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List of Acronyms

ASARECA	=	Association for Strengthening Agricultural Research in Eastern and Central Africa
AVRDC	=	Asian Vegetable Research and Development Centre
AFNET	=	African Network for Soil Biology and Fertility
DRC	=	Democratic Republic of Congo
ECAMAW	=	East and Central Africa Maize and Wheat Network
FAO	=	Food and Agricultural Organization
ICRAF	=	International Centre for Research in Agroforestry
ICRISAT	=	International Crops Research Institute for the Semi-Arid Tropics
INRM	=	Integrated Natural Resources Management
IFAD	=	International Food and Agriculture Development
IFDC	=	International Fertilizer Development Centre
IFPRI	=	International Food Policy Research Institute
MDG	=	Millennium Development Goals
MAPA	=	Millennium Agricultural Program for Africa
NEPAD	=	New Partnership for Africa's Development
QPM	=	Quality Protein Maize
RELMA	=	Regional Land Management Unit
SADC	=	Southern Africa Development Corporation
SFI	=	Soil Fertility Initiative
TSBF	=	Tropical Soil Biology and Fertility Issues
UN	=	United Nations
UNDP	=	United Nations Development Program
UNAIDS	=	United Nations Aids Program
UNICEF	=	United Nations Children's Fund
UNECA	=	United Nations Economic Commission for Africa
WHO	=	World Health Organization
WFP	=	World Food Program
WVI	=	World Vision International

Annex 1:
Increasing Agricultural Productivity and Support Services to Farmers

1.0 Executive Summary

Extreme poverty. Acute food insecurity. Environmental degradation.

1.1 These three fundamental and interrelated threats to human welfare are not unique to Africa, but nowhere else in the world are they so pronounced. And nowhere else in the world is there a greater opportunity to combine modern science, indigenous knowledge and development ingenuity to overcome them. In Africa, especially south of the Sahara, poverty is found mainly in the vast rural areas of the continent. About 255 million people living in rural areas struggle to survive on less than a dollar a day. Agriculture is by far the dominant economic activity upon which the rural African poor depend, so increasing agricultural productivity in sustainable ways is an essential first step towards reducing poverty.

1.2 Increasing agricultural productivity is also the key to reducing food insecurity. Despite the immense size of the continent, the availability of arable land has declined dramatically over the past 20 years (down from 0.38 hectares per person to 0.25 hectares per person). During this same period, food production per person has dropped by over 13%, down from 150 kg/person to about 130kg/person. There are a number of reasons for these alarming trends, but a basic problem is the heavily degraded, non-productive soils found throughout the continent. The depletion of vital soil nutrients over time – especially nitrogen and phosphorus – combined with substantial soil erosion, severely limit the ability of small-scale African farmers to reverse the downward trend in agricultural productivity.

1.3 Fortunately, there is reason for hope. There are many low-cost technologies for inmproving soil fertility that integrate inorganic and organic fertilizers and that are already being used by thousand of smallholder farmers in different regions of Africa. Examples include leguminous plants that can be used in rotation with crops to fix nitrogen biologically from the atmosphere. Fertilizers are expensive but there are phosphate rock deposits that could be used as alternatives if developed.

1.4 In addition to improving the productivity of crops, three other key areas needing improvement are: a) livestock production, c) extension services and, b) access to markets. With respect to the latter, an important issue that needs addressing is losses associated with post-harvest and storage that often exceeds 30% of the production. These problems have local, national and regional dimensions. To address them well, there is need to integrate scientific innovations with farmers indigenous knowledge. There is also need to do this at a scale that is large and in a manner that is sustainable, taking into consideration the specificity of agricultural performance and the resource constraints farmers and their national programs have.

1.5 Agricultural development at the expense of the environment is not sustainable development. This is, unfortunately, the trend now in areas in Sub-Sahara Africa. Increasing agricultural productivity of existing land under production will have enormous

benefits of environmental conservation. This will be combined with increased efforts on conservation agriculture practices and on rain-water harvesting.

1.6 Strengthening farmers associations and local support institutions is key to achieving growth in agriculture in Sub-Sahara Africa. There is great and urgent to revitalize extension in Africa, much of which destroyed during the Structural Adjustments Programs of the 80's.

1.7 Toward achieving the foregoing objectives, a **Millennium Agricultural Programme for Africa** (MAPA) is proposed for which the focus of this proposal is Great Lakes Region. This is a phased large-scale initiative being proposed by the UN-ECA's Sub-Regional Development Program based in Rwanda. This program will advance the implementation of NEPAD's Comprehensive African Agricultural Development Program. Key to achieving this is strengthening national agricultural programs (both research and extension) and farmers associations. Towards this, the services of both national, regional and international research and development institutions will be sought.

1.8 The Programme will focus initially on 11 countries in eastern, central and southern Africa: Burundi, DR Congo, Republic of Congo (Brazzaville), Central Africa Republic (Bangui), Kenya, Rwanda, Tanzania, Uganda, Zambia, Sudan and Angola – countries that share a common set of characteristics (including high-level political commitment) that will help ensure near term and longer run success). The program will be strongly linked to the United Nations Millennium Project effort to scale up agricultural innovations through the concept of the Millennium Village Projects.

1.9 The Millennium Agricultural Programme for Africa will be implemented in three phases over a 10-year period (2005-2015). The first 3-year "establishment phase" is meant to achieve quick results in areas of the greatest potential for impact on hunger and poverty. If fully funded, the Programme will, in its first three years, reach at least 500,000 people in eastern, central and southern Africa with appropriate technologies, as well as the information needed to effectively use them to significantly reduce poverty and the risk of hunger.

1.10 Phase 2 will be designed on the experience of Phase 1 and is likely to extend to more locations within the target priority countries. And Phase 3 will entail a massive effort to achieve the Programme's goal of helping reduce rural hunger in Africa by half. Phase 1 will require a budget of US$12 million in the first year and $20 million in the second and third. Thereafter, an annual budget of $20-25 million will be required for the core Programme, on the assumption that other sources of multilateral and bilateral financing are helping to support the effort. These investments will have to be matched by infrastructural developments (roads and ICT) by countries in the region and their development partners.

1.11 **A budget of $250,000 is sought to develop phase 1 of the program**. This will support national and regional level consultative processes. It will help develop concrete action plans for the four thematic areas of the program mentioned above. It would identify opportunities for strengthening agricultural research programmes at sub-regional levels i.e. sub-regional research programmes targeting agricultural productivity. SRDP will identify a lead organization from its research and development partners to develop and facilitate the implementation of MAPA.

1.12 The following concept note provides additional detail on all of the above, and explains more fully how agroforestry and improved natural resource management practices – implemented through the Millennium Agricultural Programme for Africa – can meet the interrelated challenges of poverty, food insecurity, and environmental degradation.

2.0 The Challenge:

Sustained Poverty Reduction, Wealth Creation, Empowerment and Food Security

2.1 **Poverty** means low income, poor nutrition, and low consumption. It also means poor education for children, poor health including an increased chance of developing AIDS from HIV, increased vulnerability to various climatic and economic risks, powerlessness and lack of dignity. Africa is the only continent where the number of poor people is actually increasing. Poverty in Sub-Saharan Africa is largely a rural phenomenon: approximately 255 million or 85% of the continent's poor reside in rural areas where agriculture is the principal economic sector. Increasing agricultural production is thus imperative to poverty alleviation on the continent. Women and children are particularly vulnerable in the rural African setting.

