

March 3, 2006

TO: Professor Thomas Nzioki Kibua, Executive Director, Institute of Policy Analysis and Research

FROM: Henry Rempel, Professor and Senior Scholar, Department of Economics, University of Manitoba

RE: Opening a dialogue on possible research collaboration

1. **Climate change will threaten existing water availability in sub-Saharan Africa**

Contemporary science research predicts rainfall in many parts of Africa will become more erratic and the overall quantity likely will decline. SASOL Foundation and Excellent Development have demonstrated that sand dams are a cost-effective, community-based strategy to harvest water in arid and semi-arid lands locations.

In mid-2005 I led a team to assess the outcomes and impacts of 387 dams that had been built by SASOL in Kitui district. On the basis of a stratified random sample of 30 dams we submitted a report – *Water in the Sand: An Evaluation of SASOL's Kitui Sand Dams Project* – to Mennonite Central Committee (MCC) and Canadian Food Grains Bank (CFGB). As a follow-up to this evaluation there is a reasonable probability that MCC/CFGB will provide assistance to both SASOL and Excellent to enable each to construct an additional number of sand dams.

2. **Research options to complement proposed sand dam construction**

A group of scholars from several Faculties at the University of Manitoba are prepared to work in collaboration with interested research scholars in Kenya to complement the water harvesting actions promoted and undertaken by SASOL and Excellent. Specifically, our interest is to assist in **building capacity within Kenya to advance food security in arid and semi-arid lands** with: 1) the promotion and proper maintenance of sand dams; and 2) building of capacity within SASOL, Excellent and within Kenya's research community more generally to take advantage of agricultural, environmental, nutritional, sanitation, and health opportunities presented by the improved availability and accessibility of water within communities that have constructed sand dams.

Our interest is based on several key factors:

- 1) **basic premise** - availability and access to water is vital to various forms of life;
- 2) **sand dams** are a proven water harvesting technology in settings where rainfall is distinctly seasonal causing rivers and streams to flow only periodically (sometimes referred to as ephemeral streams and rivers); and
- 3) when combined with on-farm water harvesting practices – **terracing/trenching, strategic planting of trees/shrubs/grasses, and mulching** – sand dam technology has potential to: a) expand the overall supply of water readily accessible within a community; b) expand the range of farm output that can be produced; c) increase farm production per unit of land and/or labour; d) increase the probability of crop and animal survival when rains fail; and e) improve health

at the household level via improved water quality, improved sanitation and improved nutritional intake.

Given these factors, we envision a **project goal** that would expand the capacity of Kenyans to maximize development impacts per unit of water under rain-fed conditions with water harvesting and conservation means that are sustainable and that recognize the risk-averse behaviour of peasant households. (Development impacts would include such elements as access to water, food security, gender equity, increased household income, and improved livelihood security and well-being for household members.)

3. Potential research team resources

In addition to myself, potential members of a research team include:

- **Joan Lupupa** – PhD student, from Zambia, enrolled in the Department of Economics with expertise in foreign exchange rates and environmental economics;
- Professor Elizabeth Troutt – Department of Economics, who teaches environmental economics (her PhD is in Agricultural Economics from University of Wisconsin with a dissertation based in Uganda);
- **Hilda Manzi**, agricultural specialist, a member of the 2005 sand dam evaluation team, who has applied to enter a two-year MSc. program in the Plant Science Department of the University of Manitoba;
- Professor Martin Entz, Plant Science Department, University of Manitoba and sponsor of Hilda Manzi's application;
- **Charity Wanjiru Nyaga**, nutrition specialists, based in Kenya, and who was a member of the 2005 sand dam evaluation team;
- Professor John Serieux, who teaches economic development and international finance and who has experience in Malawi; and
- Professor Barry Coyle, Agricultural Economics Department, who teaches international trade and econometrics and has experience in Southeast Asia.

