Accra 9th of November 2007

To whom it may concern

The UK Department for International Development (DFID) is developing a new research strategy for the period 2008-2013, in which its budget for research will double.

Responding to some of the questions which are raised in DFID's consultation and aware that DFID's will broaden its traditional focus on *agriculture* and *natural resources* to promote research into how to achieve growth in equitable, socially responsible and sustainable ways in Africa, **FARA** would like to make a contribution about following question:

(a) What are new **research opportunities** for sustainable agriculture?

(b) What is the role of the **right kinds of education and technical skills** for the world of work?

(c) How can developing countries harness **new technologies** and investments to accelerate growth and what **technological innovations** can best raise agricultural productivity?

You will find enclosed some reflections following a consultation among the professional staff of FARA: *Contribution of the Forum for Agricultural Research in Africa (FARA) to the DFID consultation on a new research strategy*.

Yours sincerely,

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Contribution of the Forum of Agricultural Research in Africa (FARA) to the DFID consultation on a new research strategy

In response to the question; How can research contribute to growth in equitable, socially responsible and sustainable ways in Africa?

A number of new **research opportunities** can be identified in the field of sustainable agriculture. Specific research questions can be formulated which would respond to the need for new technologies and *to reverse the stagnant funding of agricultural R&D and broader knowledge systems in Sub-Saharan Africa.* (World Bank : 176).

DFID could build on its work on sustainable agriculture and develop its work on economic opportunities and growth by taking up **research subjects** on following issues:

1. Share learning and best practices in Agricultural Information Systems.
2. Access Global On-Line research in Agriculture
3. Environmental management
4. Risk management and adoption to climatic change
5. Risk management and crop insurance
6. Rural credit
7. Applied ICT research in the field of agriculture
8. Market information

***Share learning*.** Information and communications technology tools, such as decision-support-systems and geographical information systems, can be mobilized to help amplify, accelerate and improve the precision of farmer decision making and harvest the fruits of modern methods such as integrated water, nutrient, pest and disease management and weather forecasting information. Information and communication technology can also be used at catchments levels to investigate emerging issues that arise from increased competition for water within agriculture, and between agriculture and other sectors (IAC, 2004, p. 216) and that arise as a result of climatic change.

Access Global On-Line research in Agriculture. To reach the unreached and excluded there must be vastly improved access to information and communications technology in Africa. Increased investments in communications and knowledge infrastructure are required to enable access to the internet, libraries and information centres for the *participatory knowledge quadrangle of farmers, extension professionals, educators and scientists*. Such investments will provide them with the resources of currently available databases and other information. Institutions lacking fast and affordable access to the Internet can make full use of CD-based information sets such as the Essential Electronic Agricultural Library. Better-connected institutions can subscribe to Access Global On-Line research in Agriculture. There is also significant web-based distance education and videoconferencing to both complement and supplement courses given in African universities. An integrated application of the internet and radio helps to transmit timely information to all who may benefit from it.

For many years access to appropriate agricultural technologies by African farmers, agribusinesses, producers, etc.) has been a major constraint in taking advantage of the agricultural research outcomes. Several international service providers have developed online databases on agricultural technologies based on geographical or local conditions. FARA is adding value at the African continental level by experimenting on innovation and learning approaches emphasizing on interactions and, knowledge and experience sharing through its **r**egional **a**gricultural **i**nformation and **l**earning **s**ystem (RAILS). To be effective in the African context, a diversity of channel and communication tools with strong people focus is being introduced. The focus is on content management and how the network members, be

it organizations or individuals can effective contribute to the global knowledge exchange. Improving the African voice.

Environmental management. ICT plays a key role in environmental management in activities ranging from optimizing clean production methods to decision making. Spatial information refers to a particular geographic location or area. It allows analysts to view the distribution of income across a country as a grid in order to target areas for action, understand demographic trends, and monitor progress. Spatial information collected by satellite or airborne remote sensing can be used to understand the capability of the land to support economic activity and water use efficiency. This information can help ensure that natural resources are used efficiently and sustainably.

