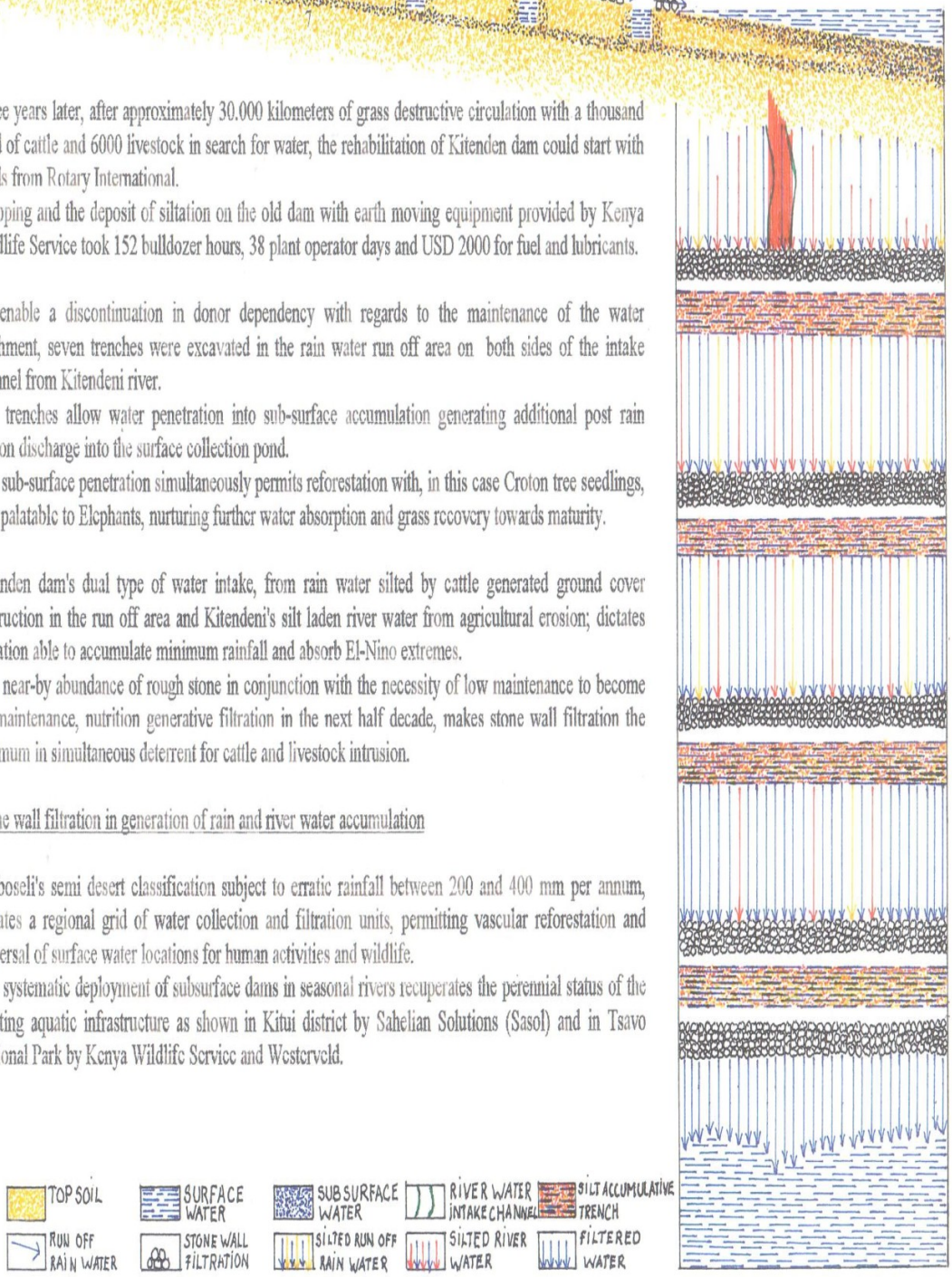
Three years later, after approximately 30.000 kilometers of grass destructive circulation with a thousand head of cattle and 6000 livestock in search for water, the rehabilitation of Kitenden dam could start with funds from Rotary International.
Scooping and the deposit of siltation on the old dam with earth moving equipment provided by Kenya Wildlife Service took 152 bulldozer hours, 38 plant operator days and USD 2000 for fuel and lubricants.

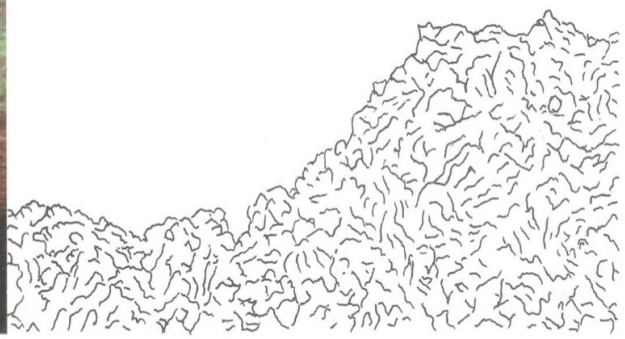
To enable a discontinuation in donor dependency with regards to the maintenance of the water catchment, seven trenches were excavated in the rain water run off area on both sides of the intake channel from Kitendeni river.
The trenches allow water penetration into sub-surface accumulation generating additional post rain season discharge into the surface collection pond.
The sub-surface penetration simultaneously permits reforestation with, in this case Croton tree seedlings, non palatable to Elephants, nurturing further water absorption and grass recovery towards maturity.