2.2 **Food insecurity** is acute in Sub-Saharan Africa: rarely in modern history have so many Africans been so reliant on food aid. Overcoming food insecurity is intrinsically linked with reversing agricultural stagnation, safeguarding the natural resource base, slowing population growth rates, coping with HIV/AIDS, improving market conditions and reducing poverty. Significant increases in production cannot occur through expansion of land holdings because the frontier is limited and the availability of arable land has shrunk from 0.38 to 0.25 ha per capita over the past 20 years. During this time, per capita food production has declined from 150 kg/person to 130 kg/person. To reverse this situation by the year 2020, Africa would need, according to the World Bank a sustained annual growth rate in agricultural production of 4%; achieving the Millennium Development Goals by 2015 would require even greater growth. Such ambitious targets can only be achieved and sustained if greater attention is given to the restoration and maintenance of the land resource base.

2.3 **Soil fertility decline** is the fundamental biophysical root cause of declining per-capita food production in smallholder farmers in Sub-Saharan Africa. Incidences of pests and diseases also increase with declining soil fertility, e.g., *Striga hermontheca*, a parasitic weed, attacks many cereals including maize, the staple food crop in many regions of Africa. In heavily infested fields, striga can cause 100% yield loss. For these reasons, investing in soil fertility management is necessary to help rural households grow more food, shift into higher value agricultural enterprises, and become less vulnerable to changes in climate and markets. Because all agricultural enterprises depend directly or indirectly on soil quality, investing in soil fertility is a 'win-win' situation that can generate significant and lasting returns with a high probability of success. Investing in soil fertility has the added advantage of leading to an improved environment through increased vegetative cover and water quality. Efforts to improve soil fertility must be complemented by increased efforts to reduce land degradation. In this regard, a promising option is conservation agriculture where the socioeconomic conditions allow. There is need to improve rain water harvesting, and there are indeed low-cost water harvesting technologies that be deployed smallholder and resource-poor farmers.

2.4 In addition to investing in soils and water management, greater investments are also needed in three complementary areas: a) livestock development, b) improving extension services and, c) improving access to markets for the poor. Livestock forms an important component of smallholder farming systems in Africa. Unfortunately, production and benefits is challenged particularly by inadequate feed, diseases and markets. There are,

however, promising innovations in many regions that could be scaled up if resources were available. Strengthening farmers' associations and institutions that support them is essential to achieving these goals. This will be an important component of MAPA.

2.5 With respect to livestock, a separate and complementary proposal will be developed and this will included in MAPA. This is because of the need to cover adequately the magnitude and complexity of the issues involved and the wide range of innovations available in the region and beyond. This cannot be done adequately in this proposal whose focus is soil fertility replenishment and complementary technologies for increasing agricultural productivity.

2.6 Priority target countries are those in the Great Lakes Region - Burundi, DR Congo, Congo Rep (Brazzaville), Central Africa Republic, Kenya, Rwanda, Tanzania, Uganda, Zambia, Sudan and Angola. Within these countries, target areas will be the subsistence maize and livestock production systems. Crop production is rain-fed and livestock is extensive, free ranging or communal grazing. Another target area is smallholder farmers with perennial crop production systems particularly banana. These are the systems where resource poor, small-scale farmers produce 80 percent of the region's food. These farmers live in remote villages with little or no access to research, markets and other services. In such systems, attainment of food security and self-sufficiency requires fundamental change in order to reverse agricultural stagnation and safeguard the natural resource base (Cleaver and Schreiber, 1994).

2.7 Soil fertility and crop production, in such low input conditions, are highly dependent on maintenance of the soil's organic matter through the recycling of crop residues and the use of organic inputs. Yet, soil organic matter and soil fertility are rapidly declining throughout the region leading to massive land degradation. The majority of farmers, who can neither afford nor rely on a regular supply of inorganic fertilizers, must find alternative organic sources of nutrients. There is great potential for improving production based on the existing yield gaps as demonstrated in Table 1 for maize.

Table 1. The yield gap of maize between actual and potential for some selected countries in Africa

	Maize yield	**Potential yield**	**Yield gap**
Country	**(t/ha)**	**(t/ha)**	**(%)**
Ethiopia	1.2	4.0	- 69.4
Ghana	1.2	5.2	- 77.0
Kenya	1.6	4.7	- 64.4
Malawi	0.9	2.2	- 59.9
Nigeria	1.8	3.4	- 45.5
Tanzania	1.0	2.6	- 61.1
Uganda	1.5	4.4	- 64.7
Zambia	1.1	2.8	- 60.3
Average	1.3	3.4	- 60.3

Source; Djurfelt, G. and R. Larsson (2004)

2.8 SRDP has identified several international and regional research and development in the region that can assist in the implementation of this program. Some of the key ones are:

(i) The **World Agroforestry Centre** (also known as ICRAF) is an acknowledged leader within the international research and development community in the field of natural resource management, and soil fertility management, in particular. It has developed a wide range of agroforestry technologies for soil and land management that are now adopted by thousands of farmers in the east and southern Africa regions. ICRAF has country programs and resident staff in nearly all the GLR countries.

As part of an effort to improve inter-institutional coordination and collaboration, the Centre has been facilitating a process of bringing about a greater integration of research and development activities of all CGIAR centers and their key partners in eastern and southern Africa. Moreover, ICRAF provided stewardship and represented the other CGIAR centers in the Soil Fertility Initiative (SFI) for Africa, and made effective contributions to SFI action plans of several countries, e.g., Tanzania that is now implementing a large SFI project. As a consequence, ICRAF is well positioned to lead a new initiative that will encompass all relevant means of restoring soil fertility and improving land quality.

(ii) The Tropical Soil Biology and Fertility Institute (TSBF-CIAT), the International Maize and Wheat Improvement Center (CIMMYT), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Institute of Tropical Agriculture. These CGIAR centres that have either their global or regional headquarters are in the GLR have a wide range of improved gremlin and technologies for improving soil land productivity.

(iii) The International Livestock Research Institute (ILRI): - this centre that deals with livestock research and development has its headquarters in Nairobi. We have an opportunity here to engage the technologies and expertise existing in this institute to improve livestock health, nutrition and productivity in the GLR.

(iv) National agricultural research and extension. Also there national universities that have appropriate technologies. An example is Jomo Kenyatta University of Kenya that has developed good techniques for tissue cultured banana. There are also a number of national extension services and non-governmental organizations have substantial expertise in disseminating those innovations among farmers.

(iv) Regional and Sub-regional research organizations. Relevant ones in the GLR region are ASARECA and IRAZ. The latter, based in Rwanda, needs to be strengthened since it has enormous germplasm of bananas that is has managed to conserve well in the midst of the civil war that has ravaged the country for long.

(v) NGOS and Private Sector: There are many and large development-oriented NGOs that can also be engaged to improve delivery of agricultural services, inputs and markets. There are also private sector organizations, for example seed companies, that will be engaged in this regional initiative.

2.9 By drawing on such diverse and competent sources of expertise, a number of national extension services and non-governmental organizations have substantial expertise in disseminating those innovations among farmers. MAPA will ensure that the substantial, but highly fragmented, knowledge on soil fertility replenishment, improved crop and livestock production systems, and natural resource management strategies are pulled together. This knowledge will be rapidly synthesized and applied for greater impact on poverty and hunger in the region. In this way, this GLR initiative provides a unique and vehicle for capitalizing on hundreds of millions of dollars of past investments.

2.10 MAPA is a tangible, innovative step towards harnessing the clear synergies that can be generated through stronger and more systematic collaboration of development and research institutions that can lead to a sustainable positive impact on food insecurity, poverty, and economic growth in the region. It aims at making significant contribution to *'Africa's 21st Green Revolution'* that was launched in 2004 by the Secretary General of the United Nations, Kofi Annan. It will also accelerate achievement of the Millennium Development Goals. The program will be linked to the UN Millennium Project effort to scale up agricultural innovations through the concept of the Millennium Village Projects.

