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Harnessing Floods to Enhance Livelihoods and Ecosystem Services in Gash Area, Sudan

Volume VI:
Gender and Equity

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Table of Contents

Table of Contents	i
List of Figures	i
List of Tables.....	i
Acknowledgements	iv
Executive summary	v
1. Introduction	1
1.1 Kassala State.....	1
1.2 Problem statement	1
1.3 Research objectives	2
1.4 Research questions and methodologies	2
2. The present situation	2
2.1 Gender aspects of Sudanese society	2
2.2 Gender aspects in Kassala State	3
2.3 Gender aspects of the Gash Area.....	4
2.4 Livelihood zones in Kassala State.....	6
2.5 The experience of IFAD project (GSLRP).....	8
2.5.1 <i>Community development, empowerment and capacity building</i>	8
2.5.2 <i>Water Users Associations (WUAs)</i>	8
3. Results and discussions	8
3.1 Sample size and distribution.....	8
3.2 The socio- economic characteristics of respondents	9
3.3 Results on food security and livelihoods in the study area.....	11
3.3.1 <i>Source of livelihoods</i>	11
3.3.2 <i>Irrigation methods</i>	12
3.3.3 <i>Land ownership, cultivated areas and water rationalization</i>	13
3.3.4 <i>Farming production activities</i>	14
3.3.5 <i>Livestock as a source of livelihoods</i>	18
3.3.6 <i>Forestry activities</i>	21
3.3.7 <i>Products marketing</i>	24
3.3.8 <i>Extension services</i>	24
4. Conclusions and recommendations	25
4.1 Conclusions	25
4.2 Recommendations for gender inclusive investments in GAS	26
4.2.1 <i>General activities</i>	26
4.2.2 <i>Specific major activities</i>	27
5. References	28
Annex	29

List of Figures

Figure1 : Location and Localities in Kassala State	1
Figure2 : Livelihood zones in Kassala	7

List of Tables

Table1 : Sample size and distribution	9
Table2 : Tribes disaggregated by gender.....	9
Table3: Marital status disaggregated by gender	9
Table4 : Age groups disaggregated by gender	10
Table5 : Family size disaggregated by gender	10

Table6 : Living area disaggregated by gender	10
Table7 : Educational level disaggregated by gender.....	10
Table8 : Annual income distribution male and female, and among localities.....	11
Table9 : Source of living among localities.....	12
Table10 : Irrigation methods among localities.....	12
Table11 : Sufficiency of water for farming and livestock.....	13
Table12 : Land ownership.....	13
Table13 : Cultivated area in fadden.....	14
Table14 : Water rationalization in farming and for livestock	14
Table15 : Gender roles in farm production activities across localities.....	15
Table16 : Distribution of farm returns and their share in food security of HH members	15
Table17 : Decision on the selection of the type of crop, method of production and distribution of farm returns.....	15
Table18 : Distribution of returns from labor work in farming	16
Table19 : Farm savings use among family members	16
Table20 : Gender and decision on method of production - vegetables	17
Table21 : Gender and decision on method on production - fruits	17
Table22 : Gender and decision on method of production – Sorghum production.....	17
Table23 : Gender and decision on farm return distribution.....	18
Table24 : Gender and decision on farm return distribution - fruits.....	18
Table25 : Gender and decision on farm return distribution – Dura.....	18
Table26 : Gender and decision on farm return distribution - cash crops.....	18
Table27 : Methods of livestock rearing.....	19
Table28 : Ownership of livestock or being a source of livelihoods	19
Table29 : Distribution of herd size for goats and sheep.....	19
Table30 : Gender roles in livestock production - milk production.....	20
Table31 : Livestock returns and their share in food security of HH members.....	20
Table32 : Gender effect on decision on type and method of livestock production	21
Table33 : Gender effects on decision on livestock return distribution within the household	21
Table34 : Availability of forests resources.....	21
Table35 : Sufficiency of forestry products to generate income.....	22
Table36 : Gender effect on decision of type of forestry products to utilize as a source of livelihoods	22
Table37 : Gender effect on decision of choosing forestry production method	22
Table38 : The decision on forests production returns and its distribution within the household members	22
Table39 : Cash from selling of products	23
Table40 : Cash from paid work.....	23
Table41 : Savings from livestock activities.....	23
Table42 : Gender effect on selection of methods of forest products as a source of livelihoods	24
Table43 : Gender effect on decision on forest products return and its distribution	24
Table44 : Existence of marketing organizations for farm, livestock and forestry products.....	24
Table45 : Provision and distribution of extension services in agriculture, livestock and forestry	25
Table46 : Quality & distribution of extension services.....	25
Table47 : Role of government departments' activities for women empowerment in agriculture, livestock and forestry sectors	25

