Assessment Report for Water for Agricultural Production

Euroconsult Mott MacDonald in association with:
– SNV Netherlands Development Organisation
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October 2014
Assessment Report for Water for Agricultural Production

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Farmers of Gok Akon Cooperative Society weeding Onion Garden. By Peter Mugisha Agronomist

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<tr>
<td>APARD</td>
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<td>Food and Agricultural Organisation of United Nations</td>
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Executive Summary

The Water for Lakes Program is a broader bilateral program for water and sanitation between South Sudan and the Netherlands. The program is funded by the Dutch Government and has an implementation period of three years with a potential extension of 2 years and the implementation process started on the 1st of November 2013. The Programme has 5 major components namely (i) Water for Livestock, (ii) Water for Agriculture, (iii) Water for Fish and Habitats (iv) Water for People (Improved Water and safe Sanitation) and (v) Knowledge and capacity development for Integrated Water Resource Management (IWRM).

The program aims at stimulating economic development by unlocking the potential of integrated development and management of land and water resources for production using water as an entry point. Lakes State is endowed with vast resources and if harnessed could stimulate economic and improve the living conditions of the population.

The agricultural sector faces a daunting set of challenges. The most important among these are. The most important among these are: inadequate knowledge and skills, use of poor technology, poor markets for produce, weak farmer institutions and inadequate water for agricultural production among others.

Notwithstanding the challenges, there are also many important opportunities in the sector and this study presents interventions that water for lakes programme should adopt for the water for production component and these include; Intensification and development of Agricultural Production systems; and Support to the professionalization of the producers.
1. Introduction

The Water for Lakes Program is part of the broader bilateral program for water and sanitation between South Sudan and the Netherlands. The program is funded by the Dutch Government and has an implementation period of three years with a potential extension of 2 years and the implementation process started on the 1st of November 2013.

The program aims at stimulating economic development by unlocking the potential of integrated development and management of land and water resources for production. It will address issues related to security and stability of local communities and look on how to diversify their livelihoods base. The programme has "water" as its entry point looking at surface water, groundwater, rainfall, soil moisture and will equally incorporate a range of auxiliary programmes to support the development of the water dependent economic sectors. The programme is described in five interrelated components, four of which represent the envisaged productive use of the water resources: Water for Livestock, Water for Agriculture, Water for Fisheries, and Water for People. The fifth component is a crosscutting component pertaining to knowledge and capacity development for Integrated Water Resource Management.

The program will be implemented in 5 out of 8 counties of Lakes State, namely; Rumbek North, Rumbek East, Rumbek Centre, Cueibet and Yirol West. (Annex 3 Map of Lakes State showing counties.)
2. Purpose of the Assessment Report

The main purpose of the assignment is to define the strategy for the water for production component.
3. Methodology of Assessment

Interviews with stakeholders in Lakes State were conducted, including international organisations, local organisations, government officials, individual farmers and farmers’ groups, in order to gather information on types of interventions, experiences, and lessons learned related to the developing of the agricultural potential in the Lakes State.

A workshop was held with State and county officials and farmers to collect joint views of possible areas on investment and elicit feedback to further refine the document.

The focus of the interactions was based on how to boost agricultural production and productivity through increased access to water for organised farmer groups as well as individual smallholder farmers in Rumbek North, Rumbek East, Rumbek Centre, Cueibet and Yirol West, in order to contribute to the Government of Southern Sudan’s priority of increasing food production.

At the same time, a wide range of documents were reviewed to obtain more analytical information about agricultural systems, poverty, gender and other topics relevant to the program.

Several days were spent in the field where selected counties were visited in order to gain an understanding of the existing conditions, practices and institutions operating at farmer, county and state levels. Government officials at the state and county levels were met to gain information on government priorities and ongoing activities. Several projects were visited that were, or are currently, working with farmers to gain lessons learned and best practices. Farmers were also randomly interviewed in order to learn about their practices, how they access services and markets, and the constraints they face.
4. Brief Overview of Agriculture in Lakes State

The agricultural potential in Lakes State is high. The soil and climate conditions allow for a wide variety of food and cash crops. Most small-holder systems of farmers include a wide range of crops which include sorghum, groundnuts, sesame and a wide range of vegetables (green grams, cowpeas, pumpkins, onions, sukumawiki, tomatoes) and fruit trees (guavas, gista, mangoes, lemon, pawpaw, bananas). There is one long rainy season from April to November and a dry season from December to March. This long season allows the growing of staple crops and vegetables in the dry season for those farmers who can access water.