3.0 Programme Goal and Objectives

3.1 The Goal of the Millennium Agricultural Programme for Africa (MAPA) is: *By 2015, to help reduce hunger in rural Africa by half through improving soil fertility, increasing land productivity, and diversifying income generation options for the poorest farming households.*

3.2 **Specific objectives are:**

- To mobilize an alliance of selected institutions and individuals – at international, regional, national and local levels that can contribute effectively and efficiently to the MAPA goal and objectives.
- To sensitize, educate, and engage policy makers and shapers on the benefits of disseminating widely agricultural and related natural resource management innovations that can contribute to the MAPA goal.
- To synthesize the best science and local knowledge available -- irrespective of source -- and determine the target application domains for improving soil fertility and land productivity on a sustainable basis, and to identify appropriate technical, institutional and policy innovations.
- To design and coordinate the implementation of an integrated action plan for scaling up the use of improved soil fertility and land productivity improvement innovations.
- To produce and facilitate the use of recommended seed and planting materials through private and public sector
- To identify and facilitate the establishment of market and enterprise development opportunities for small-holders.
- To inform, train and empower farmers, development facilitators, extension agents, community leaders, and students (particularly women in all preceding categories) on the use of innovations.

- To develop, install and support a learning system that ensures that the experience gained in scaling up helps inform and enhance the effectiveness and efficiency of subsequent phases of investment.
- To identify and address through applied research second generation problems (and opportunities) that might threaten (or enhance) the sustainability of gains.

4.0 Geographical Scope of the Programme

4.1 MAPA will focus initially on 11 countries in East, Central and Southern Africa Region**:** Burundi, DR Congo, Congo Rep (Brazzaville), Central Africa Republic, Kenya, Rwanda, Tanzania, Uganda, Zambia, Sudan and Angola**.** These countries were chosen for the following reasons:

- In most countries, there is sound scientific evidence of innovations that improve soil fertility and land productivity,
- In most countries, farmers in the thousands or in some cases tens of thousands, are already using and benefiting from innovations described above,
- In most countries, there are credible research and development organizations that we can utilize and partner with to access technologies and enhance impacts of agricultural innovations
- In most countries, SRDP has already well established, effective partnerships with a range of credible research and development partners that have the capability to support the objectives described above. This include CGIAR, ASARECA, and many NGOs and CBOs.
- In most countries, there is a strong political commitment at the most senior levels (senior government officials, parliamentarians and, in some cases, even at the level of the president) to support MAPA.

4.2 These are also countries that fall within the mandate of the UN-ECA's SRDP. Within each country, we will focus initially on those areas that show the greatest potential for impact on hunger through the use of agricultural and related innovations such as Agroforestry. And there are exciting developments in several locations in the region, e.g., in western Kenya, southern and central Malawi, and eastern Zambia.

4.3 While focusing on these 11 countries and selected districts within those countries, MAPA will explore the potential for extrapolation of the innovations elsewhere, both within the targeted countries and to additional countries in the target sub-regions. This objective will be achieved through support of participatory adaptive research and the development of extrapolation domains through GIS and other tools.

5.0 Approach

5.1 The project will be designed and implemented to link and strengthen the research, education and development continuum. Although soil fertility replenishment will receive great emphasis in Phase 1, other interventions will be explored to the extent resources allow. The project will support the MDG-based planning and implementation process that aims at linking action at local, national, regional and global levels. Ultimately, the project aims at assisting local communities, starting with targeted pilot sites in various countries, to achieve food and nutritional security, and be on path of improved welfare and sustainable development.

5.2 There are 6 Ss that underline the approach of MAPA: *Scale, Science, Specificity, Selectiveness, Sales and Sustainability*[1]

"…these projects reach only a small fraction of the population. Like expensive boutiques, they are only available to the lucky few."

These provocative words from a recent paper published by Hans Binswanger in Science[2] bemoaning the failure in Africa to scale up successful HIV/AIDS programs to coverage at the national level. 5.3 These "boutiques", often referred to in the agriculture and natural resources literature as "pilot projects", are paradoxically a source of both inspiration and frustration to scientists and development practitioners -- irrespective of sector. They are often the subject of case studies, impact assessments, public awareness efforts, and are invariably used as a show-piece for visitors, ranging from students to farmers to presidents. But frustration is experienced when such projects fail to be translated into high impact programmes at the national or regional levels. In facing the specter of hunger in Sub-Saharan Africa, our collective challenge today is to move *beyond boutiques* and achieve a scale of adoption and impact that bring better lives to millions of poor people.

It is really only recently that these questions of scale of operations are being asked serious by the international research and development community. The failure of the "Green Revolution" to have impact in more marginal environments, particularly on sloping rain-fed lands and on most of the African continent, was widely acknowledged; there were grave concerns about the rate of tropical deforestation and environmental degradation; and there was the emergence of scientific interest in farming systems approaches. All of these factors contributed to a recognition that efforts to improve agricultural productivity must be done in conjunction with efforts to conserve the environment. Managing this nexus is, however, difficult. However, there are options such as many agroforestry practices and there are many that hold great promise as a solution to these problems facing the developing world.

5.4 Experience by practitioners and scientists alike, over the past 30 years in Africa, has demonstrated the difficulty of applying broadly applicable technical recommendations to farmers. Heterogeneous farming environments and differential resource access of farmers demands greater specificity in the application and relevance of innovations. Achieving this specificity requires the early, active involvement of farmers and rural communities, and thereby demonstrates a special challenge in developing and extending natural resource management innovations in a cost effective manner. The implication for MAPA is that: a range of options, rather than packages, is needed, so that farmers can experiment and select those innovations or combinations of innovations that best suit their circumstances; innovations must be sufficiently flexible to allow local adaptation and improvement; and significant investments must be made in information exchange and capacity building to allow informed decision making at the household and community level.

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[1] The 6 "S"s are inspired by and adapted from the 4 "S"s used by Jeff Sachs in his article in "The Economist", October 26, 2002 (pp.73-4).

[2] Binswanger, Hans P. (2000) Scaling Up HIV/AIDS Programs to National Coverage. Science 228: 2173-2176.

5.5 It is now widely recognized that natural resource management is an investment choice, and that investment depends on four supporting "ins": *incentives, information, inputs and institutions* (Barrett et al, 2002). As we examine the potential for investment in soil fertility and land productivity in Africa, we are confronted with considerable variation among countries and within countries with respect to those investment-determining factors. Public investments, in the form of incentives, information, inputs, institutions, (and infrastructure) are needed to support greater and more sustainable uptake of innovations. For this reason, any strategy aimed at achieving impact in the near future must be selective in deciding on when and where to invest. It is to this end that we have chosen to focus on soil fertility replenishment and improving agricultural productivity in the initial phase of MAPA in the GLR. And to make rapid progress, we shall engage relevant stakeholders including research organization that can guide best the targeting of the available technologies to the agro-ecological and socio-economic conditions of our farming communities.

5.6 For agriculture to grow, it must be linked effectively with, and be responsive to market demand. And smallholders must see their farms as business enterprises. This implies the need for farmers to develop business skills, acquire better access to market information, and focus greater attention on product quality and the opportunities for value adding. For research and development institutions in the GLR, it means undertaking an agenda that reflects and anticipates trends in market demand. Market-driven agriculture represents a significant conceptual departure from earlier approaches that focussed on subsistence needs and looked at marketing as a problem rather than an opportunity. By connecting better with markets farmers can benefit from sales of products and (in the future) environmental services (like biodiversity conservation, carbon sequestration to mitigate climate change, and watershed management) that are valued by others. These benefits, in turn, become an important incentive for innovation in land and soil regeneration.