Acronyms

FAO	Food and Agriculture Organization
FEWSNET	Famine Early Warning Systems Network
IDP	Internally Displaced Persons

IPC	Integrated Food Security Phase Classification
NBHS	National Baseline Household Survey
NGOs	Non-governmental organizations
RNF	Rural Non-Farm
SDG	Sudanese Pound
UN	United Nations
WFP	World Food Programme
WHO	World Health Organization
WUA	Water Users Association

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Executive summary

This research for development explores how to optimize the use of floods for agriculture and ecosystem services to support livelihoods in different landscapes and socio-economic settings in Sudan. Flood-based Farming Systems (FBFS) divert floodwater and spread it over large areas to grow crops, water rangeland and/or replenish shallow groundwater. FBFS contribute substantially to local food security and economic development, particularly for poor farmers and pastoralists in the lowlands. Decision makers, development planners and investors do not integrate ecosystem services and gender in their land and water programs and often investment criteria are narrowly defined in terms of production targets. Methodologies to incorporate gender and ecosystem services and evaluate tradeoffs are not available. Decision making is not informed by careful analysis of winners and losers. This may lead to an inequitable distribution of benefits and costs of investments programs. It may also preclude 'upstream-downstream' solution, where by sedimentation issues are addressed for instance by developments upstream.

This report is focusing on integrating Gender to optimize the use of floods for agriculture and ecosystem services for supporting livelihoods of population in Gash River area in Sudan. It addresses the proposed project's three main questions on the impact of current investment plans of upstream agricultural development on downstream flood based farming systems and livelihoods, in particular for women; the added value of incorporation of gender in investment plans in flood based farming and the most efficient set of interventions.

The methodology for information and data collection included desk review for both present and historical information, interviews, focus group discussion with women, men and youth, surveys and other research techniques. The coordination with other research team was considered during the different research stages. A questionnaire was prepared to collect information from male and female respondents to reflect the current situation along the Gash River area. The collected data was analyzed by using SPSS tool.

The research concluded that; securing water is crucial in achieving food security and improving rural livelihoods. Women's secure access to water and land is central to achieving the Sustainable Development Goals (SDGs) in reducing poverty, hunger, gender equality, decent work and economic growth...etc. The study highlighted the gap between benefits gained by respondents in the upstream and those living downstream, as well the evident gender gap between urban and rural people in the study area.

Assets unequally distributed between rich and poor, but they are also unequally distributed between men and women, at state level as well as within communities and households.

Women limitation and their exclusion from participating in decisions places them in an impossible situation where they are obliged to take the burden of keeping the family livelihood but yet restricted from managing the land or the resources in the way they see fit or within the sense of their priorities.

The future investments should consider gender mainstreaming during planning, implementation and management of projects and programs. This implies the assessing the implications of any intervention on women, men, girls and boys through participatory approach while designing gender sensitive interventions. The expected outcome will improve performance of water management projects and systems, while strengthening the position of rural women and men or any other disadvantaged groups.

Recommendations were drawn for gender inclusive investment, at the field level the focus is on people, including women and men as individuals, the socio-economic differences among households, and communities as a whole to be investigated and discussed with both women and men.

Based on the results on gender income, opportunities and decision making, activities are recommended to support gender within the current context and gender roles to improve livelihoods of women and their role in providing support to family. The activities are differentiated to; upstream which include Rural Kassala and Kassala localities, the recommended activities are small livestock diary and milk processing and the promotion of forestry with managed *revegetation*. For downstream area that includes Rural Aroma and North Delta localities, activities focus on improving small ruminants and poultry and the promotion of forestry with managed revegetation.