Risk management and adaptation to climate change. New technologies are being developed that provide more accurate and timely estimation of risk. Spatial information about fire, rainfall, wind, and salinity may help countries identify and estimate risk more accurately. A great deal of information is currently available to developing countries for use in making policy decisions. Some of this information (such as that obtained from satellites) is not released. Often the systems or skills needed to manage the data are lacking. Capacity building and information donation or exchange would address this issue (CALESTOUS J., p. 59). India offers again an interesting example. In Haryana, over the past 6-7 years, the productivity of wheat has gone down on account of global warming and prevailing high temperatures. Early sowing can help in avoiding the 'February Heat' and result in productivity increase. But the given proportion of 1 extension worker per 8 villages, was a limiting factor to communicate this finding with every farmer. Rajesh Khullar and his team made an innovative approach of touching all the farm families through children from schools and colleges. These children communicated the idea of early sowing to get better yields to their families, and it resulted in an increase in the productivity. (Sharma , 2007 : 21)

Risk management and crop insurance. The Agriculture Insurance Company of India Ltd (AIC), New Delhi, is aware that agriculture is a risky activity, which is vulnerable to natural forces, and accordingly risk management assumes its significance. The crop insurance programme being run in India is the largest in the world. AIC uses of latest techniques like remote sensing to estimate crop yield. GIS covers a wide area at regular intervals, it help in minimising the problems of asymmetric information, and do away with frequent field visits, etc. The use of such technologies has helped AIC in designing suitable products (with timely payment of compensation). AIC recognizes the utility of automatic weather stations to help develop the weather index. The reverse side of the medal are the limitations of the usage of latest ICTs, such as frequency of quality satellite images, clarity during rainy season, requirement of a system of ground-truthing and validation, high cost, lack of legal framework etc.

Rural credit. ICTs in universal access to financial services should not merely be limited to the access, but take into account the process and the end usage. More in particular ICT can be used for use of ICTs for land records, future price discovery, market intelligence, agricultural database management, e-banking, mobile-based payment, etc. unconventional delivery technologies like ATM, digital cash, mobile banking etc, can make microfinance reach till the last mile.

Applied ICT research in the field of agriculture. CTA produced last year a key document on how ICT can transform agricultural extension. The report gives an overview of opportunities for applied ICT research in the field of agriculture in Africa (Richardson, 2006).

Farmers have little information on the kinds of crops s/he should grow, how s/he should grow the crops, what planning s/he needs to do with respect to his/her area and soil conditions, and what are the market dynamics etc. The other gaps mentioned by him included credit

gap, productivity gap, marketing gap, price realization gap, and infrastructure gap etc. Barring the infrastructure gap, all the abovementioned gaps can be dealt to an extent by using ICTs. Virtual aggregation of small stakeholders (producers) across multiple geographies, to get the power of scale, is possible through the use of ICT. Real time multicasting, customisation of information, and personalisation of content on the basis of knowledge of who is logging in and who is participating, can be done through ICTs. (Sharma, 2007 : 18)

Market information. A new research field is to measure the impact of market information (the market prices of agricultural commodities) which is offered through private service providers and through mobile telephony. The broader coverage, more than the possession of individual mobile phones, induces market participation by reducing transaction costs in crop marketing and increasing prices, especially for perishable goods. The Kenya Agricultural Commodity Exchange and Safaricom Limited collect and disseminate current and reliable commodity price information to Kenyan farmers through a low cost Short Message Service (SMS) provider (World Bank : 175). Manobi/Senegal would also be relevant to mention in the field of agricultural market information. Its approach is generic and large scale. Some 15.000 farmers are already mapped through the mobile network. In the future, via this service, any farmer can send a free SMSs mentioning the problem s/he is facing in the field, or the information s/he desires to seek. In return, the extension workers either visit the farm or provide advice over the phone.