The main international UN agencies and NGOs operating in the sector include: FAO, WFP, Oxfam, Across, NPA and the local NGOs are DRDA and APARD. During the period of assessment, I met and held discussions with these NGOs on the status of the agricultural sector in the state, further discussions were held on their projects they are implementing and their lessons. These provide extension services, seeds, and tools to the farmers and they also provide support towards building the capacity of government departments through trainings.

4.1 Characteristics of Agriculture in Lakes State

4.1.1 Land

The land in Lakes State is owned by the community headed by the chiefs and the government through the Directorate of Land at the state level. The right to use land within a village is linked to the customary kinship structure which is still practiced and works effectively. There is a system of customary “chiefs of land” at all levels of society (family, village, boma and payam) responsible for distributing land and resolving conflict. The chiefs are also responsible for regulating the use of the common land reserved for grazing, fishing, hunting and gathering.

Under the 2009 Land Act foreigners are not permitted to own land, but can lease land for a maximum of 99 years: community lands may be allocated for investment purposes, but that investment must reflect an important interest for the community and contribute to economic and social development of the local community; and land acquisition of 250 fedans or more (104 hectares) must be approved by state authorities.

4.1.2 Soil fertility

The soil in Lakes State is relatively fertile with a sandy loamy texture in most parts of Lakes State and farmers have not found any problems with it. Farmers in fact practice rotational farming, leaving sections to fallow when crop yields start declining. Farmers have not reported any use of inorganic fertilisers to enrich its fertility: very few have confirmed use of cow dung and use of organic methods in the control of pests and diseases.

4.1.3 Labour

Close to 80% of farm labour is provided by women who combine this activity with their domestic chores. Farming is not viewed favourable (as a befitting profession) by young men and women, who often migrate
to cities and prefer livestock for social status. In addition, farm labour, when available, is expensive and often lacks appropriate skills and the incentive to work. It is characterised by use of rudimentary tools with few using ox ploughs for land opening. Labour is normally critical during land opening and this limits the amount of land under cultivation, which eventually results in low yields that cannot support household food needs all year around which results in food insecurity in some period of the year. Most of the farmers desire to have and own ox-ploughs which are on high demand in the state, and some organisations, like APARD and DRDA, have tried to make them available though most farmers still cannot access them.

4.1.4 Productivity
Productivity in the state is very low, despite the high potential. The low productivity is attributed to: lack of use of improved varieties of seed, lack of extension services which result into poor management practices (crop spacing, broadcast sowing, etc.) that also limit optimal yields and also the lack of enough household labour due to the culture of the youth and men prefer having to look after cattle than engaging in crop production. Input service providers are almost non-existent, the only inputs available are being provided through humanitarian assistance, mainly by the FAO and the government. Farmers have complained that the seeds distributed by government and NGOs come late and are sometimes already spoiled upon receipt.

4.1.5 Crops grown
Lakes State accommodates a wide range of crops including sorghum, groundnuts, bulrush millet, sesame, fruit trees and vegetables. The growing of cereal crops is mainly done during the rainy season and vegetable growing during the dry season. Growing of vegetables during the dry season is hampered by a lack of water for irrigation.

4.2 Challenges to Agriculture
The agricultural development of Lakes State faces several challenges and these include but are not limited to:

4.2.1 Inadequate water for agricultural production
Due to a prolonged drought (November-April), the access to water becomes a major challenge for the communities in Lakes State, and it is a source of insecurity. Farmers cannot access water for agricultural production as well as for livestock. There are no enough hand pumps and, of those that existed, many are not functioning.

4.2.2 Inadequate knowledge and skills
There is a weakness or almost total absence of agricultural support services and communications infrastructure to facilitate the access to knowledge and skills by farmers in Lakes State. The weak or non-existent extension service support to agricultural and livestock farmers are a major concern for Lakes State. The public sector extension and veterinary/animal care services are extremely limited. Inspection services are weak in enforcing standards and lack equipment and training. There is lack of critical mass in the number of extension workers.