1. Introduction

1.1 Kassala State

Kassala State lies between latitude $34^{\circ} 12'$ and $36^{\circ} 57'$ East, and between longitude $14^{\circ} 12'$ and $17^{\circ} 12'$ North with a total area of 55374 square kilometers. The state shares an international border with Eritrea to the East. Nationally, it borders the Red Sea State and River Nile State to the North, Gezira State to the West, and Gadarif State to the South. The state is composed of eleven localities (Mahaliyas). Of these administrative units, nine are primarily rural in composition while the two localities of Kassala Town and New Halfa are urban centers. The estimated number of people in Kassala State is around 2.283 million by mid 2015 at a growth rate of 3.5% per annum. The male population represents 55% of the total population of the state. On average, 26%, 63% and 11% of the population are considered as urban, rural and nomads respectively with an average 6 people per household.

The targeted localities, Gash River runs are Rural (or Reefi in Arabic) Kassala where the Gash enters Sudan then Kassala Locality, Rural Aroma and North Delta locality where the Gash River dies or disappeared. Kassala town represent the line between what we consider upstream and downstream. Areas located form Kassala and southwards is known as upstream and areas located northwards from Kassala town is downstream. The map below shows the geographical location of localities including the research targeted localities.

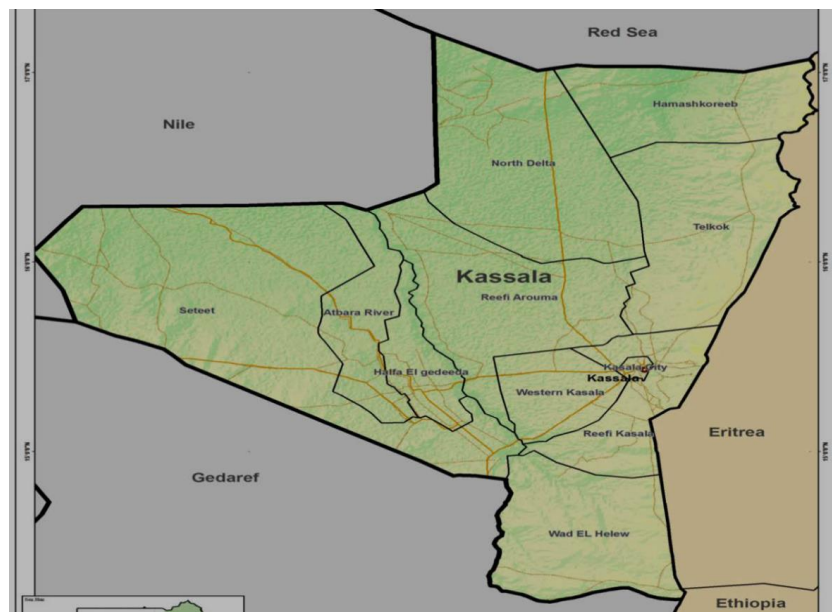


Figure 1: Location and Localities in Kassala State

1.2 Problem statement

Decision makers, development planners and investors do not integrate ecosystem services and gender in their land and water programs and often investment criteria are narrowly defined in terms of production targets. Methodologies to incorporate gender and ecosystem services and evaluate tradeoffs are not available. Decision making is not informed by careful analysis of winners and losers. This may lead to an inequitable distribution of benefits and costs of

investments programs. It may also preclude ‘upstream-downstream’ solution, where by sedimentation issues are addressed for instance by developments upstream.

1.3 Research objectives

This part of the research is focusing on integrating gender in the overall research programme and expected to contribute to achieving the following outcomes:

- Importance of gender and ecosystem approach in FBF development is endorsed by next users.
- The methodology applied by the next users for FBFS development scenarios includes gender and ecosystem services, identification of winner and losers and trade-off analysis and linked to watershed development activities.

1.4 Research questions and methodologies

The methodology for information and data collection included desk review for both present and historical information, interviews, focus group discussion with women, men and youth, surveys and other research techniques. The coordination with other research team is very important so this was taken into consideration at the various levels and stages of this research. The proposed research activities are action oriented and was implemented together with local stakeholders and relevant staff involved in these ongoing interventions, to enable joint learning. This part of the research designed to answer the following questions:

- What is the impact of current investment plans of upstream agricultural development on downstream flood based farming systems and livelihoods, in particular for women?
- What is the added value of incorporation of gender and ecosystems perspective in investment plans in flood based farming?
- What is the most ‘efficient’ use of floods in Gash basin? And what interventions and set of intervention support this?