4. Potential research agenda

4.1 Build capacity to analyze DFID and MCC/CFGB data sets on sand dams constructed by SASOL in Kitui District of Kenya. Data sets already available include:

- 2005 MCC/CFGB funded survey as part of the sand dam evaluation: 187 households, 102 variables;
- 2001 surveys funded by DFID:
 - a) 562 variables from 745 households who are part of SASOL's sand dam construction initiative; and
 - b) 372 variables for 3,000+ households in communities that did not have a sand dam at the time of the survey.
 - c) In addition, there was a survey of households in communities with a sand dam but who did not participate in the construction of a sand dam and so do not have direct access to the water in the dam. As of now we do not have this data and it is not clear we will get it.

This data analysis can be merged with additional data that will be collected in base line and evaluation surveys carried out by SASOL and Excellent as part of their implementation of a sand dam construction project, plus surveys that could be carried out as part of this research initiative in the application of activities 4.4 to 4.7 below.

{Joan Lupupa, Hilda Manzi, Charity Wanjiru Nyaga and Henry Rempel}

4.2 Build research capacity at the University of Manitoba of African specialists: Hilda Manzi (MSc. In Plant Science), Joan Lupupa (Ph.D. dissertation research), and up to three more Kenyan post-graduate students in fields such as the Faculties of Agriculture, Arts (Economics), Environment, Earth and Resources, or Human Ecology.

4.3 For African countries dependent on agricultural exports as their primary source of foreign exchange, capacity building in macro-level modeling of the **effects of market liberalization** – exchange rate regimes, interest rates, agricultural pricing, dismantling of parastatals in agriculture-related industries, etc. – **on food security at a national level**, which provides the setting for agriculture development, food security and improved livelihood security and well-being at the district, division and location levels within a country.

{Joan Lupupa, John Serieux and Barry Coyle}

4.4 Complement SASOL and Excellent's sand dam construction activities with capacity building in agriculture research that advances on-farm water harvesting and conservation, and expands agricultural potential of the land areas served by sand dams that have been or are being constructed.

{Hilda Manzi and Martin Entz}

4.5 Capacity building to enable SASOL and Excellent to address environmental issues related to access to the water in a sand dam: a) community means of addressing effects of changing land values in the proximity of a sand dam; b) devising means to address the current problem of contamination of the sand and water within a sand dam by animals and people; c) develop strategies to address maintaining sand and water quality for a catchment area within which a series of sand dams have been or are being build; and d) advance understanding of the place of water in development and to promote sustainable approaches to utilizing water effectively to restore severely degraded landscapes in the regions where sand dams have been or are being constructed.

{Joan Lupupa and Elizabeth Troutt}

4.6 Augment SASOL Foundation and Excellent Development's sand dam construction initiatives with collection and analysis of relevant nutrition, sanitation and health data to enable measurement of food security related outcomes and impacts generated by sand dam construction and to provide input to training strategies undertaken in this area by SASOL, Excellent, Government Ministries and other

NGOs.

{Charity Wanjiru Nyaga and Henry Rempel}

- 4.7 Assist SASOL and Excellent to build capacity at the sand dam community level to obtain the performance measurement indicators for project implementation and assessment as set out in the respective LFA's (log frames) for the proposed SASOL Foundation and Excellent Development projects.

{Kenyan initiative with input from Manitoba's research team}

5. The need for a Kenyan partner

As a Team we are interested in developing and conducting the research and capacity building as outlined above. But, to obtain funding from international agencies such as International Development Research Centre, Rockefeller Foundation, Ford Foundation, or the John D. and Catherine T. MacArthur Foundation we feel it would be imperative that the funding application be forthcoming from a Kenya-based organization OR that it be seen as a collaborative initiative between the University of Manitoba and a Kenyan partner.

At this point we envision a three-year project with the details to be worked out between the collaborating partners. For now we do not have plans for Canadians to locate in Kenya for an extended period. Rather, we envision budget provision for international airfare and a per diem for lodging and meals for up to six field trips of two to three month duration during the course of the three years. For an extended research attachment there would then need to be provision to cover salary as well.

A research agenda need not be limited to the sub-points under point 4 above. Also, responsibility for any one research activity would be shared with interested Kenyan research scholars in addition to the three Kenyan/Zambian scholars listed above.