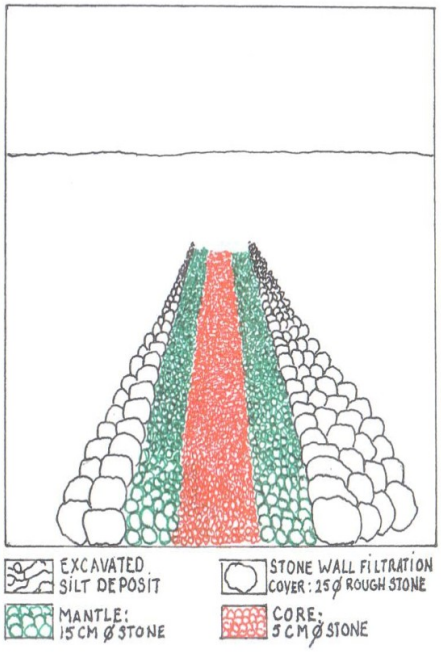
Kitenden dam's dual type of water intake, from rain water silted by cattle generated ground cover destruction in the run off area and Kitendeni's silt laden river water from agricultural erosion; dictates filtration able to accumulate minimum rainfall and absorb El-Nino extremes.
The near-by abundance of rough stone in conjunction with the necessity of low maintenance to become no maintenance, nutrition generative filtration in the next half decade, makes stone wall filtration the optimum in simultaneous deterrent for cattle and livestock intrusion.

Stone wall filtration in generation of rain and river water accumulation

Amboseli's semi desert classification subject to erratic rainfall between 200 and 400 mm per annum, dictates a regional grid of water collection and filtration units, permitting vascular reforestation and dispersal of surface water locations for human activities and wildlife.
The systematic deployment of subsurface dams in seasonal rivers recuperates the perennial status of the existing aquatic infrastructure as shown in Kitui district by Sahelian Solutions (Sasol) and in Tsavo National Park by Kenya Wildlife Service and Westerveld.