A questionnaire was prepared to collect information from male and female respondents to reflect the current situation along the Gash River area. The collected data was analyzed by using SPSS tool.

2. The present situation

2.1 Gender aspects of Sudanese society

Gender related indicators for Sudan compare relatively negatively with other countries in Sub-Saharan Africa. This is due to two main factors: the long-lasting insecurity situation on the one hand and Sudanese culture which, in practice if not in theory, favors men in most aspects of social life. Overall women’s illiteracy rate is 54% by comparison with men’s at 30.5%, girls’ enrolment rate at primary level is 42% by comparison with boys’ at 50%, and youth illiteracy rate is 28.5% for young women while it is 17% for; young men. Although total fertility rate has dropped from 6.1 in 1980 to 4.6 in 2000, population increase is still estimated at 2.5%. Women form 30% of the labor force.

With respect to the involvement of women in social and economic life, there are considerable regional differences, related to history, tribe and culture. Urban women have more work opportunities than rural ones, particularly with respect to paid employment. Rural women generally participate considerably in agricultural activities, and particularly in the cultivation

of staple crops. There are considerable differences in the situation prevailing in different parts of the country, making it difficult and very inadvisable to generalize.

2.2 Gender aspects in Kassala State

Available statistics indicate that women make up 48.4 percent of the population of Kassala State. Of this population 35 percent are reported extremely poor. Adverse environmental conditions, the occurrence of armed conflict and economic problems in the state have had a disproportionate impact upon women. This is, in large part, due to the high rates of illiteracy and absence of vocational training among this section of the population – factors which reduce coping capacity and the number of available livelihood opportunities. This position of heightened vulnerability tends to be particularly acute for rural women who are adversely affected by male urban migration. The subsequent rise in the number of female-headed households has seen many rural women, in turn, move into peripheral urban areas to secure food for family members.

The need to address women's rights and development issues in Kassala State has been a topic of open discussion since the 1960s. Nonetheless, progress has been severely constrained on almost all fronts.

The women's movement in Kassala started after independence with the efforts of the Sudanese Women's Association (SWA). The agenda they advanced was primarily developmental and they supported initiatives designed to enhance levels of awareness and organization among women. During this period educated women provided services including adult learning, literacy programmes and health education to the wider community. At the same time, they launched campaigns aimed at improving the enrolment of girls in education and ending harmful traditional practices, particularly FGM and early marriage. Despite some improvement in education standards and opportunities available to women, the women's movement as a whole has been in retreat for over two decades.

Throughout the 1990s almost all work in the field of women's empowerment and development was conducted by INGOs. However, with the exception of a few successful IGA projects inside Kassala town, these initiatives have failed to impact women's social and political position in a sustainable manner. Operating in a hostile political environment, INGOs were subjected to constant pressure throughout this period and had their work hampered by state restrictions.

All international NGOs operating in Kassala have identified women as a primary target group and there are now several women's units within state ministries and localities designed to promote their needs. Yet progress, where achieved, is both slow and tentative. Important barriers to female emancipation in Kassala State include the prevalence of tribal politics that marginalizes women and the use of traditional tenure systems which curtail the ability of women to own land and livestock. Where programmes to address this situation exist, they tend to be decentralized lacking coordination and policy-level leadership.

Furthermore, the majority of NGO interventions lack the sensory data needed to develop demand-driven programmes. They, therefore, replicate templates used in other contexts and rarely equip women to compete in the local job market or to function in the available socio-political space. The situation of women in Kassala State is essentially characterized by whether they live in urban or rural areas, although by some groups, such as the Bejia ethnic

groups, particularly the Hadandawa, still their social norms and structure are influencing their lives strongly, even if they are living in urban areas. On account of socio-economic changes in the towns, however, in the previous decades there have been many changes in the lives of women living in these towns. Above all, the increased educational possibilities and the increasing modernization have given the women more confidence and increased occupational opportunities. Among the upper and middle classes, in particular, whose values are becoming somewhat more urbanized, some internal-family changes have been witnessed. Thus women could find jobs in some areas but still on a limited scale.