4.2.3 Use of poor technology
There is little or no use of improved varieties of seed. Farmers rely on outdated and low performing planting material and seed based on local cultivars or landraces of the principal crops, most of which have degenerated and for which there has been no opportunity in recent years for improvement. There is a need for improved varieties or developing the existing crop varieties to cope with the changing climatic conditions. There is use of rudimentary tools and methods of agricultural work and the virtual absence of improved production techniques; both hampering the increase of cultivated area and crop intensification.
4.2.4 Weak entrepreneurship base and absence of commercial farming.
Agriculture remains a subsistence activity by smallholder farmers using simple implements, and the average farm size is in the range of 0.4-1.7 hectares. There are very few farmer organisations and little commercial farming and/or the adoption of modern farming technologies. Farming remains primarily rain-fed, and irrigation is still limited and in addition, livestock farming is dominated by culture and tradition and lacks a business orientation in most cases; cattle for instance, are still raised for prestige and for dowry payments rather than for meat, milk, hides and other by-products, and are normally sold when farmers have no other alternative or when they are aged.

4.2.5 Poor markets for produce
There is a lack of a marketing system and adequate markets, so that the commercialization of farm produce is negligible and the whole rural economy is neither market-oriented, nor even monetized; and lack of marketing facilities and poor infrastructure in the livestock (health services, holding grounds, slaughter slabs, hygiene facilities) and fisheries (including landing points) sector; transport facilities; appropriate processing technologies (crop and fisheries).

4.2.6 Weak farmer institutions organisations
There is a lack of a critical mass of farmer and rural producer associations as a means of entering the market place with the aim of minimizing the cost of inputs, accessing loan finance at affordable rates and influencing farm-gate prices. Some donor projects have worked with smallholders to organize themselves into groups, cooperatives or associations. However, many of the producer members do not farm as a business, and decisions are not made based on cost/benefit basis. There is little ability to calculate costs of production and to use market information to determine if products will be competitive and profitable in markets. Extremely weak literacy and numeracy skills, particularly among women, are constraints to smallholders becoming commercialized.

For the programme to contribute to sustainable agricultural development in Lakes State there is a need to look for ways of addressing the challenges addressed.
5. Proposed Program Strategy

The overall objective of the Water for Lakes program is to stimulate economic development by unlocking the potential of integrated development and management of land and water resources for production in agriculture, livestock and fisheries.

The strategy thus proposes two components for action:
1. intensification and development of Agricultural Production systems; and
2. support to the professionalization of the producers.

The details are indicated in the following paragraphs:

5.1 Intensification and development of Agricultural Production Systems.

Agriculture in Lakes State is characterised by low production and productivity. The factors of production (land, labour and capital) are severely underutilised and need to be increased substantially by removing constraining factors while concurrently exploiting available opportunities.

Objective

The main objective of this component is to have increased food production at household level for increased incomes as well as improved household food and nutrition security. Lakes State has a huge agricultural potential, however less food is produced and the state continues to experience food insecurity. In order to realize considerable agricultural potential, it is essential to look at areas that will improve the production and productivity conditions. That means increasing physical production and productivity through better technologies that generate higher yields.

Hence the objectives in this area are five-fold:

- increased farmer access to relevant information, knowledge and technology through effective, efficient, sustainable extension services;
- water resources developed for agriculture on the basis of sustainable irrigation, water for livestock and aquaculture;
- increase on use of Labour Saving Technologies and Mechanisation;
- improve cultivation practices and develop sustainable production systems in order to generate higher levels of production and farm incomes;
- livestock development.

5.1.1 Increased farmer access to relevant information, knowledge and technology through effective, efficient, sustainable extension services.

The importance of agricultural advisory services in rural development is widely known and understood, however there is weak and in most cases almost total absence of agricultural support services and communications infrastructure to facilitate the access to knowledge and skills by farmers in Lakes State.

The specific objective of this sub-component is “Increased farmer access to relevant information, knowledge and technology through effective, efficient, sustainable extension services.”