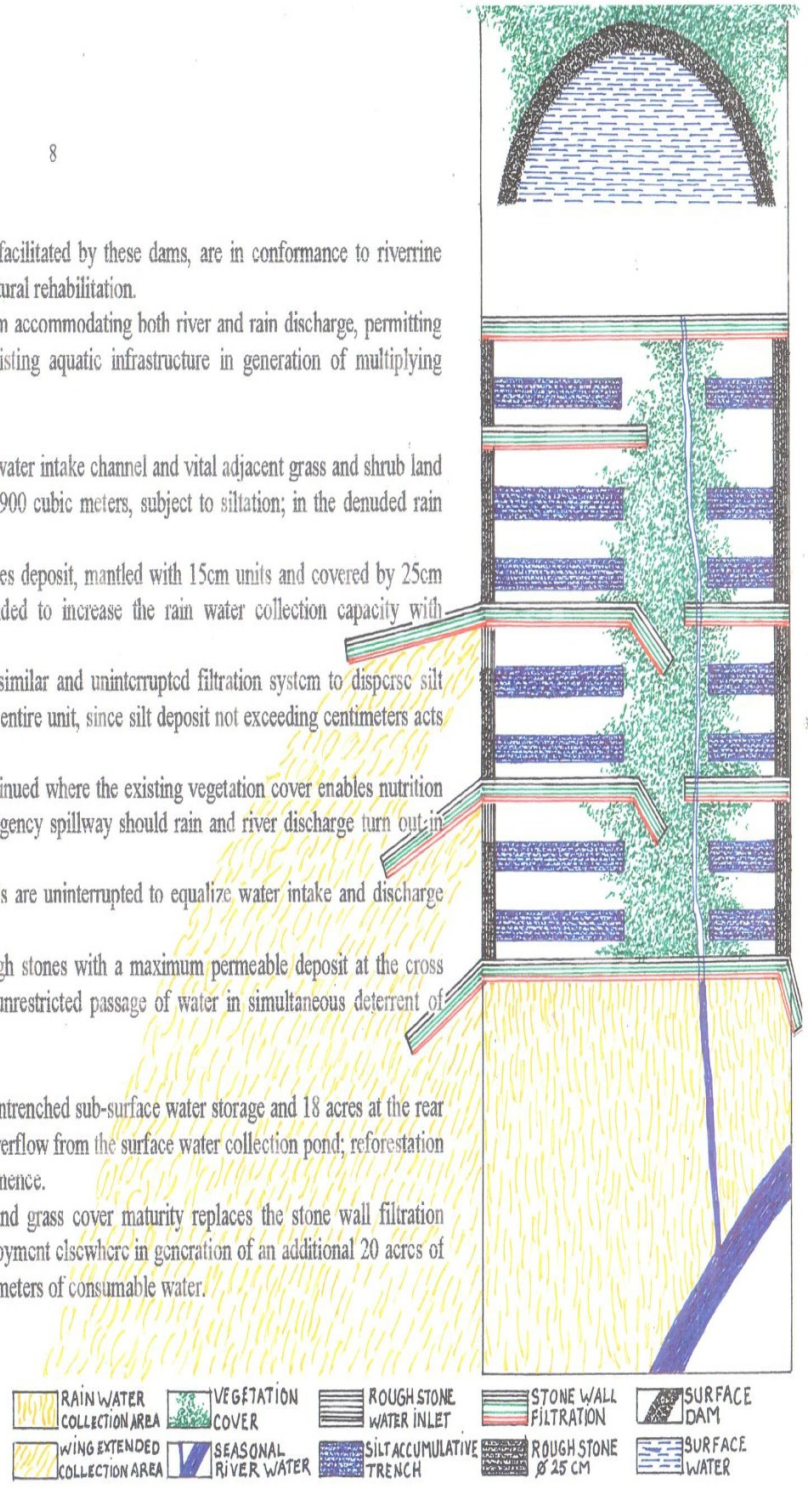


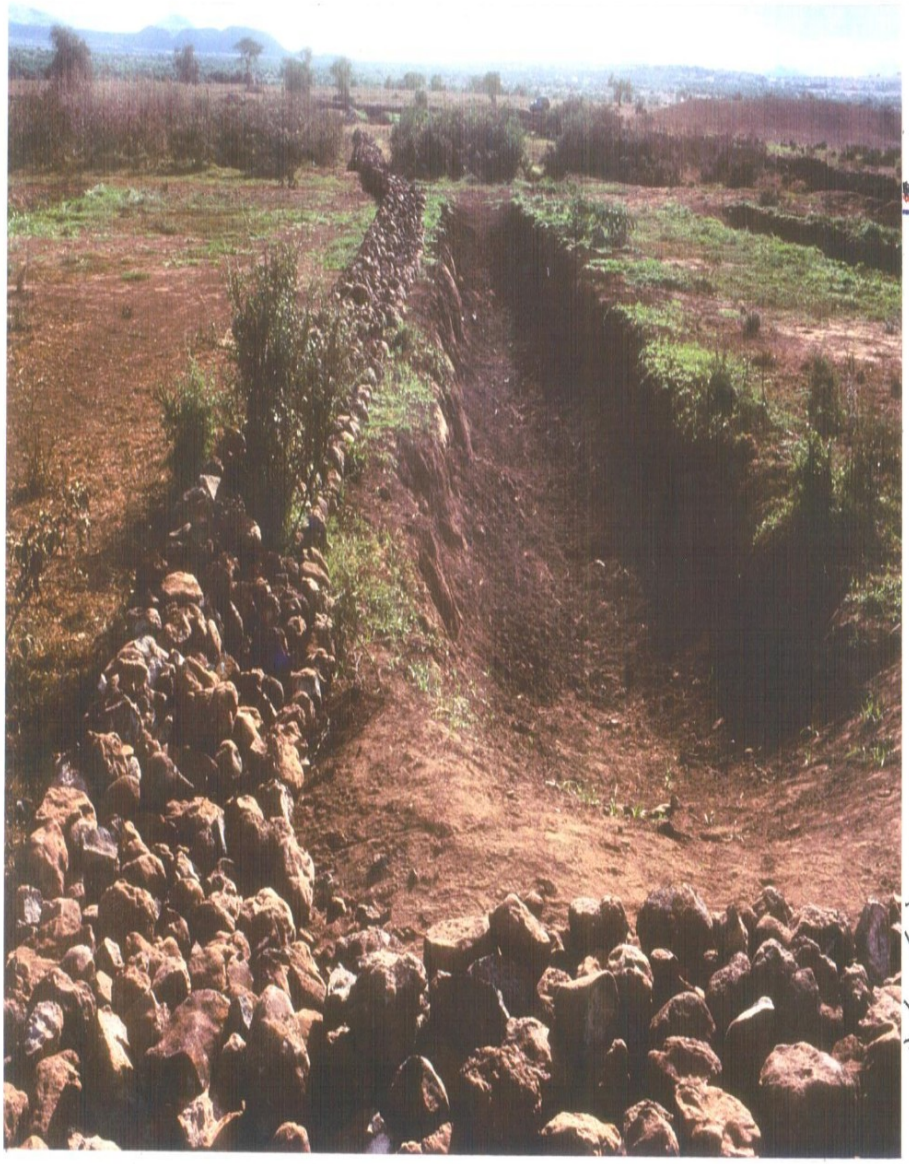

EXCAVATED SILT DEPOSIT
STONE WALL FILTRATION COVER: 25 Ø ROUGH STONE
MANTLE: 15 CM Ø STONE
CORE: 5 CM Ø STONE

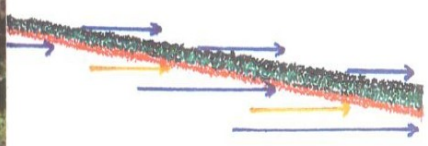
Agricultural development and reforestation facilitated by these dams, are in conformance to riverrine extension subject to manual irrigation and natural rehabilitation.
The surface dam of Kitenden is a hybrid form accommodating both river and rain discharge, permitting ever extending reforestation away from existing aquatic infrastructure in generation of multiplying surface water locations.