In rural Kassala, still the social norms, beliefs, attitudes and behavior have impact on the socio-economic processes of rural population of the State. In particular, the Beja tribes have a highly specific ethical code and well developed and articulated views on almost every aspect of their life. Therefore, from the early childhood and as a part of the society, women are affected by the impact of social norms on the socialization of female and male children, prevailing conceptions of gender roles and relation in the family and society at large. In rural areas, the activities of women consist of firstly the household work, secondly the craft work and small agricultural work. In the household women are responsible for cooking - starting from grinding sorghum and milking the goats. In the households which have many animals, women see to the production of butter and clarified butter.

Altogether, women are responsible for the organization and the functioning of the household needs in the house. Because the fowl and small animals, like goats and sheep, are bound spatially narrowly to the house, they also belong to the female working environment. Women are thereby responsible for feeding and cleaning of animals. This is also seen as a task for women. Small girls also learn to take over such tasks.

Although the agricultural work is mostly a man's work, but during the field work it has been observed that some women are doing agricultural work. This is specifically in the visited Beni-Aamir villages. Some women can grow certain agricultural products, on certain pieces of land in the vicinity of homestead. As a rule the women pursue vegetable-growing and fruit cultivation for household food security.

2.3 Gender aspects of the Gash Area

The Hadandawa tribe being the most important in population size on the Gash Delta, it has been the focus of numerous gender studies. Women's involvement in productive activities reflects the pastoralist nature of the Hadandawa and an adaptation to a life of confinement. Women make all the items which are used for home making: roof, bed, and floor mats. They have no other activities, and it would appear that they spend many idle hours daily. Illiteracy is a major problem among Hadandawa women; most of them do not speak Arabic. They also used to process milk into butter or sour milk, and older women used to market the products. However both these activities have more or less disappeared due to the absence of surplus milk. In recent years, under the influence of various NGOs and other external support, women have started to raise a few poultry and produce eggs for the market; however the Hadandawa still do not consume these products much.

According to Islamic law, women inherit land. However, most women forego their inheritance rights in favor of their brothers, and are often excluded from the land distribution and allocation. This practice is based on reciprocity: the brother provides protection to his

sister; in exchange, the sister foregoes her inheritance rights. This system of reciprocity reaches its limits in times of livelihood stress and land scarcity, when the brother can no longer guarantee the subsistence and security of his sister. As no women are registered on the books as landholders, it is not surprising to find that women are not members in any of the farming organizations, as they are excluded from access to land and their role in crop production would appear to be minimal.

With increased poverty, women are developing alternative coping mechanisms. Women participate in savings groups, sanduq, for consumption purposes and engage in home based income generating activities such as mat making and poultry rearing. In the poorest households, economically active women are reported to contribute to 50% of household income. However, household income still falls below subsistence levels, leading to reliance on external aid. Only the poorest Hadandawa women have any activities outside the home; when economic necessity is pressing, these women may work as wage labourers in agriculture locally, primarily in harvesting and, to a lesser extent, in weeding.

There is a marked difference between the life style of the Hadandawa women and that of women from other social groups in the area. By contrast the women from the group generically known as 'fellata' are fully involved in economic activities, working in agriculture as labourers in the well irrigated enterprises and elsewhere, having micro-enterprises in food processing and marketing, making handicrafts and selling them and also being involved in livestock husbandry.

It must be recognized that the gender situation in the project area is problematic. Although it varies according to the socio-ethnic groups concerned, in all cases women are basically marginalized and excluded from most economic activities and the social and political decision making processes.

Among the Hadandawa, the situation is extreme, with women being involved only in home based activities, and not even being involved in home level livestock husbandry activities. These women basically do not leave home and their activities are limited to childcare, food preparation and processing, as well as home care. As their homes are small and mostly open to the winds, the latter is not a major activity. The only women who are active outside the home are extremely poor widows or divorced women who have children and are therefore household heads. These women may be active in any kind of work they find, either in agriculture, or in handicrafts or any of the kinds of work available in the larger settlements. Hadandawa women in general engage in making handicrafts, basically those which relate to home making, as they are traditionally responsible for the home. This includes activities such as mat making from palm leaves, leatherwork to produce containers for different types of foods preserved, and the use of palm leaves and leather for production of furnishings and other household items.

Although excluded from animal husbandry activities, Hadandawa women own livestock obtained as part of their dowry on marriage. They are also traditionally responsible for milk processing activities. This role has however become negligible since the drought of the 1980s when the majority of livestock disappeared. Nowadays except during the main calving season, milk production is only sufficient for drinking unprocessed or producing sour milk due to the extreme heat. Locally produced ghee is a rarity; the manufacture of cheese is unknown among this community.