In response to the question: how can governments promote the right kinds of education and technical skills for the world of work?

Agriculture is presently the career of last resort for Africans at all levels of the industry from potential farmers to academics. This is a grave situation for Africa's largest industry which is expected to be the driver for economic development.

One of the causes is the disjointed nature of teaching and training in agriculture where there are weak connections between the curricula and pedagogy at primary, secondary and tertiary levels. In this case the problems probably start at the top because governments have focused on increasing numbers in tertiary agricultural education without commensurate increases in funding. This has resulted in the loss of key staff, poor succession planning and under recruitment. The outcome is low morale and a lack of interest in agriculture as an academic career.

This has had a knock-on effect on the capacities of research institutions which has been identified in many studies, c.f., Commission for Africa, IAC etc. The IFS, for example, has drawn attention to the missing generation of agricultural scientists and warned of an impending crisis in agricultural research. This has serious implications for the success of CAADP and the achievement of the MDGs, especially MDGS 1 and 7. The same negative effect reaches to the grass roots. The majority of African children have no choice but to go into farming after primary schooling. They are doing so without the traditional benefit of having worked along side their mothers and fathers on their farms and having been put off agriculture by unenthusiastic teachers. Agricultural practices are sometimes even used as school punishments. The same lack of interest in agriculture, other than as a last resort career, permeates persons entering agriculture after the other levels of education.

Research is needed to take a look at agricultural capacity building at all levels with a view to recommending how agricultural teaching and training can be revitalised and made contextually appropriate for the world of work and make agriculture once again a career of choice. UK institutions are well placed to contribute to African counterpart institutions in the remedial actions that are likely to be recommended

In response to the question: how can developing countries harness new technologies and investment to accelerate growth and what technological innovations can best raise agricultural productivity?

Technological innovations that can best raise agricultural productivity are those that are adoptable by end users. For innovations to be adoptable, they must be found suitable, acceptable and usable by end user. One of the best ways of ensuring this happens is by actively engaging the views of the stakeholders in the process of the description of the problem and the development of the solution. This way, the technology can go without any push once it is developed.

However, focusing research on agricultural productivity alone will almost always make end users poorer. Where there is adoption, the market gets flooded and income to farmer plummets. Farmers respond to this situation by dropping the commodity from their list of enterprises. To sustainably raise agricultural productivity, technological innovations must be driven by market demands. And for as long as there is market to absorb surplus, the farmers keep on adopting. Therefore, productivity must be raised on the spine of effective market demand.

But engaging end users and responding to effective market demands are not all that are required for technological innovations to get adopted. Technological innovations get adopted when presented in an environment where all other associated social innovations are in place. For example, farmers can only adopt the fertilizer technology and use it to raise their productivity only when it is available and affordable.

To ensure that associated social innovations are in place, the process of development must engage all stakeholders along the commodity chain in the development process. Input dealers, transporters, financial institutions, policy makers, extension service, researcher, farmers, and the output market (supermarket, consumers, etc) all must be involved in the process of the development of technological innovations to ensure that developed product has a chance to increase productivity in a sustainable manner.

How do we put all these together? This same question was the reason why **FARA** held a widespread stakeholders (African and non-African) consultation recently through which it was agreed that the nature of carrying out the research and development is of utmost importance to the adoptability of the end result. The consultations noted that the paradox of lack of adoption of agricultural technologies in Africa is largely due to the linear methodology adopted for the development and delivery of such technologies and proposed an innovation systems approach to research and development.

Innovation systems approach is new to agricultural research and development. Recently, **FARA** articulated this approach in the form of “integrated agricultural research for development” (IAR4D). This approach considers agricultural productivity alongside markets, natural resource management and policy.