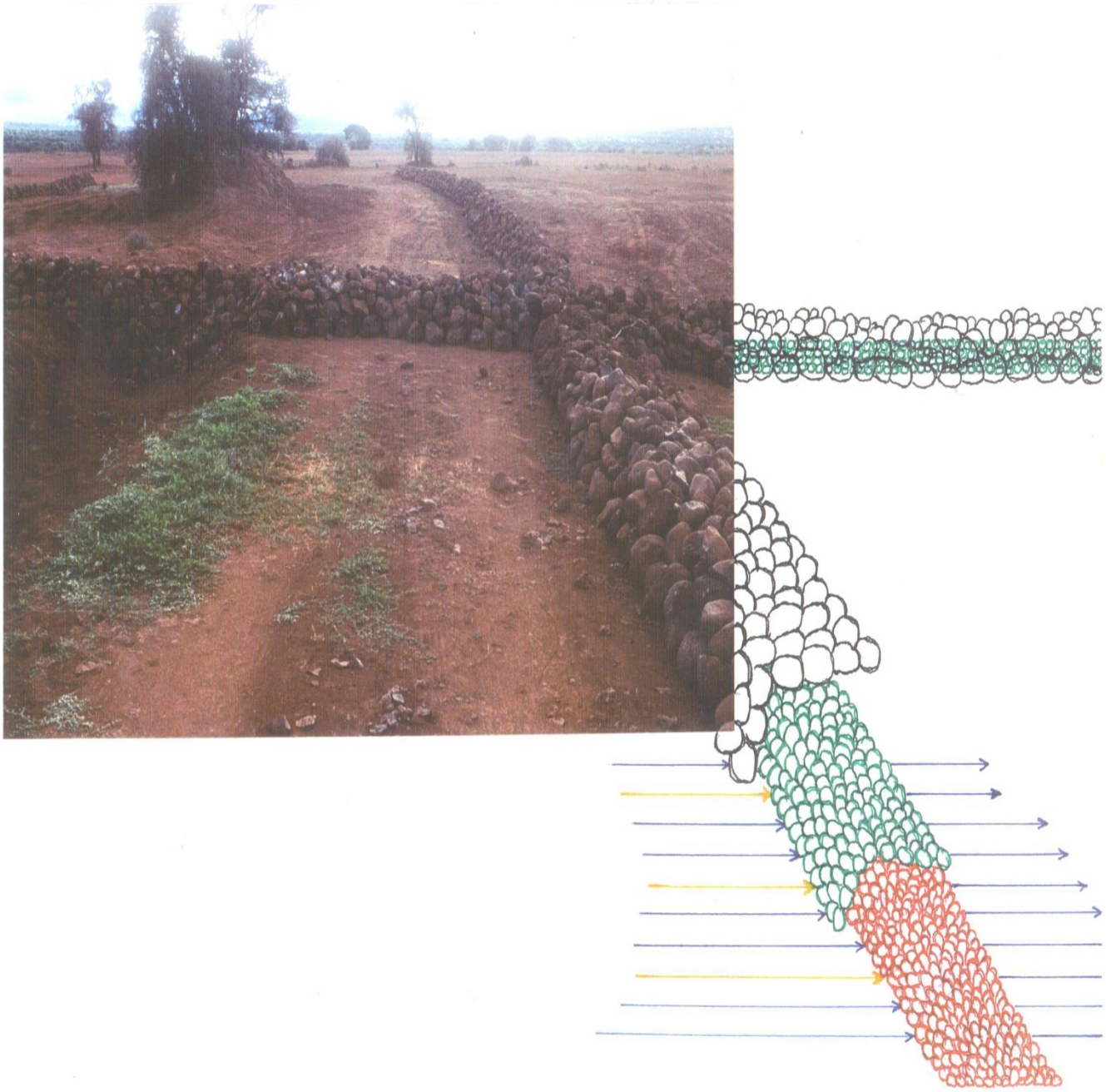
Seven trenches bi-sected by Kitendeni river water intake channel and vital adjacent grass and shrub land were excavated with an initial capacity of 1900 cubic meters, subject to siltation; in the denuded rain water run off area of Kitenden dam.
Stone wall filtration from centered 5cm stones deposit, mantled with 15cm units and covered by 25cm large rough stones; was triple wing extended to increase the rain water collection capacity with approximately 50%.
The river water intake channel obtained a similar and uninterrupted filtration system to disperse silt laden volumes from Kitendeni river over the entire unit, since silt deposit not exceeding centimeters acts as a fertilizer.
The three internal filtration walls are discontinued where the existing vegetation cover enables nutrition generative filtration and doubles as an emergency spillway should rain and river discharge turn out in simultaneous excess.
Both the up and down stream filtration walls are uninterrupted to equalize water intake and discharge over the entire length of the unit.
The side walls are made of 25cm large rough stones with a maximum permeable deposit at the cross points with the wing extensions, to allow unrestricted passage of water in simultaneous deterrent of cattle and livestock intrusion.