Hadandawa women do not collect water unless the water point is extremely close to their homes, this task is left to children and men; they do however collect firewood if the source is very close to home. They are fully responsible for childcare, preparing sorghum and cooking meals, and preparing coffee, which is a main social focus of life in this community.

Among other communities, in addition to their home making tasks, women work routinely and their participation in economic life is not an indication of extreme poverty. These women are active in handicraft production, animal husbandry at the compound level, and also in agriculture. In this sector, they participate in harvesting of family sorghum crops, cutting the heads of the plants, and also in threshing if this is not done mechanically. They also work as paid laborers in the orchards and horticulture farms, where they are again mainly responsible for transplanting and harvesting. Their income is substantially lower than that of male laborers in these fields.

2.4 Livelihood zones in Kassala State

There are six livelihood zones in Kassala State which includes:

1) Southern Riverine Small/Medium-Scale Cultivation: The basis of the economy of this zone is irrigated production with also some flood-retreat cultivation. Towards the southern parts of the zone rainfall is substantial leading to a good production in the rainy season surrounded by the vast zones of rain fed semi-mechanized and irrigation scheme cereal production, this zone, with its fertile alluvial soils but limited land area, concentrates on garden produce and orchard fruits. These cash crops – notably onions and tomatoes – are the most profitable use of the land in a situation where market value has greatly increased by good roads leading to big centers such as Gedarif, Wad Medani, Ed Damazin, Sennar, Kosti and Khartoum.

2) Eastern Pastoral: This zone has a very varied topography, from mountain to hill to inland and coastal plains, but a common ecology is that the rainfall is too low for rain fed cultivation (a mean of not more than 150mm per annum). The best use people can make of the land is for grazing, and goats and sheep are the main livelihood activity in this very harsh and rugged environment, together with some camels and donkeys for carriage. Cattle are few because of the harsh environment.

3) Eastern Agro pastoral Sorghum: On this plains terrain the natural cover is grass. Mean annual rainfall of 230-240 mm is low for crop cultivation, but the light clay soils have some moisture retention quality and are relatively fertile. Usually, in two out of three years there is satisfactory rainfall in from June to September. The soils favor sorghum, and this is the sole crop grown, purely rain fed, successfully enough in most years to provide a large part of subsistence for the population, although only a little for sale by wealthier farmers. Livestock are kept for milk but also offer the greater part of the earnings of the wealthier households through sales.

4) Flood Retreat: This zone is composed of separate areas of flood retreat cultivation including the Aroma/Wager area in east Kassala (El Gash). Sorghum is the food crop of choice on these fertile alluvial soils, and wealthier farmers are not only entirely self-sufficient in the staple, but can also market a surplus. Poorer households by contrast only manage to produce a harvest to last them some three months of the year, and they are dependent on the market to buy the balance of their requirement. The retreat of the river flood-waters begins in July, allowing the progressive sowing of sorghum for a harvest between December and

January. Sorghum has recently replaced cotton as the major cash crop. In addition, there is some production of vegetables, notably tomatoes, and of watermelons, for home consumption and garden marketing.

5) Central Irrigated Schemes: The zone comprises the New Halfa scheme which dates from 1964 when the Khashm el Girba Dam was created on the Atbara River for a scheme on which to resettle some 50,000 Nubians from Wadi Halfa displaced by the disappearance of their pasturelands under Lake Nasser behind the Aswan Dam. Production on the moderately fertile clay-based soils is mainly sorghum and cotton, with wheat as an important second food and cash crop for the wealthier farmers. There is also secondary production of groundnuts, horticultural produce and orchard fruits.

6) Southeast Semi-Mechanized Rain fed Agriculture: There are two kinds of production, in this zone: mechanized plots and smallholdings. In the smallholdings, the owners cultivate for themselves with traditional ox-ploughing or hand-tilling. Members of these households may also work on the mechanized farms. The clay soils are fertile, and mean annual rainfall ranges from 400 mm at the northern limit to up to 900 mm towards the south, where the rains continue into October. The main food crops grown are sorghum and to a lesser extent millet; sesame is the main cash crop, followed by cotton and sunflower seed that are grown by wealthier farmers. {This map has been created by FEWSNET and partners. It is difficult to ascertain the livelihood zones with 100 percent accuracy.