5.7 MAPA's goal is to bring about sustainable change in the way farmers adopt and benefit from innovations in improved soil fertility and land productivity. Short-term fixes, such as the fertilizer starter-pack programme in Malawi have failed to demonstrate sustainability after showing ability to raise yield and improve food security in the short-term. Alternative approaches are required to help farmers and their communities move beyond dependency on food aid and free seed and fertilizers. There are many agricultural innovations that have the potential to bridge the gap from emergency relief to sustainable development. By building farmer and community capacities to learn and adapt, by linking farmers and communities to markets, and by supporting development and implementation of farmer-centred institutions and policies, the potential benefits of agricultural research and development in the region and beyond will be realised and sustained beyond the "boutiques."

6.0 The state of available science

6.1 The most severely depleted nutrients on African farms are nitrogen and phosphorus. Although soils could be improved through imported mineral fertilizers, the majority farmers today cannot afford sufficient quantities of them to effectively replenish soil nutrients on a sustained basis. Average fertilizer application rates in many African countries are less than 10 kg/ha and are less than 1 kg/ha in some countries. These rates are not expected to increase dramatically in the foreseeable future due to many constraints. The challenge is to develop and introduce improved nutrient management

systems that integrate organic and inorganic nutrient sources in practical, cost-effective ways, and that fit well with farmer practices and priorities.

6.2 To restore nitrogen, land can be temporarily taken out of crop production and planted with fallows of nitrogen-fixing woody perennials (shrubs and trees) and herbaceous legumes. To increase both phosphorus and nitrogen, inorganic sources of phosphorus, including indigenous rock phosphate, combined with the use of organic sources (manure, legumes, and non-leguminous shrubs, such as *Tithonia diversifolia*), can be applied directly to crops.

6.3 In southern Africa, ICRAF and its national partners have shown that leguminous trees and shrubs accumulate 100 to 200 kg N/ha in their leaves and roots, mostly during the dry season. When these materials are incorporated into the soil, maize yields double and sometimes quadruple (Kwesiga et al., 1999). Thousands of smallholder farmers in southern Africa are now using a 2-year fallow, 2-3 year maize rotation, without significantly increasing demands on limited cash and labor resources (Rao et al., 1998).

6.4 In many areas of eastern Africa, smallholders need both nitrogen and phosphorus, necessitating the combined use of organic and mineral sources of nutrients (Palm et al., 1997). Short-term (6-10 month) improved fallows have proven to be an effective and profitable way of adding about 100 kg N/ha and recycling other nutrients in the depleted soils of western Kenya; (Niang et. al 1998, Rao et al 1998).

6.5 In phosphorus-deficient soils, Minjingu phosphate rock from northern Tanzania is proving to be as effective and profitable as imported triple super phosphate (Sanchez et al., 1999;). This has been demonstrated by many years of research in the phosphorus-deficient soils of western Kenya. Application of both large and small rates can results in dramatic improvement in crop yields (Jama et al 1997) .

6.6 Besides nutrient depletion associated with cropping without fertilizers, land degradation across Africa is also the result of accelerated soil erosion and the degradation of soil structure and soil physical properties. A study by Oldeman et al. (1991) estimated that, in sub-Saharan Africa, soil erosion by water affects 227 million ha, wind erosion affects 187 million ha, chemical degradation affects 62 million ha, and physical degradation affects 19 million ha.

6.7 There are many regional institutions with innovation for erosion control and better land management. But one notable one is Regional Land Management Unit (RELMA), a major Sida supported initiative, based at ICRAF headquarters in Nairobi. Since 2003, RELMA has become part of ICRAF. Working through extension services, RELMA has had outstanding success in adapting and extending better land husbandry across eastern and southern Africa, particularly in promoting soil conservation, soil fertility, livestock production, water harvesting and management and agroforestry.

6.8 Other international research centers have a similar record of achievement in the development of promising innovations that improve soil fertility and land productivity. Over the past years, CIMMYT, TSBF-CIAT and NARS partners in southern Africa have also worked towards developing more robust soil fertility management technologies that benefit smallholder farmers by requiring less investment and less risk. Much of this work has drawn on the pool of knowledge and expertise about the needs of small-holder

farming systems in southern Africa developed in the 1980s and early 1990s. The CIMMYT-coordinated, Rockefeller Foundation-supported Soil Fertility Management and Policy Network for Maize-Based Cropping Systems (Soil Fert Net) has been a focal point for such activities since 1994 in Malawi, Zimbabwe, and more recently Zambia and Mozambique. This network is comprised of government research and extension staff, universities, NGOs, the private sector and several IARCs.

6.9 TSBF-CIAT have spearheaded efforts on improving the research capacity of NARS partners in the region through understanding the role of biological and organic resources in soil fertility management and how they can be integrated with farmers' decision making. Part of this work is conducted through the African Network for Soil Biology and Fertility (AFNET), formed in 1988 and now active in 16 countries of SSA. TSBF-CIAT and Soil Fert Net have complementary foci and a long record of productive collaboration.

6.10 A major initiative of these networks has been to develop, test and promote through pilot efforts "Best Bet" soil fertility technologies with smallholder farmers in the region (Giller 1999; Waddington and Mekuria 2000 and 2002). The following "best-bet" technologies have been widely tested with farmers in eastern and southern Africa and are ready for wider promotion:

- Site-specific mineral fertilizer recommendations for maize dependent on soil type and rainfall regime. There is now good knowledge on phosphate rock deposits and potential in the region that can be included in these recommendations.
- Knowledge-based management of organic inputs of plant or animal origin in combination with mineral inputs.
- Lime as a soil amendment on acidic sandy soils. This is particularly important in Rwanda and Burundi where the soils in many areas are acidic.
- Well managed and higher N content livestock and compost manure.
- Use of grain legumes such as pigeon pea-maize intercrop, or crop rotations containing soybean.
- Use of green manures of various leguminous trees, shrubs and herbaceous plants
- Use of Tithonia and similar plants that are high quality organic fertilizer. Tithonia, that is a weed in many areas in the GLR, is very rich in nutrients that crops need.
- Nitrogen use efficient (and drought tolerant) open-pollinated (OPV) maize seed together with small amounts of fertilizer (instead of allocating the same resources to more expensive hybrid seed).
- Smallscale irrigation technologies
- Integrated pest and diseases management, including the use of tithonia and other plants as pesticides in organic farming practices.

6.11 The CIMMYT Maize Program and its partners in southern Africa have developed a range of open-pollinated and hybrid maizes that outyield existing maizes by over 30 % across many low yielding and higher yielding smallholder maize production environments and management systems. These maizes are more drought tolerant and more nitrogen use efficient. After several years of widespread testing and assessment by farmers, NGOs, extension services and seed companies in southern Africa, they have been or are currently being released in several countries, including Malawi, Zimbabwe, Angola, South Africa, Mozambique and Zambia. Their use is now being widely promoted in the region, including commercial seed production and marketing by local and regional seed companies.

6.12 Additional work to develop and deploy very early maturity maize with good tolerances to major diseases is underway at CIMMYT in southern Africa. Such fast maturing maizes offer farmers far more flexibilities and benefits, including possibilities for the very early harvest of green maize cobs to reduce hunger periods, late planting during the normal rain-fed cropping season, and off-season wetland plantings in seasonally flooded lowland areas.

6.13 Similar work is underway in eastern Africa, through ECAMAW (East and Central Africa Maize and Wheat Network), which is one of the networks under ASARECA, and managed by the CIMMYT Kenya office located at the World Agroforestry Centre in Nairobi. The work in eastern Africa is somewhat wider and includes tolerance to major biotic threats, particularly witchweed (striga) and stem borers. CIMMYT also have a major initiative underway to develop better quality protein maize (QPM) varieties for eastern and southern Africa and deploy these with farmers.

6.14 As these maize varieties are adopted by farmers, they offer prospects of increased returns to some of the soil fertility interventions being incorporated into these systems (including those proposed by this MAPA project), and the prospects of more stable maize production and food security for farm (and urban) households in the region. Some of these maize varieties could be specifically targeted to MAPA areas, if it is not already available, on a case-by-case basis.