To achieve the objective, activities will be implemented under four key components:
- training of 4 extension staff from each of the 5 counties as trainers of trainers (TOTs) who will also train 2 front line extension staff chosen from the payams. The staff should be deployed by the program to provide extension services to the farmers in the selected counties and payams;
- enhance awareness of available technologies by establishing demonstrations among selected farmers and farmer groups;
- train farmers in accordance with selected enterprises. The following crops should be supported by the program; sorghum (short term), ground nuts and selected vegetables (onions, Egyptian spinach, kales (Sukuma wiki) and egg plants). These crops have been chosen because of their profitability, demand - within Lakes and in the rest of South Sudan, marketability, ability of the farmers to grow them with ease (production methods and stages), ability to produce in large quantities timely that can sustain a competitive market and capacity for mass employment creation;
- train farmers in agro forestry, energy saving technologies, soil fertility management;
- conduct study tours and exchange visits for farmers;
- use of innovative approaches for the delivery of services. Participatory approaches such as Farmer Field Schools (FFS) and study circle methodology.

5.1.2 Water resources developed for agriculture on the basis of sustainable irrigation

With the largest population in the region primarily depending on agriculture for their livelihood, sustaining agricultural productivity is one major avenue to alleviate poverty and improve food security. For sustained agricultural productivity to be realised, there is a need for sustained access to water since water is essential to all life – human, animal and vegetation.

A good potential for improvement in agriculture lies in the development and supply of water. In fact, settlement and pastoralism in the region are commonly influenced by the availability of water supplies and land capacity for crop and animal production. Access to water by farmers will reduce conflicts since these often result from lack of access to water when farmers usually move towards the flood plains in the dry season, which is wet to grow vegetables, these are the same areas that pastoralists use for grazing and watering livestock during the dry season causing conflict.

The specific objective of this sub-component is “Water resources developed for agricultural production on the basis of sustainable irrigation.” To achieve the objective, activities will be implemented under the following:

- rehabilitate three water yards owned by African Farmers, Makernhom and Akan Bang farmer’s cooperatives;
- establish a solar powered water yard for Gok Akon cooperative;
- undertaking county-based demonstrations on rain water harvesting and management;
- promote the formation of water user associations and carry out a plan for training farmers, including women farmers, in irrigation and drainage, and in management of water users associations.

5.1.3 Increased use of Labour Saving Technologies and Mechanisation

Lack of farm power at the household level has a substantial negative impact on agricultural production and household food security in Lakes State. Farmers in Rumbek East informed us that they are interested in expanding agricultural activities, but said that this had not been possible with the traditional tools they use. For instance, the majority of the people interviewed explained that they only had malodas (traditional hoes with a very small blade) or hoes to cultivate. In the communities, where Oxfam has distributed ox ploughs in addition to hoes and seeds, villagers expressed their appreciation and asked for more ox ploughs. Farmers in Lakes State respond to the shortage of farm power by scaling down their activities, reducing the area under cultivation and growing a limited range of crops.

The specific objective of this sub-component is “Increased use of labour saving technologies including appropriate mechanisation and other farm management related investments.”
To achieve the objective, activities will be implemented under two key components:

- **promotion of animal traction technology.** The program should work with other organisations working in Lakes State that are promoting the use of ox-plough technology to ease access to the farmers. Some of the organisations in the state include OXFAM and APARD;
- **training of mechanics and service providers for the maintenance and repairs of the ox-plough.**

### 5.1.4 Improve cultivation practices and develop sustainable production systems in order to generate higher levels of production and farm incomes.

The current farming practices being used by farmers in Lakes State are poor; these practices are causing land resources to degrade—threatening future food security as well as the livelihoods of poor people. The use of practices such as deforestation, slash and burn has a greater effect on the environment and crop production through lowering of soil organic matter and has resulting in poor soil water holding capacity.

The specific objective of this sub-component is “Promote use of good farming practices for improved food security and environment protection.” To achieve the objective, activities will be implemented under the following:

- promote dry-season land preparation using minimum tillage methods (Conservation Farming), utilizing fixed planting stations (small shallow basins), retention of crop residue from the previous harvest in the field or use of other mulches or ground covers, and rotation of crops in the field;
- promote Agroforestry and energy saving technologies which increases the contribution of the tree-crop component and the overall productivity of the farming system through training farmers in agro forestry.