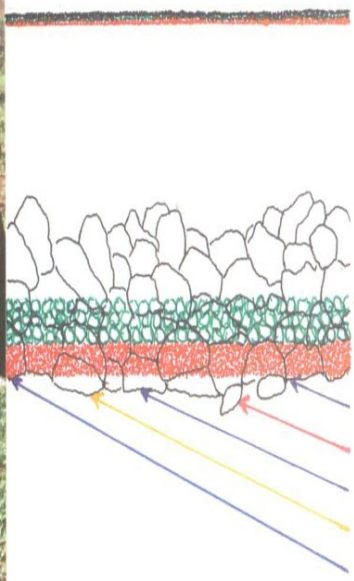
After saturation of the approximate 3 acres entrenched sub-surface water storage and 18 acres at the rear side of the dam, generated by seepage and overflow from the surface water collection pond; reforestation in requirement of manual irrigation can commence.
Subject to sufficient rainfall; tree-, shrub and grass cover maturity replaces the stone wall filtration within a five year period; permitting re-deployment elsewhere in generation of an additional 20 acres of prime forested grass land with 10.000 cubic meters of consumable water.






RUN OFF WATER
SILTATION
STONE WALL FILTRATION
25 CM Ø ROUGH STONE


25CM Ø ROUGH STONE
5CM Ø STONE
15CM Ø STONE
SILTATION
FILTERED RUN OFF WATER



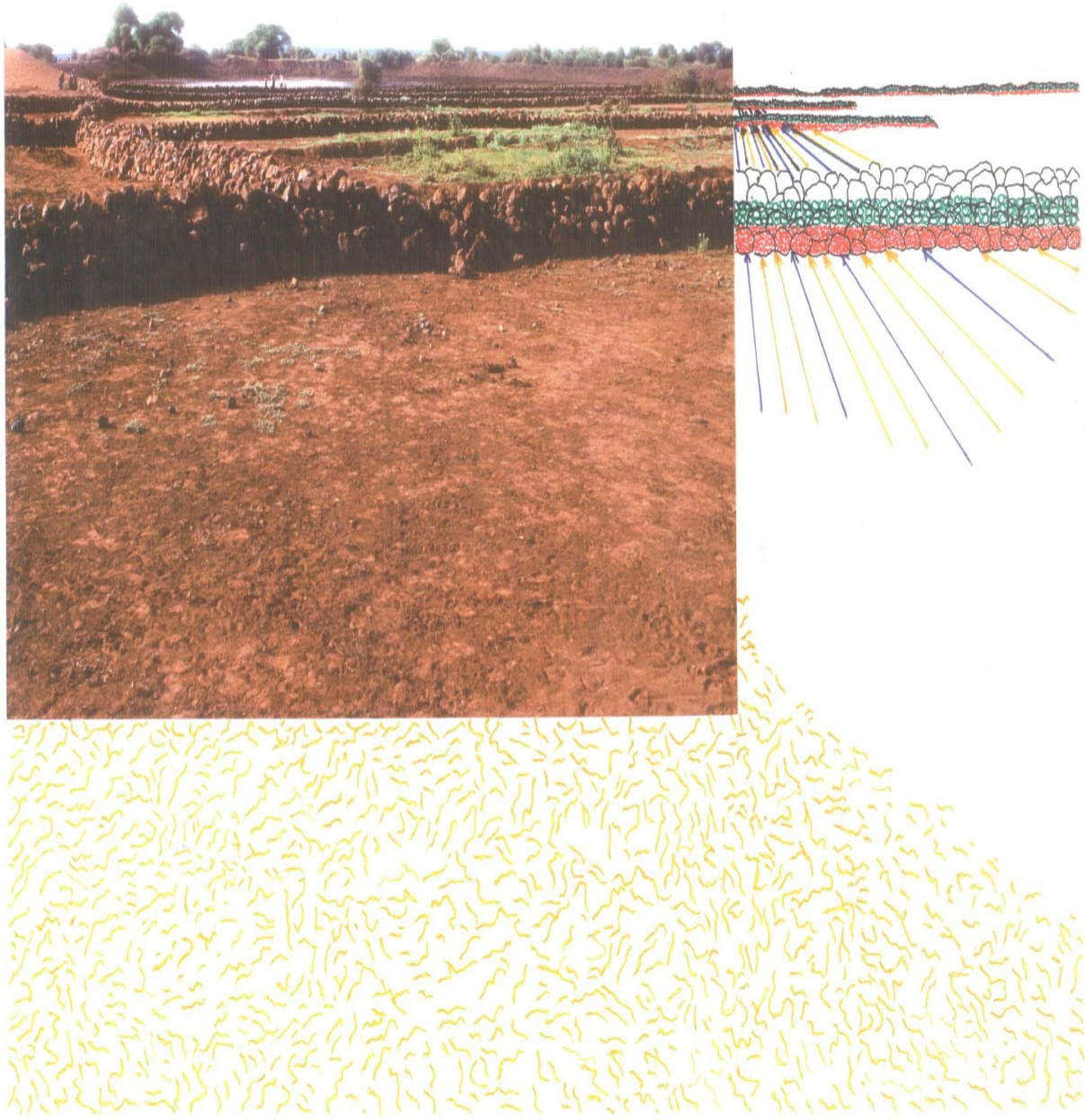

DISCHARGE FILTRATION WALL
INTAKE FILTRATION WALL
RUN OFF WATER
SILTED RUNOFF RAIN WATER
SILT LADEN RIVER WATER

WING EXTENDED RUN OFF RAIN WATER COLLECTION AREA

25 CM ROUGH STONE PERMEABLE WATER INTAKE

EROSION PROTECTIVE 25 CM Ø ROUGH STONE SIDE WALL

TRENCH EXCAVATED SOIL DEPOSIT



SILTED RUN OFF RAIN WATER

INTAKE STONE WALL FILTRATION

FILTERED WATER

INTERMEDIATE STONE WALL FILTRATION AND WATER DISPERSAL

WING EXTENDED RUN OFF RAIN WATER COLLECTION AREA

DISCHARGE STONE WALL FILTRATION

The Amboseli region requires 900.000 cubic meters of consumable water per annum (Uniconsult (K) Ltd, 1983-2005) at a cost of USD 3.15 million, to deploy 126 water collection and filtration units, with an annual forest regulated evaporation of 360.000 cubic meters.

Fifty units are required for the immediate environmental and economic stabilisation of the 12000 member Masai community, the reduction of their livestock circulation and to cater for occasional wildlife inter-action.