6.15 In semi-arid areas of Africa, the ICRISAT whose regional headquarters are in Nairobi aims to provide better access to nutritious food by providing subsistence farmers with opportunities to increase their income by pursuing opportunities for commercialization. In eastern and southern Africa, ICRISAT has made major progress in the improvement of groundnuts and pigeon pea and their incorporation into sustainable farming systems. These grain legumes are nutritious, thrive under low rainfall and soil fertility conditions, can be grown with low capital investments, and can be traded in local, regional and international markets. ICRISAT's strategy involves:

- Technology innovation systems. These systems comprise the development and dissemination of technical production information, the promotion and use of improved high yielding varieties with market acceptable traits, and deployment of integrated pest management to increase productivity and improve grain quality.
- Institutional innovations for improving access of the poor to seeds of improved high yielding varieties. These innovations will forge partnerships between public research institutions, private seed companies, and community seed enterprises for the production of foundation and certified seeds that will be marketed as small packs through rural stockists and collection points. Public-private partnerships will resolve constraints in availability of certified seeds, small seed packs ensures its availability in affordable sizes, and sale through rural stockists and collection points guarantees equitable access by smallholder farmers in rural areas.
- Market institutional innovations to reduce transactions costs and enhance the competitiveness of poor smallholder farmers in grain legume markets. Research and analysis of the grain legume sub-sector improves understanding of market structure and performance as a basis for design of context-specific systems of market organization and coordination. Market information systems enhance the flow of information along the commodity chain and allow farmers to respond to

market signals. These systems are being tested and evaluated to improve market incentives and the overall efficiency and effectiveness of grain markets.

- Capacity building of grain legume sub-sector stakeholders to strengthen the organizational and business capabilities of farmers, traders, and processors so that they can function more effectively.

6.16 Other 'best bet' technologies include:

(i) Conservation agriculture – several institutions including ICRAF promote conservation agriculture for its many benefits including soil and water conservation. A key constraint to crop performance in the region is inadequate water. Much of the region receives less than 800 mm rain per year in a normal year and the region is prone to drought periods within the cropping season. The objective of better water management and yield enhancement has given birth to an interest in conservation agriculture. Techniques associated with conservation agriculture are minimum or zero tillage, early land preparation and timely planting, legume rotations, micro water basins, point seeding and fertilizer application, and soil cover with biomass (residues and others). Haggblade (2004) found that conservation agriculture practices accounted for 1.1 tons/ ha /year of extra maize in a survey of farmers across Zambia and that this is profitable after subtracting out extra costs. It is estimated that about 60,000 farmers in Zambia were employing two or more of the conservation farming techniques and that this was being promoted by farmers' associations (Haggblade and Tembo 2003).

Besides providing soil and water conservation benefits, many of the species used for conservation agriculture have soil fertility improvement benefits. Many fix nitrogen biologically from the atmosphere. Some also have food value including their use as indigenous vegetables. Many of them have also good fodder value, and the use of these cover crops will augment the supply of livestock feed on farms. Their adoption is currently limited by the lack of seeds and planting materials and limited knowledge by the farmers on how to manage and integrate them into their farming systems.

ii) Rainwater harvesting - in addition to soil fertility management, rainwater harvesting is key to improving agricultural productivity in the region. Indeed, these were the cornerstones of the *Green Revolution* of Asia. There are wide range of simple runoff and roof-top rainwater harvesting techniques that need to be disseminated widely. They include ponds at homesteads harvesting runoff from roads and hillsides, check dams using sand and rocks on seasonal river beds, treadle (foot pumps) for small-scale irrigation, among others. ICRAF has been prompting rain water harvesting for the production of high value crops and fruits such as grafted mangoes in the drylands of the ECA region. The widespread application of these rain water harvesting technologies is, however, limited by lack of knowledge on technologies and management, initial funds to make the investments necessary, among others. To address these problems, regional networks of research and development partners are emerging. And an active one in the East and Southern Africa region is SEARNET that is coordinated is hosted by ICRAF. These networks need to be strengthened and made more action and impact-oriented.

6.15 These examples illustrate the crucial role of agricultural innovations and related integrated natural resource management (INRM) approaches in land quality restoration. The innovations have moved well beyond the research stage and are already being applied by tens of thousands of farmers in eastern and southern Africa. However, local adaptation of these integrated approaches is required by our national partners as the

innovations spread to new areas. This is to account for variations in the adaptation of plant species, differences in market infrastructure, and diversity in farmers' interests and preferences. With a sound scientific base of more than a decade of research and development in soil fertility and INRM, national agricultural research in the region and their international and national partners are well positioned to support and further extend the adoption and impact of these innovations throughout Africa. At the same time, it will be necessary to continue to invest in the development of new innovations that enable innovations to extend to countries, regions and communities that have not yet benefited.]

c) **Reducing post-harvest harvest losses** – the losses of agricultural production in Africa after harvest and in storage are enormous. Estimates range between 30 to 50% depending on the crop type. Much of this due to lack of appropriate rural infrastructure at both farm and district levels. Farmers also have little knowledge and/or resources to improve their drying and storage conditions. The losses are particularly high for vegetables and also for all crops where markets are poor and access to the market is also poor. This is the situation in much of the GLR. In MAPA, tremendous emphasis will be given to improving storage and to reducing post-harvest losses. There are many low-cost technologies that will be disseminated and adapted to local conditions of farmers in the GLR. This will be accompanied by an expanded training of extension program for staff and farmers.

d) **Strengthening farmers associations** – this is essential to the success of MAPA. Farmers association help achieve economies of scale with respect to the supply of inputs and the sale of outputs. Training and capacity building is simplified when farmers are in groups. So are credit schemes. Therefore, great effort will put in MAPA towards strengthening farmers associations and common interest groups. Approaches such as Farmers Field Schools will be employed in this exercise.

7.0 Principal components of MAPA

(i) Planning, development, management and coordination of the MAPA action plan, including developing business plans for each focal country.
(ii) Establishment of an alliance of research and development partners that is committed and capable of delivering on the programme goal and objectives.
(iii) Synthesis of existing and emerging knowledge, thereby enabling the definition of innovations that can have an immediate impact on soil fertility and land productivity; and complementary development of recommendation domains where those innovations have the greatest prospects for adoption and impact.
(iv) Sensitization and education of policy makers and direct engagement with them, with special emphasis on senior leaders and parliamentarians.
(v) Informing, training and empowering development facilitators, extension agents, community leaders, students and farmers.
(vi) Procurement, production and distribution of appropriate seed and planting materials; and the parallel development of sustainable demand-driven seed supply systems that effectively meet the demands of small-scale farmers.
(vii) Facilitation of greater use of inorganic fertilizer where cost effective and appropriate.
(viii) Pro-active identification and development of market linkages and commercial enterprises that contribute to the programme goal.

(ix)Development and installation of a monitoring and evaluation system that enhances the systematic learning from experience, leading to improvements to subsequent phases of MAPA.
(x) Conduct of applied research to further strengthen the scientific basis for continued promotion and extrapolation of innovations.

Activities, deliverables, and budget for each of the 10 components listed above will be elaborated in the Project Design Document.

8.0 Partnerships and Linkages

8.1 The MAPA initiative will contribute to the attainment of the Millennium Development Goals (MDG). Most directly, MAPA will address goal #1: to eradicate poverty and hunger. As indicated above, the goal of MAPA is to halve hunger by 2015 in those areas where the programme is implemented. At the same time, we expect to make an equally important contribution to poverty reduction and the goal of environmental sustainability.

8.2 The **United Nations** strategy for the MDG includes "operational country-level activities" that help individual countries implement policies necessary for achieving the MDG. In addition, the learning dimension of MAPA will contribute directly to the Millennium Project, through the field level testing and evaluation of policy options that relate to the work of Task Force #2 (Hunger), Task Force #1 (Poverty and Economic Development), and Task Force #6 (Environmental Sustainability).