### 5.1.5 Livestock Development

Livestock production represents a significant proportion of agricultural activity in Lake State. Livestock are not just a food source, but a central factor in all aspects of the social and cultural activities, being used to mediate social relationships. Livestock may be used to pay the bride price or as a compensation for the settlement of disputes. Pastoralists, especially the poorer ones, regard cattle as a safety-net for hard times and are always reluctant to sell them. Selling cows is very difficult as they are considered security, thus selling them will be the final thing. When cows are finished, families will be very vulnerable.

Projections of the population growth and domestic and external demand for livestock and livestock products highlight the urgency to transform the current status into one which is more commercial oriented. Furthermore, as the livestock population increases, there will be more pressures on grazing land and water resources, heightening the prospects of more conflicts among pastoralists and between pastoralists and farmers as they compete for limited fodder and water resources.

Other challenges facing the sector include: poor breed quality, inadequacy of animal feeds, insecurity and cattle rustling, lack knowledge of productivity enhancing practices and poor access to veterinary drugs.

The specific objective of this sub component is to increase livestock production and productivity.

To achieve the objective, activities will be implemented under the following:

- carry out sensitisation missions for a transformational cultural change from the current social model of acquisition and conservation to a commercial market model that monetizes stock through market-based transactions;
- promotion of training of TOT Community Health Workers and extension service officers in aspects of animal husbandry;
- training of farmers on appropriate methods of livestock husbandry like disease control, proper feeding etc.
5.2 Support to the professionalization of the producers

Because of the smallholder ship and subsistence nature of Lakes State farmers, it must be pointed out that in order for the Water for Lakes program to succeed; it requires farmers’ organisations that are efficient and effective in providing services to their members, the farmers. During the study, two farmer organisations (Gok Akon and African farmers) were visited and analysed, and it was found out that the current level of institutional development and preparedness in these organisations, be they cooperatives or non-cooperatives, is very low. The main weaknesses of farmer organisations are found in the areas of management capabilities and governance. In general, they lack experience in entrepreneurial activities, and many of them have not yet acquired experience in successfully carrying out joint actions for the benefit of their membership, which is the main route to creating social capital.

There are many farmer organisations that have been formed at boma and payam levels in the state, although many of them have been formed fairly recently and through initiatives from the government, rather than arising from existing practices of local cooperation. Cooperatives are more effective if they arise out of farmer initiatives instead of being formed from the outside, and South Sudan does have a strong tradition of community cooperation. But these farmers have shown themselves to be open to new crops and technologies of production, what is needed above all are to add entrepreneurial experience and expertise to these groupings.

Objective

The overall objective of component 2 is to empower farmers in the sense of giving them greater ability to develop solutions on their own initiative and to access the specialised forms of technical assistance that they need on particular issues.

The following three Sub-components are being suggested for implementing the main lines of component 2:

- Promotion of farmers’ organisations and capacity building for producers.
- Building Viable and Sustainable Marketing Systems.
- Support access to finance.

5.2.1 Promotion of farmers’ organisations and capacity building for producers

With a specific objective of; “Increased capacities of farmers’ organizations in management, entrepreneurship and group dynamics to more effectively engage in value chain activities especially collective marketing (bulking).” Facilitating farmers to work together in groups will contribute significantly to productivity and incomes enhancement. Grouping farmers with common interests provides a conducive environment for group members to work together on increasing yields, on the basis of improved technologies, and it also introduces the concept of working together to improve market access for all.

The investment area and associated activities to be implemented are:

- train members in organizational assessment and development, as well as capacity for situation analysis and for guiding and supporting farmers’ (and farmers organizations’) planning processes;
- training farmers’ groups in visioning, governance, enterprise selection, market analysis and needs identification;
- group mobilisation to prepare for delivery of advisory services while ensuring that all categories of farmers (men, women, youth) are reached; and
- strengthen higher-level farmer organizations (HLFO) (African Farmers, Makernhom, Gok Akon and Akan Bang farmer’s cooperatives) to enhance farmer participation in market development activities, to include training in management and business skills and output marketing.