IAR4D proposes the engagement of all stakeholders along the commodity chain in the articulation of the problem and the development of the solution. They are actively engaged all the way. Because it encompasses the commodity chain approach, the issue of effective market demand is taken care of. It proposes the concept of “innovation platforms” as fora where all stakeholders meet to develop innovations. The platform calls for attitudinal changes leading to more interaction among the players ending up in more learning. This situation

leads to the generation of innovations that have a good chance of adoption thereby leading to higher income and greater impact on the MDG.

IAR4D operates on the structure of innovation platform (IP) which is multi-sectoral and multi-institutional coalition of public and private scientists, extension workers, extension, farmers, farmers' organization, NGOs, private sector representatives, and policy makers. Partners determine the entry points and complement each other in the development of the solution

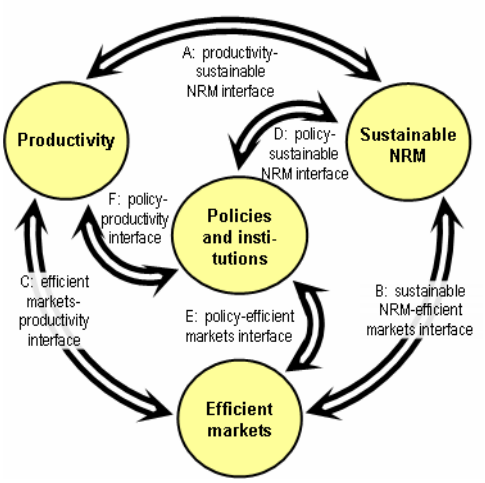
IAR4D is characterized by some key features including:

- Nonlinear collective and collaborative interaction among actors (rather than linear researcher-extension-farmer transfer of technology model)
- Direct interacting communication among actors
- Quick feedback from end users – timeframe will depend on the case – feedback at all stages of research for development
- Participatory action research and learning (not just research on farmers' fields occasionally consulting farmers)
- Flexible, adaptable to new knowledge, builds on experiential learning, relies on internal M & E for continual corrective feedback
- Knowledge sharing among different stakeholders

IAR4D engenders research process which is multidisciplinary rather than disciplinary specific interventions. Research addresses key constraints and opportunities agreed by the IP in the context of the whole value chain system (from input supply through production to consumption) and sustainable livelihood systems. IAR4D engenders institutional and human capacity building and skills to effectively participate in innovation process. IAR4D builds on the successful principles of approaches such as Integrated Natural Resource Management, farming systems research, and participatory action research.

However, it goes beyond all these approaches to encompass several additional principles:

- IAR4D, more than other techniques before it, focuses more on strengthening the innovation capacity of actors throughout the agricultural value chain. This means not just increasing participation, but also strengthening linkages and interaction among key stakeholders in ways that facilitate idea sharing and joint action. It also implies accelerating learning by and among stakeholders to respond to changing complex agricultural and natural resources management contexts and achieve developmental outcomes.
- IAR4D aims to diagnose and address institutional constraints to improving the effectiveness of agricultural R&D systems. Among the salient challenges is the need to align R&D, policies and markets to the welfare needs of the poor and to the demands of consumers.
- IAR4D contends that increasing agricultural productivity entails more than crop and livestock improvement. It must address policy and market failures as well as sustainability issues.
- To do so, IAR4D takes a systems approach both in terms of production processes (value chain analysis) and spatial dynamics (landscape and watershed analysis). Rather than focusing on any one component technology, IAR4D addresses the interfaces between productivity, sustainable NRM, markets, policies and institutions (see Figure 1).



Implementation of Research and Development using the principles of IAR4D lead to the following outcomes:

- Increased capacity of systems of innovation to generate, adapt, use and promote technologies and institutional arrangements for sustainably improving agricultural productivity, increasing access and efficiency of agricultural markets, and increasing returns to agricultural enterprises.
- Increased effectiveness and efficiency of agricultural research and development organisations in discharging their mandates and fostering agricultural innovation;
- Increased return on investment in agricultural research and reduced research to development lag time.

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