8.3 The work of MAPA will directly reinforce and support the efforts of the New Partnership for Africa's Development (NEPAD) which includes strong emphasis on sustainable land and water management, increasing food supply, and complementary improvement of infrastructure and market access. MAPA will also support the objectives of the Framework for Action on Agriculture developed by the WEHAB working group for the Johannesburg Summit.

8.4 MAPA will engage with and support the Africa Challenge Programme (CP) of the Forum for Agricultural Research in Africa (FARA). A major emphasis of that Challenge Programme is soil fertility replenishment. Implementation of the Challenge Program is led by the three Sub-Regional Programs of FARA: ASARECA, CORAF and SACCAR. We confidently expect that MAPA will provide a vehicle for rapid delivery in the GLR of technologies and policies developed through the Africa CP.

8.5 The scientific foundation of MAPA is strengthened through active collaboration among a number of CGIAR institutions, including ICRAF, TSBF-CIAT, CIMMYT, ICRISAT, and ILRI, among others. TSBF-CIAT and ICRAF recently established a strategic alliance to undertake research on soil fertility in Africa. Stronger alliances with RELMA that has since 2003 joined ICRAF, the Asian Vegetable Research and Development Centre (AVRDC) and the International Fertilizer Development Center (IFDC) are currently being pursued.

8.6 Successful implementation will also depend on alliances with development organizations that have strong and successful working relationships with rural communities. Examples of some MAPA will forge a strong partnership include with include the World Vision International (WVI), CARE, Oxfam, Heifer International, ACDI-

VOCA, Technoserve, Save the Children, Africare, Vi Agroforestry, Sasakawa Global 2000, among others. in the implementation of development projects in Africa. Under MAPA, SRDP will prioritize and where appropriate strengthen and add to these partnerships to deliver on the programme goal.

8.7 MAPA will initiate and support dialogue with the private sector (at all scales) in each of the target countries with a view to better understanding and exploiting market and business development trends and opportunities for small-holders.

8.8 SRDP works in partnership with IFAD, UNDP, FAO, and UNAIDS in a range of development-oriented initiatives. Under MAPA, these alliances with United Nations agencies will intensify to include WFP, UNICEF, and WHO. These partnerships will be strengthened through MAPA.

8.9 At the regional level, SRDP will work in close collaboration with the Forum for African Agricultural Research (FARA) and the sub-regional research organizations: ASARECA, SACCAR/SADC, and CORAF/WECARD. These partnerships will be strengthened through MAPA.

8.10 At the national level, the SRDP will strengthen already robust working relationships with national research and extension institutions and universities, and establish new partnerships with ministries responsible for basic education. In Kenya, for example, the programme will strengthen the soil fertility component of the National Agriculture and Livestock Extension Programme, while in Uganda the programme will link with the National Agricultural Advisory Services. Similar institutions will be strengthened in all the 11 countries of the GLR.

8.11 Finally, recognizing that a number of bilateral donors already have strong commitment and financial support to soil fertility and related issues in Africa, their active engagement in the design, implementation and complementary support of MAPA will be sought.

9.0 Budget and Timeframe

9.1 MAPA will be implemented in three phases (of 3 yrs, 3 yrs, and 4 yrs) over a 10-year period (2005-2015).

9.2 Phase one will be a 3-year establishment phase designed to produce quick results in areas of greatest potential for impact on hunger. ***If fully funded, MAPA will reach at least 500,000 people*** in eastern and southern Africa with seed/planting materials and complementary information within 3 years, thereby providing them with the knowledge and capability (e.g., seed and/or fertilizer) to significantly reduce the risk of hunger.

9.3 Phase 2 will be redesigned on the experience of Phase 1 and is likely to extend beyond the selected areas in the 11 priority countries. Phase 3 will entail a massive expanded effort to help achieve the MDG of reducing hunger by half in the 11 target plus more where resources.

9.4 Phase 1 will require a budget of US$12 million in the first year and $20 million in the second and the third. Thereafter, an annual budget of $20-25 million will be required for

the core MAPA programme on the assumption that other sources of multilateral and bilateral finance are providing complementary support to the effort.

10.0 Next steps

10.1 With a positive indication of support to the overall MAPA concept and a firm commitment to phase one funding on the scale indicated above, a MAPA consultation and design process will be initiated in June 2007. This will involve a series of consultancies, planning workshops and consultations in each of the 11 priority countries. The output will be a project design document (to be completed by December 30, 2006) that will serve as the action plan for phase 1 and an indicative plan for phases 2 and 3. **A budget of $250,000 is sought for these pre-implementation activities.**

10.2 SRDP will identify a lead agency from the GLR region to assist in develop and implement MAPA. SRDP will identify a lead agency from the GLR region to assist in develop and implement MAPA.

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Annex 2:

Fisheries Development Food Security for the Great Lakes Region: Preparatory Phase of the Programme

I. Introduction

The riparian countries of the Great lakes region, (Angola, Burundi, Democratic Republic of Congo, Central African Republic, Republic of Congo, Kenya, Rwanda, Sudan, Tanzania, Uganda and Zambia), have immense potential for fisheries. The region is endowed with numerous water bodies, which include inter alia the Nile, Lake Victoria and River Congo and others. The region also includes some coastal countries, which have marine fishing activities.

Efforts underway for the development of fisheries and fishing industries should be scaled up so as to uplift the living standards of the inhabitants, the majority of whom live on less than a dollar a day.

Most riparian populations in the sub region are involved in artisanal fishing. Whilst direct fishing activities are dominated by men, women are engaged in fishing related activities such as net repairs, fish processing and marketing.

Current fishing practices tend to have negative impacts on lakes and sea ecosystems in spite of the existence of fishery regulations in most countries. Destructive activities such as the use of small mesh size nets, cast nets, baskets, gillnet and mosquito nets are rampant. Fishing close to the shore near brooding areas is also common. Due to fishing malpractices over fishing is widespread and there is lack of adequate facilities including cold storage.

Fish landings are generally located in remote areas with poor access roads and hence are not well served with means of transport and communications. Other social services like medical, schools, banking facilities are also hard to come by.

Fishing is also a source of conflict between communities across fishing grounds.

II. The project as a component of the Food security programme

1. Development Objectives

Its overall objective is to contribute to food security in the subregion through the development of fishing activities and fisheries with special focus on lake/river fishing for poverty reduction.

2. **Immediate Objectives**

The project provides for preparatory activities towards the preparation of a substantial programme for the development of fishing activities in the subregion. This phase will help to analyse the situation in the 11 Great Lakes countries with a view to identifying challenges and opportunities and charting out strategies, plans and programmes for the development of fisheries and the related activities for food security.

III. Activities

(i) Assessment of the fishing sub sector, reviewing demand and supply capacities as well as policies, regulations and institutional mechanisms in support of the sub sector.

(ii) Evaluation of on-going projects including multi-country programmes and their impact on the fishing infrastructures and downstream conservation and processing activities.

(iii) Undertake multi-sectoral programme design in response to challenges and opportunities identified, taking into account existing programmes and potentials. In doing so, due consideration shall be accorded to social and environmental implications/impacts including Gender dimensions. Prospects for regional cooperation will also be considered.

IV. Expected Outputs/Outcome

- A comprehensive report on river/lake fishing industries of the Great Lakes.
- A database on the fishing industries
- A Programme document for the development of the fishing industries in the sub region
- This preparatory work will help to sensitise further on the role of lake/river fishing activities for food security and poverty alleviation and the potential for reduction for regional cooperation.