5.2.2 Viable and Sustainable Marketing Systems

In Lakes State, the current marketing arrangements within farmer organisations are inadequate because farmers in those organisations are still “chain actors” and have not graduated to the level of being chain participants. Most stop at production and do not have long-term relationships with the buyers both in the
domestic and export markets. This implies that the markets are not sustainable since they have to search for them every season.

It is envisaged that the interventions will result into increased production and productivity at the household level, as a result promotion of production of high value horticultural crops such as fruit and vegetables will require immediate action for marketing.

The program should ensure that viable marketing systems are built to deliver services to the farmers including relevant market information, proper storage facilities, produce standards and providing linkages between the farmers and the buyers. The development of marketing systems should be built on the concept of “collective marketing (bulking)”. Business-to-business processes should be facilitated to enable the private sector to participate in the identification of innovative solutions to address input and output markets challenges. The relationships promoted would involve private companies, government offices mainly the extension department, NGOs and farmer organisations. (Annex 4 Figure showing the relationship between producers, farmer organisations, private sector and Government).

Increased market opportunities through market linkage development, provision of support to targeted farmer groups (including commodity-based farmer associations, producer interest groups, market intermediaries, agri-businesses, input suppliers and other market participants) with the goal of developing and strengthening links between agricultural producers and markets, reducing market transaction costs and aligning production decisions with business and market opportunities, should be high on the agenda of the program.

Specific activities should include:
- support of round-table meetings between farmer groups and traders/processors;
- design market information systems;
- provide training in basic marketing management.
6. Existing risk-management and drought-management strategies by farmers in Lakes State

Pastoralists and agro-pastoralists in Lakes State have developed strategies to adapt to a fragile environment and to effectively manage risks, with increasing dry spells, unreliable rainfalls, and frequent flooding. The weather alternates between a rainy season (April–November) and a dry season (December–April). To cope with scarce resources and to adapt to these climatic conditions, pastoralists practice transhumance, i.e. the seasonal migration of livestock and its keepers in search of pasture and water resources.

During the dry season, young (mostly unmarried) men – as well as some young women, children, and a few older men – move with the cattle to where there is water and pasture, staying in cattle camps.

Due to erratic rains, with sometimes little rain even during parts of the rainy seasons which is sometimes followed by floods all result into crop failure causing food insecurity in most households in the state. Communities during this period mitigate this risk by having only one meal a day coupled with collecting of wild fruit or by reducing the size and quantity of meals as well as selling of natural resources such as firewood and charcoal.
7. Strategy for increased production of high value fruits and vegetables

With its rich soil and favourable climate, several parts of Lakes State have enormous potential for competitive production of high value fruits and vegetable for the domestic and external markets. Smallholder farmers can cultivate mangoes, guavas, citrus, onions, tomatoes, okra, egg plants, spinach, pawpaw, kale, water melon and many others. At the present time, the contribution of these fruits and vegetables to agricultural output is negligible; furthermore, the industry has only minimal commercial orientation. In general, due to infrastructure constraints producers have limited access to consumers beyond their local markets. As a result, decisions about area to be cultivated are often made on the basis of own household consumption needs, not market demand. Any surplus produced is usually sold or bartered for other goods in the local market. At the present time, the country is a net importer of these products, primarily from Kenya and Uganda, notwithstanding Lakes State’s potential for producing high value fruits and vegetables, rising global prices for these items and an unmet regional demand.

Fruits and vegetables are highly perishable and subject to high post-harvest losses if not preserved under ideal temperature conditions. As a result, competitiveness in the sector is determined by the availability of adequate logistics, including cold chains, to move products to markets. In order to meet these conditions, it has become necessary for many fruits and vegetable suppliers to own or control the entire value chain from production through marketing as this allows the supplier to control the logistics without having to rely on third parties. Consequently, the industry is characterized by the dominance of large commercial firms with the capability and capacity to move products through the entire value chain, supplying high quality products to end markets consistently and on a timely basis.