The majority of the 16 bore holes sunk in the periphery of the national park without the provision of sub-surface water recuperating dams, are derelict caused by maintenance and operational obstacles or will become in-operational due to a consequent depression in the water table.

The diesel generated pumps will have to be converted, facilitating donkey generated rotative transmission in simultaneous deployment of ground water table resuscitating, sub-surface dams.

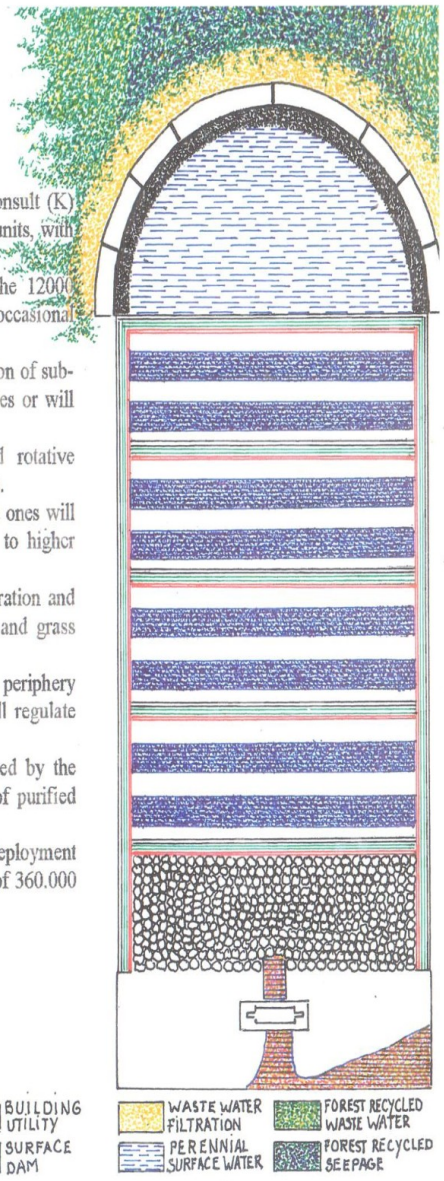
Subject to Amboseli's rising water table, one lodge has been inundated while the two adjacent ones will follow the same course and should therefore be re-allocated outside the park's depression to higher altitude.

The deployment of 725.000 cubic meters of surface water, including forest regulated evaporation and seepage of 40%, or 290.000 cubic meters per annum, generates consequent afforestation and grass improvement at lower altitudes.

Once a ring of water conservation and reforestation has been established in the higher altitude periphery of the national park, vascular afforestation towards the depression derived from gravity, will regulate ground water table fluctuations in consequent de-salination.

The substantial amount of consumable water required for amongst others, tourism; generated by the developments concerned, turns into an asset of biosphere rehabilitation, should discharge of purified waste water be re-cycled into additional surface water provision and afforestation.

Provision of Amboseli's consumable water demand of 900.000 cubic meters per annum, in deployment of 1.260.000 cubic meters, will generate an annual forest regulated evaporation and seepage of 360.000 cubic meters subject to further commercial propelled increase.