Timeframe and Schedule of Activities

Activities	Months															
	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Adoption of the Project and mobilisation of resources		—	—	—												
Recruitment of Experts						—	—									
Field missions/data collection/consultations							—	—								
Preparation of assessment reports									—	—						
Preparation of programme document										—	—					
Subregional meeting of Experts												—				
Revise programme document													—	—		
Launching of Programme for the development of fishing activities for food security and poverty alleviation/resource mobilisation																–

Annex 3

Formulation of a Programme on Livestock development for food security in the extended Great Lakes Region of East and Central Africa

A. Preparatory Project

I. Background and rationale and justifications

The term food security relates to the condition that exists when people have economic access to sufficient, safe nutritious and culturally acceptable food to meet their dietary needs and lead an active and healthy life (FAO 1996). There are over 800 million hungry people with 204 million of them in Africa, an unacceptable situation, which the international community is committed to halving by 2015 (UNDP 2005a). The recent Millennium Development Project report on the fight against hunger suggests special concern in the extended Great Lakes Region (GLR) of East and Central Africa, which reported an undernourishment of over 30% in nine out of the 11 countries (UNDP 2005b). Increasing agricultural productivity of food-insecure farmers, including diversifying farm enterprises e.g. strengthening livestock are among the recommended strategies by the MDG hunger task force. However the major problem is poor understanding of the role of livestock in food security among the poor. As a result the livestock sector has been given low profile in the on-going debate on poverty eradication, even in countries where most of the people get over 50% of their daily requirement from livestock. Recent research findings by the International Food Policy Research Institute (IFPRI) and the International Livestock research institute (ILRI), projected a massive increase in consumption of animal products in the next twenty years (IFPRI 1995; Delgado et al., 1999), which has given a new impetus to livestock development in developing countries. To that effect the African Heads of State endorsed a new thrust in livestock development in their Sirte Declaration in 2003 and has given the African Union Commission the task to spearhead this. Therefore incorporation of a livestock component in the Food Security programme for the extended GLR is imperative.

The Great Lakes Region of East and Central Africa carries over 40% of the livestock population in Sub-Saharan Africa (FA0 2004). Livestock have multiple functions in rural poor households ranging from immediate products, which provide food and/or income, intermediates products such as manure and draft power to indeterminate products such as social status, capital accumulation and risk aversion in years of crop failure. However, this resource has not been adequately tapped in addressing food security in the region a scenario, which can be attributed to biophysical, socio-economic and political factors. The state of

poverty among most of rural households in the region and lack of poverty-focused livestock development programmes in the past have led to slow growth in the livestock sector in the region (LID 1999).

The current global thrust on poverty eradication, coupled with review of role of livestock in poverty reduction and food security call for a change of focus in livestock development programmes to allow poor producers and consumers to take advantage of the surge in demand of animal products.

It is evident that in poverty alleviation, livestock are often the only assets of many of the landless poor, their products (milk, meat, eggs, wool, hides and skins) provide a direct or indirect source of income throughout the year, and, they are a means of capital accumulation and provide a cash buffer in times of need. Further more, in food security the milk and eggs they produce are the only agricultural products that can be harvested every day throughout the year. Livestock can be productive throughout the year where crop agriculture is difficult or impossible. Animals provide draught power without which crop production in many areas would be severely compromised, and, they make use of crop and agro-industrial by-products and waste and convert them to high quality human food. With regard to the environment and its conservation they produce manure that contributes to sustainable nutrient cycling and maintenance of soil fertility and structure as well as to bush and weed control in many areas. Small animals are often owned by women giving the disadvantaged groups in intra-household nutrition, women and children priority access to livestock products for consumption or sale. Draught animals reduce much of the drudgery of women's work. Therefore livestock keeping increases gender equity.

The livestock production systems in the GLR and most of Sub-Saharan Africa can be described under three main categories namely; pastoral/agro pastoral, mixed smallholder farming and the urban livestock production systems. These production systems have distinct features, which have to be taken into consideration in planning poverty-focussed livestock development projects. At the same time in the new thrust to incorporate livestock component in the ongoing poverty reduction strategy programmes, a number of initiatives are on the ground. On that basis a participatory process to develop a livestock development programme within the Great Lakes Food Security programme will result into a more feasible, profitable and sustainable programme.

A budget of USD285000 to facilitate formulation of a fully fledged livestock project within the Great Lakes Food Security Programme in a period of three months is proposed.

The GLR comprising of Angola, Burundi, Central African Republic, Democratic Republic of Congo, the Republic of Congo, Zambia, Rwanda, Tanzania, Kenya, Uganda, Sudan, carry over 40 % of the Sub-Sahara Africa livestock population (Table 1). Table 2 describes the characteristics of the three main livestock

production systems in the region, which have a major bearing on strategies for enhancing contribution of livestock to food security. Pastoralists obtain their main daily requirement, food, shelter, fuel and cloths from livestock and livestock products contribute over 50% of total household revenue (Jahnke 1982).

However, this production system, which is found mainly in the arid and semi-arid areas, has suffered major setbacks due to vagaries of weather, frequent conflicts and civil war, diseases as well as encroachment of grazing lands for other non-pastoral uses. The system is changing rapidly with diversification and movement to more crop-livestock integration. In the smallholder mixed farming system and urban livestock production there is more intensification due to small land sizes and the move toward more market oriented livestock production system. A clear understanding of the different roles and functions of livestock in these production systems is a pre-requisite to a viable poverty-focused livestock development programme.

- Livestock have multiple functions among poor households:-
- Livestock provide an important dietary component animal protein – meat, milk and eggs thus contributing to household food and nutrition security.
- Livestock are the main and often the only source of steady income
- Livestock diversify smallholder production systems and there by increase food and income security
- Livestock provide draft power, which contribute to increased crop production, reduce human drudgery especially for women (fetching water, forages and fuel wood)
- Livestock contribute to increased farm production efficiency through integrated nutrient management
- Livestock keeping is one of the few activities by which the poor can accumulate capital
- Livestock are one of the few natural capital assets owned by the poor
- Livestock allow the poor to gain private benefit from common property resources
- Livestock act as buffer capital in lean seasons
- Livestock give social status security and cultural identity
- Livestock makes arid and desert regions with sparse vegetation habitable for humans, where sedentary agricultural life-style with farming of land is impossible

More specific to food security, animal products provide the best quality protein in the human diet as they are able to provide essential amino acids such as arginine that the human body cannot manufacture for itself (Grosse 1998). Animal products supply about 17 per cent of the energy and 32 per cent of the protein eaten by people (Bender, 1992). Recent studies in Africa have shown ownership of livestock in rural households of Africa has shown to have direct and indirect effects on the nutritional status of children (Tangka et al., 2000). Nutritional status of children measured as a rate of underweight prevalence is

one of the indicators used to identify hunger “hotspots” (UNDP 2005). Burundi, Democratic Republic of Congo and Tanzania are among the countries found to have high prevalence of up to 55% in Burundi. Keeping of smallstock, dairy goats, pigs, poultry and rabbit has been associated to improved food and nutrition security of poor households in a number of developing countries (Owen et al. 2005).

There have been attempts to map livestock and poverty in an effort to support decision making and targeting of development projects (Thornton et al., 2002).

This groundbreaking work reported that most of the poor are found in the mixed farming system although the pastoral poor are more vulnerable because of unpredicted weather. Furthermore some pastoral areas in the region have suffered marginalisation because of remoteness from central government, persistence of conflicts and low representation in policy and decision making bodies. The ongoing national policy reforms and livestock commercialisation thrust in most countries has taken some of these issues into consideration. In the mixed farming systems the small land sizes is the major problem. A number of international development partners such as DFID – Livestock Production Programme, Heifer International and Farm-Africa are promoting dairying, keeping of small livestock (Sheep, goats, pigs and poultry) as a strategic approach to increase consumption of animal products by the poor.