For the expansion of the production of high value fruits and vegetables in Lakes State, the following strategy can help:

- provide extensive extension services to the farmers for them to acquire skills in production, management and handling of vegetable value chain;
- establishment and support of farmer cooperatives that can be linked to larger commercial farms; and
- linking these commercial farms to regional and international transport and logistics networks.
8. Conclusions / Recommendations

- The program should target the rehabilitation of irrigation systems owned by farmer organisations that were vandalised during insecurity and these include: Africa Farm Cooperative Society, Women for Women Cooperative Society and Akaan-bang Farmers’ cooperative society. These groups have been selected because of their interest in commercial farming as well as past experience in production.

- Gok Akon multi-purpose cooperative society has been involved in the production of vegetables on a large scale and is being supported by Across through the provision of extension services. Across is also trying to link them to the ox-plough service provider, the only challenge they have is a lack of water and a moderate storage facility where they can harvest their vegetables from. It is recommended that a water yard (borehole, solar pump, 4 tap stands & overhead tank) be availed to Gok Akon and a moderate store built for them.

- It is critical that participation of stakeholders in the decision making process on the location, management and maintenance of these schemes is put into consideration, thus using a participatory irrigation management approach. This will help in harnessing collective decision making that will provide opportunities for collective action, dialogue between users, agencies and governments and provide opportunities for equity, better management, and improved collection of water related charges.

- The farmers in the farmer groups need urgent trainings in the following areas:
  - best crop management practices in vegetable growing;
  - post-harvest handling;
  - record keeping;
  - general farming as a business concept; and
  - negotiation skills.

- To achieve sustainability, the program should invest in building the capacity of these farmer organisations in areas of cooperative development emphasising governance issues, member participation, value of share capital contributed by the members, volume and value of business transacted through the organisation. Leadership and management are really the factors that will make these organisations succeed or fail, as a result training to further builds the capacity of the leaders and managers should be emphasised.

- Other farmers should be organised around the water facilities that will be established in the payams by the programme. Using the frontline extension officers with support from the extension officers trained at the county level should organise farmers in groups of 20-30 and establish demonstrations around the water facilities where farmers will be trained in the management of the crops selected by the farmers.

- Farmers and other stakeholders should be trained and empowered to take full responsibilities of the water facilities. The target beneficiaries should be trained in the installation of irrigation management, operation and maintenance of equipment and irrigated agriculture management and establishment of Farmers’ Water User Associations (FWUAs).

- The program should build the capacity of the directorates of agriculture, Animal resource and cooperatives through training of extension staff from each of the 5 counties as trainers of trainers.
(TOTs) who will also train front line extension staff chosen from the Payam, the trainings should involve various technologies ranging from crop and animal husbandry management and water harvesting technologies and cooperative development.

- The following crops should be supported by the program; sorghum (short term), ground nuts and selected vegetables; onions, Egyptian, spinach, kales (Sukuma wiki) and egg plants. These crops have been chosen because of their profitability, demand - within Lakes and in the rest of South Sudan, marketability, ability of the farmers to grow them with ease (production methods and stages), ability to produce in large quantities timely that can sustain a competitive market and capacity for mass employment creation.

- For the recommendations to be effectively implemented there is need for the program to recruit an Agricultural specialist with experience in agronomy and agribusiness development to oversee the implementation process of the component.
### Annex 1. Log frame