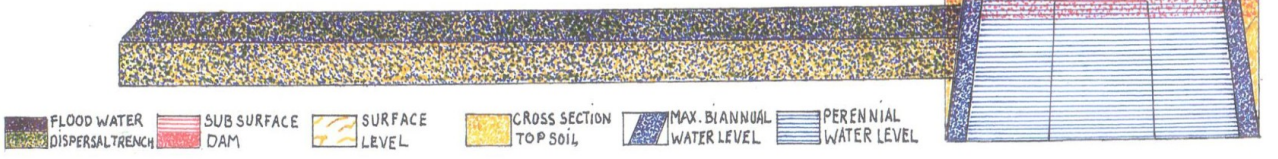


Kilimanjaro-Amboseli: international cooperation in biosphere reconstruction

Saturation of the 1.26 million cubic meter water collection capacity in the Amboseli region, in a ten year time frame, will initially almost entirely depend on Kilimanjaro's pacified run off water.
Torrential discharge, caused by deforestation of approximately 200sq.kms from the elevated Kitendeni-, Karashi-, Maarba-, Kamwanga and Naiperra river basins, will have to be brought under engineered control, through the systematic deployment of sub-surface dams.
An average of 154 sub-surface dams will revert the perennial status of the rivers concerned and will bring a water volume in excess of 1.5 million cubic meters into manual access for agriculture and afforestation.
A capital injection of USD 3.85 million for water conservation over a ten year period, in conjunction with a USD 3 million investment for reforestation, provides prime arable land with sufficient perennial surface water for additional triple agriculture at a cost price of USD 140 per acre.

Water conservation dictates a continued increase in water collection units with tree-, shrub and grass cover to prevent erosion, subject to rain season addition of in situ recycled evaporation from 960.000 cubic meters of the Kilimanjaro-Amboseli sector concerned.
The periphery of the seven kilometer wide wildlife corridor between Kilimanjaro and Amboseli National Parks is the optimum location for the region's bio-diversity nursery, incorporating altitude variety, for the supply in projected demand.
The current 760 USD average price per acre, suitable for rain dependent agriculture
in conjunction with a single capital investment of USD 140 required for centennial, low maintenance water conservation and afforestation, permits rapid and extensive community implementation.

Sasol built 320 dams in Central Kitui, Kenya; the highest concentration of dams in the world, instigating a four fold decrease in the price of consumable water and a simultaneous thirty fold increment in dry season income within the first year of implementation.
With this income, hydrology sustaining agricultural diversity is purchased and irrigated into five year maturity, from poverty eradication into health and capital accumulation.



Saturation of Kilimanjaro's hydrosphere, reflected in the region's re-appearing perennial aquatic infrastructure, with increased river flow, swamp formation and lake accumulation, is in unprecedented bio-diversity re-generation and non-restricted evapotranspiration extension, subject to afforestation.

Forest extension and hydrology sustaining quadruple agriculture development, preceded by water conservation and connected to saturated hydrosphere, is the accurate management tool to subject land mass into perennial precipitation.

The Indian Ocean and Lake Victoria are East Africa's major examples of local hydrosphere saturation disconnected by denuded intermediate land mass, in generation of eliminated perennial evapotranspiration.

Every rain season, the diminished land mass evaporation is rudimentary re-instated by vegetation cover rejuvenation, propelled through initially thermo dynamic driven and consequent torrential rainfall, generating unabating erosion and vegetation cover destruction.

Every dry season, vegetation cover is forced to, annihilated evaporation for individual survival, terminating the land mass evapotranspiration capacity.

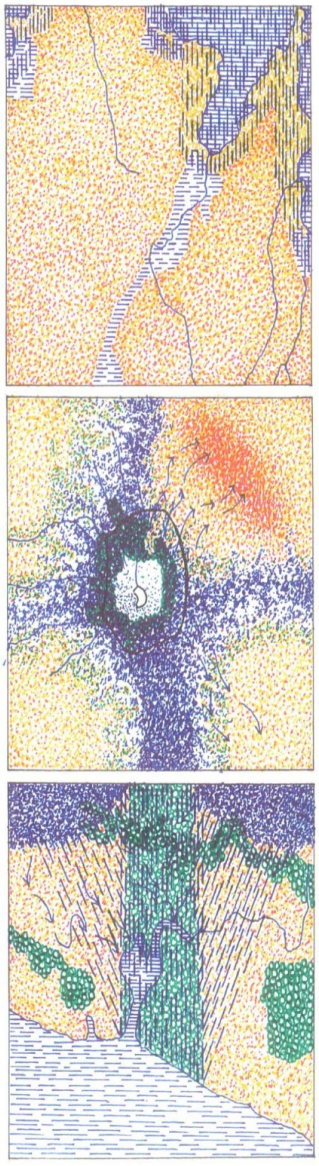
Sustained equatorial, bi-annual rainfall regime consequently ceases into desertification, relocating precipitation volumes to higher latitudes in generation of de-regulating flood cycle.