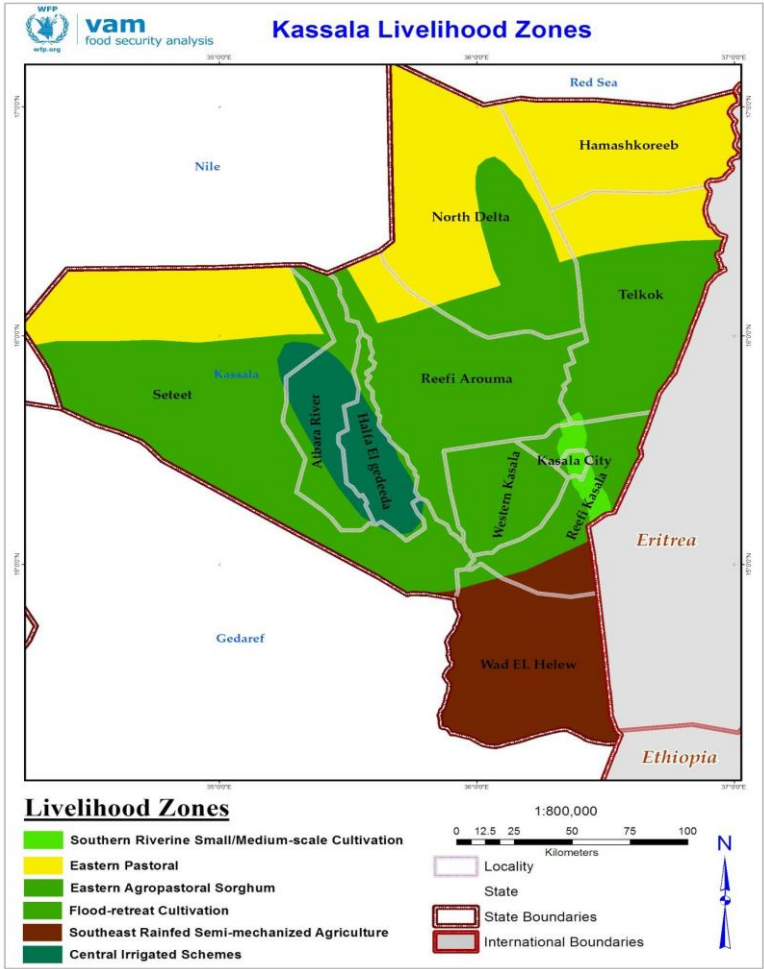


Figure 2: Livelihood zones in Kassala

2.5 The experience of IFAD project (GSLRP)

2.5.1 *Community development, empowerment and capacity building*

Given the conservative nature of the Hadandawa tribe regarding women participation in public issues, the project interventions achieved significant impacts in this regard. The participation of women in the development committees became acceptable either in separate committees or in gender balanced ones. Both the AIAs 2010 and 2011 surveys revealed that 75% of the interviewees accepted the participation of women in committees against only 23% which would have accepted women participation without project. 64% supported the participation of women in project activities. Interviewees considered that women participation brought several benefits like hygiene and healthy house environment; improved family diet; improved children health; increased enrollment and regular attendance of pupils; increased family income and contribution of women in financing agriculture, children education expenses, and improvement in household furniture and equipment. The Domestic Water Pipeline availed clean drinking water to about 20,000 households. This progress formulated a base for other developmental projects that followed. Women are still participating in the Village Development Committees (VDCs).

2.5.2 *Water Users Associations (WUAs)*

The concept of WUAs has been introduced by the GSLRP Project and has slowly been adopted at all levels (farmers; GAS, State, and Farmers Union). The benefits achieved to date include: (i) farmers names and records of tenancy have become known and fixed, (ii) the clear role of farmers in water management at the masga level has been highlighted, (iii) a sense of ownership by the farmers is very evident, and (iv) WUA members have been successfully mobilized for eradication of mesquite trees at a very low cost (when compared with machinery clearance). An important step forward in this process has been the establishment of a WUA Unit in GAS and the appointment of a WUA Coordinator to be the focal point to whom farmers can express their concerns and who took the issues up to the higher management levels. This was the situation at the end of the project in 2012, where 92 associations were formed out of the target number which was 105. According to the WUA law, the association should have been renewed and continued their roles and responsibilities. Unfortunately they were not renewed and there is a new federal strategy to organize all farmers in Sudan in farmer's production groups. The farmers in Gash still prefer the WUA. The plan is to use the same structure in the formation of the farmer's production groups at Block, Mesga, and Rabta. The process for the reformation has started and not finalized yet. Women involvement and participation in the past structure is totally lacking, women were not represented. This can be an entry point for involvement of a percentage of women in the management structures.