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<tr>
<th>Intervention Logic</th>
<th>Performance Indicators</th>
<th>Means of verification</th>
<th>Assumptions and Risks</th>
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<tbody>
<tr>
<td><strong>Component 5.1: Intensification and development of sustainable production systems</strong></td>
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</table>
| 5.1.1 Increased farmer access to relevant information, knowledge and technology through effective, efficient, sustainable extension service. | No. of government extension staff trained.  
No. of front line extension staff chosen from the payams trained.  
No. of farmers trained farmers in accordance with selected enterprises (crop and livestock)  
% increase in crop production  
No. of study tours and exchange visits conducted  
No. of extension service delivery approaches used. |                       |                       |
| 5.1.2 Water resources developed for agriculture on the basis of sustainable irrigation. | No. of rehabilitated water yards  
No. of establish a solar powered water yards  
No. of rain water harvesting demonstrations established  
No. of water user associations formed and trained.  
Promote the formation of water user |                       |                       |
| 5.1.3 Use of Labour Saving Technologies and Mechanisation                          | No. of farmers using ox-plough technology  
% increase in cultivated land for crop production |                       |                       |
| 5.1.4 Improve cultivation practices and develop sustainable production systems in order to generate higher levels of production and farm incomes. | No. of farmers adopting dry-season land preparation  
No. of fruit tree nursery beds established  
No. of improved cultivation practices demonstrated |                       |                       |
| 5.1.4 Livestock Development                                                       | No. of sensitisation missions carried out for transformational cultural  
No. of Community Animal Health Workers trained  
No of farmers trained in appropriate methods of livestock management |                       |                       |
| **Component 5.2. Support to the professionalization of the producers**             |                                                                                           |                       |                       |
| 5.2.1. Promotion of farmers’ organisations and capacity building for producers     | No. of farmer organisations trained in governance  
% of farmer organisations registering increase in business volume and profits  
% of farmers who are members of farmer organisations |                       |                       |
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| 5.2.2. Viable and Sustainable Marketing Systems | No. of farmer organisations involved in collective marketing  
No. of linkages created and maintained |                       |                       |
Annex 2. List of persons and departments interviewed

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<th>Name/department</th>
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<td>Gok Akon cooperative</td>
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<td>African farm cooperative</td>
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<td>Director agriculture Rumbek East</td>
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Annex 3. Map of lake state showing different counties
Annex 4.  Relationship between producers, farmer organisations, private sector and Government

Source: own creation
Annex 5.  TOR

Terms of Reference Agronomist

The Water for Lakes Program is part of the broader bilateral program for water and sanitation between South Sudan and the Netherlands. This program is funded by the Dutch Government and has an implementation period of three years with a potential extension of 2 years and started on the 1st of November 2013.

For the implementation of this program, Mott MacDonald is looking for suitable candidates for the position of Agronomist for a period of 20 working days, beginning on the 15th of August 2014.

The proposal indicates the following role for the agricultural specialist:

The agronomist will bring on board relevant experience with participatory irrigation management, which will also address contamination by pollutants in irrigation and drainage water. S/he will therefore assist with the development of demonstration plots that will also serve to train in modern production technologies; irrigation system maintenance, agriculture products processing and raise the skills of agrarian sector water users. Furthermore, s/he will develop guidelines, training materials and conduct training.

The agriculture specialist would facilitate multi-stakeholder platforms geared towards improving livestock and livestock products market systems. Therefore, in the context of ProWaS/SSN-Lakes, the expert would be able to work closely with livestock farmers and assess the existing risk-management and drought-management strategies, and identify key priorities for regional investments in the sector. At the same time, develop new innovative approaches for facilitating livestock farmer’s access to markets and facilitate linkages with the private sector.

It is clear that the above cannot be met in a timeframe of 20 mandays. This assignment is therefore meant to define the strategy to ultimately match the above outputs, if still deemed relevant.

Qualifications:

The successful incumbent has:
- MSc. in agriculture;
- minimum of 10 years of experience in agricultural development;
- specific experience in irrigation;
- specific experience with livestock farmers;
- strong experience in participatory approaches; and
- strong experience in South Sudan.

The input of the agronomist list is aimed to contribute to the following results of the program:
1. increased productive husbandry at community level;
2. increased availability and use of water for production of high value and yielding crops; and
3. increased production of horticultural and commercial crops.

In close cooperation with the Water for Lakes State team, both national and international, the agronomist will:
1. visit Rumbek and a selection of two counties in the state;
2. study possibilities for irrigation and demonstration plots;
3. assess the existing risk-management and drought-management strategies;
4. identify key priorities for regional investments in the agricultural / livestock sector;
5. organize a multi-stakeholder platform in order to efficiently get views on points 2 to 4 above;
6. develop a draft report and present it to the team and other interested stakeholders; and
7. develop a final report integrating relevant feedback received.

Ultimately, the input of the Agronomist/ Agricultural Expert will assist the team to develop a detailed implementation plan for the program for the 4.5 years of implementation.