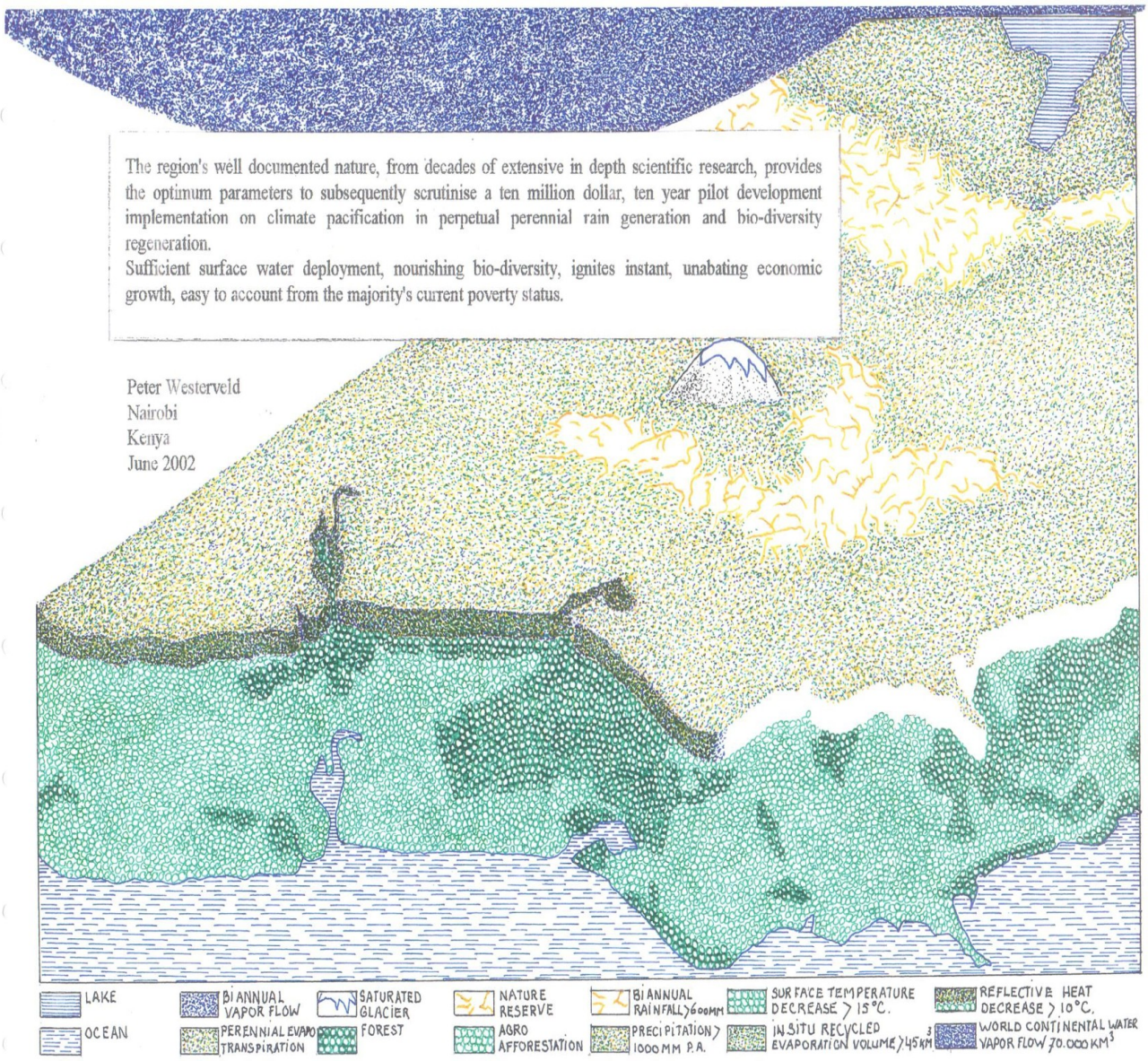
The relative ease and short routed, low cost-high revenue rehabilitation of evaporation capacities from coast and lake regions, facilitates rapid inland extension of evapotranspiration increment.

Local government in conjunction with (inter)national non-government organisations and the commercial sector, will have to be brought into cooperative comprehension through the deployment of universal pilot development with world wide application potential.

The Kilimanjaro-, Meru-, Ngorongoro and Loita landmass elevations, form the geographic land locked, rain generative pivot of the Indian Ocean- Lake Victoria hydrosphere re-connection, subject to encroaching adjacent desertification.

The Kilimanjaro-Amboseli ecosystem, in custody of equatorial bio-diversity from rain deficiency at 3755 feet to a receding glacier at 19340 feet, sustains extensive semi-nomadic cattle breeding, commercial and subsistence agriculture and wildlife tourism, bi-sected by an international boundary.




The region's well documented nature, from decades of extensive in depth scientific research, provides the optimum parameters to subsequently scrutinise a ten million dollar, ten year pilot development implementation on climate pacification in perpetual perennial rain generation and bio-diversity regeneration.
Sufficient surface water deployment, nourishing bio-diversity, ignites instant, unabating economic growth, easy to account from the majority's current poverty status.
Peter Westerveld
Nairobi
Kenya
June 2002
LAKE
OCEAN
BI ANNUAL VAPOR FLOW
PERENNIAL EVAPO TRANSPIRATION
SATURATED GLACIER
FOREST
NATURE RESERVE
AGRO AFFORESTATION
BI ANNUAL RAINFALL > 600MM
PRECIPITATION > 1000 MM P.A.
SURFACE TEMPERATURE DECREASE > 15°C.
IN SITU RECYCLED EVAPORATION VOLUME > 45KM3
REFLECTIVE HEAT DECREASE > 10°C.
WORLD CONTINENTAL WATER VAPOR FLOW 70.000 KM3

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