Livestock production systems are generally more complex than cropping systems and more so the traditional production systems. Success of livestock development programmes require strong collaboration with the producers and other stakeholders such service providers, local authorities and policy makers. On that basis a wide sector consultation in the development of a full fledged livestock development programme for action within the framework of the International Conference on the Great Lakes region programme on food security is suggested.

II. Objectives

- Development objectives

To empower the people of the extended Great Lakes Region improve their household food security though sustainable and profitable livestock production practices.

A pre-project planning is proposed on the basis of the complex nature of the livestock productions systems, the emerging regional cooperation, the transboundary nature of livestock diseases and trade as well as the need to link up with related programmes in the region. Such approach aim at building on synergies and make effective use of resources. Using participatory process in developing this programme will increase project impact and ownership.

- **Immediate objectives**

1. To draw an integrated poverty-focused livestock development project within the Great Lakes food security programme through a wide sector consultation.
2. To enable the Great Lakes to discuss regional cooperation in livestock development and consult with partners on a possible cooperation for the mobilisation of their assistance.

III. Expected output

A fully fledged 5 year livestock development project within the UN-ECA food security programme

IV. Activities

1. **A synthesis report** based on review and analysis of the ongoing major national regional livestock development projects in relation to food security and attainment of the MDGs will be produced through a desk top study and consultations with key regional programmes. A questionnaire will be prepared at this stage for the collection of additional data through field visits to some of the countries and local consultants.
2. **Data collection:** Field visit to selected Great Lakes countries will be undertaken to collect data through local resource-persons and discuss with various stockholders.
3. **A draft consolidated report** will then be prepared as a working document to be reviewed by a consortium of scientists by an identified convener and team leader as a basis for a fully fledged programme to be implemented within the framework of the Great Lakes programme. Linkages with other international programmes such as FAO Anti-Hunger Programme will be made.
4. **Preparation of the draft programme document on livestock development** for food security in the Great Lakes. The document should cover all aspects of production (including animal husbandry/cattle breeding, health, meat and dairy industries etc…) and trade.

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Table 1. Ruminant population in Great Lakes Regions (FAO, 2004)

Country	Cattle	Goats	Sheep
Africa South of Sahara	210,657,535	208,141,669	174,029,635
Angola	4,150,000	2,050,000	340,000
Burundi	325,000	750,000	230,000
Central African Republic	3,347,000	3,087,000	259,000
Congo, Dem Republic of	761,270	4,004,000	896,900
Congo, Republic of	100,000	294,200	98,000
Kenya	12,531,300	11,945,500	9,938,800
Rwanda	900,000	760,000	260,000
Sudan	38,325,000	42,000,000	48,000,000
Tanzania, United Rep of	17,704,000	12,556,240	3,521,231
Uganda	6,558,000	7,821,000	1,603,000
Zambia	2,600,000	1,270,000	150,000
Angola	4,150,000	2,050,000	340,000

Table 2. Typology of main livestock production systems

Production systems	Main characteristics	Location	Livestock species	Major constraints
Pastoral/agro pastoral	• Based on traditional extensive grazing in natural rangelands • Big herd sizes decreasing in agro-pastoral system • Social functions (status and cultural) outweigh economic functions • Livestock based economy with over 50% of HH revenue from livestock	Semi-arid areas rural	Cattle, sheep, goats, donkeys	• Frequent drought • Inadequate access to services – extension and marketing • Encroachment of grazing lands • Marginalisation in development programmes • Civil conflicts
Smallholder mixed farming	• Small herds and land sizes • Semi-grazing or zero grazing • System on transition with increasing adoption of new breeds technologies • Higher market opportunities than in pastoral systems	Semi-arid, humid and sub-humid and highlands	Cattle, sheep, goats, Pigs and poultry	Decreasing land sizes Inadequate feed resources
Urban livestock production	Intensification, semi-industrial system Most of feed imported from outside	Peri-urban in the whole region	Dairy cattle/goats, Pigs and poultry	No regulatory framework

Project : Food security project
Agriculture, Fisheries and Livestock

	Overall project (1 year)				Year 1		
	Unit	# of units	unit cost	Total cost	Q1	Q2	Q3
ACTIVITIES							
1.1. Project design to serve as action plan for phase 1 and indicative plan for phase 2							
- Consultants	month	2	10,500	42,000		42,000	
- Travel expenses for the consultants in 11 countries	air tkt	22	850	18,700		18,700	
- Allowances and accommodation for 2 consultants	days	33	250	16,500		16,500	
- Communication	month	2	1,000	2,000		2,000	
Sub total/Project design to serve as action plan for phase.. (1.1)				***79,200***	***-***	***79,200***	***-***
1.2. Support to national consultative workshops							
- Financial support to national structures	structure	11	5,000	55,000		27,500	27,500
Sub total/ Support to national consultative..... (1.2)				***55,000***	***-***	***27,500***	***27,500***
1.3. Regional stakeholders consultative meeting							
- Travel expnses of participants(55)	air tkt	50	850	42,500			42,500
- Allowance and accommodation	days	3	250	37,500			37,500
- Communication	month	1	2,000	2,000			2,000
- Interpreters and equipments	days	3	650	7,800			7,800
- Other administrative cost	month	1	3,250	3,250			3,250
Sub total /Regional stakeholders consultative meeting.. (1.3)				***93,050***	***-***	***-***	***93,050***
SUB TOTAL/ AGRICULTURE				227,250	-	106,700	120,550
Unforseen (10%)				22,725	-	10,670	12,055
SUB TOTAL/ AGRICULTURE (1)				**249,975**	**-**	**117,370**	**132,605**

2. FISHERIES								
2.1 Consultancy								
- International experts(3)	month	3	6,000	54,000		54,000		
- Fees for 3 international experts	mois	3	9,000	81,000		81,000		
- 11 local experts	mois	1	2,000	22,000		22,000		
Sub total/ Consultancy (2.1)				***157,000***	***-***	***157,000***	***-***	***-***
2.2. Meetings								
- Travel expenses for experts	Air tkt			20,000		20,000		
- Printing costs	Printing mat	400	20	8,000		8,000		
- Sundries	meeting	2	2,500	5,000		5,000		
- Meeting cost (2)	meeting	2	75,000	150,000		150,000		
- Administrative cost	meeting	2	22,100	44,200		44,200		
Sub total/Meetings (2.2)				***227,200***	***-***	***227,200***	***-***	***-***
SUB TOTAL FISHERIES(2)				**384,200**	**-**	**384,200**	**-**	**-**
3. LIVESTOCK								
3.1 Consultancy								
- 4 International consultants	days	100	400	40,000		40,000		
- Travel and DSA	days	100	200	20,000		20,000		
- Local consultant for data	days	10	200	40,000		40,000		
Sub total/ Consultancy (3.1)				***100,000***	***-***	***100,000***	***-***	***-***
3.2 Expert Group meeting to review the draft								
- Expert Group Meeting	meeting	1	30,000	30,000		30,000		
Sub total/ Expert Group meeting to review the draft(3.2)				***30,000***	***-***	***30,000***	***-***	***-***
3.3.Workshop (50participants)								
- Travel	air tkt	50	1,000	50,000		50,000		
- DSA	days	5	200	50,000		50,000		
- Interpretation	meeting	1	20,000	20,000		20,000		
- Other meeting cost(break, rooms,stationery etc..)	meeting	1	10,000	10,000		10,000		
- Reproduction and translation of documents	meeting	1	15,000	15,000		15,000		
- Sundries	meeting	1	10,000	10,000		10,000		
Sub total/ Workshop (50participants) (3.3)				***155,000***	***-***	***155,000***	***-***	***-***
SUBTOTAL LIVESTOCK(3)				***285,000***	***-***	***285,000***	***-***	***-***
TOTAL GENERAL				***919,175***	***-***	***786,570***	***132,605***	***-***