3. Results and discussions

The analysis revealed the following results as presented in the following sections.

3.1 Sample size and distribution

The total Number of population surveyed was 172 households. The survey categorized the area into four distinct geographic localities; they are namely; Kassala in the far southern part

of the study area which known as upstream, Rural Kassala and Rural Aroma in the middle and is known as midstream and at the far northern part of the study area the North Delta locality which represent the downstream of the Gash River. Based on the population density, the sample size is 35% from Kassala, 29% from the North Delta, 19% Rural Aroma and 17% from Rural Kassala.

Table 1: Sample size and distribution

Locality	Household Sample			
	Male	Female	All	
			Number	%
Kassala	48	52	60	35
North Delta	50	50	50	29
Rural Aroma	50	50	32	19
Rural Kassala	53	47	30	17
Total	50	50	172	100

3.2 The socio- economic characteristics of respondents

Tribes:

The respondents of the study area are a mix of native tribes (Hadandawa and Bani Amir) who were the majority, the study revealed that; now Hosa (originally from West Africa) are the majority representing 36% followed by Hadandawa 35%, then the Shamalyien (from North Sudan) 17%, and finally Bani Amir 12% who are less dependent on the Gash River in their livelihoods.

Table 2: Tribes disaggregated by gender

Tribe	Male (%)	Female (%)	All (%)
Hausa	38	62	36
Hadandawa	58	42	35
Bani Amir	55	45	12
Shamalien	55	45	17
Total			100

Marital status:

Married 77%, widow 11%, divorced 3% and 9% are single. High percentage of widows and divorced are women.

Table3: Marital status disaggregated by gender

Marital status	Male (%)	Female (%)	All (%)
Married	54	46	77
Widow	28	72	11
Divorced	20	80	3
Single	50	50	9
Total			100

Age groups:

About 68% of the respondents' age is ranging between 17 – 45 years, 30% between 46 – 65 years, and 3% above 65 years. In this survey which is focusing on livelihoods activities, the

age range between 17 to 45 years is the active segment of the society. Male youth (15- 24 years old) in the study area, particularly the rural can be identified into two categories; the first is those below 17 who are less active in economic activities and the second is above 17 years old who start to be involved in economical activities supported by the family to get married. Once they married they consider themselves men. The female youth are usually married and they are socially considered by the society as women.

Table 4: Age groups disaggregated by gender

Age groups	Male (%)	Female (%)	All (%)
17-45	45	55	68
46-65	58	42	30
More than 65	75	25	2
Total			100

Family size:

About 66% of the respondents have family size 5 – 9 members, while 23% the family size 1-4 members and 11% have family size exceeds 9 members. According to Sudan National Baseline Household Survey 2009, the national average household size in Sudan is 6 persons per household.

Table 5: Family size disaggregated by gender

Family size	Male (%)	Female (%)	All (%)
1-4	61	39	23
5-9	46	54	66
More than 5	24	77	11
Total			100

Living area:

20% of the respondents in the study area are living in urban areas, namely Elswagi area within Kassala town. 23% live in the primaries of the town and 57% live in rural areas.

Table 6: Living area disaggregated by gender

Living area	Male (%)	Female (%)	All (%)
Urban	52	48	20
Town outskirts	63	37	23
Rural area	42	58	57
Total			100

Educational level:

Illiterate 30% read and write 31%, primary/ Basic 26%, Intermediate 4%, Secondary 8% and university 1% respectively.

Table 7: Educational level disaggregated by gender

Educational level	Male (%)	Female (%)	All (%)
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Illiterate	37	63	30
Read and write	67.3	33	31
Primary/ Basic	48.9	51	26
Intermediate	57.1	43	4
Secondary	35.7	64	8
University	100	0	1
Total			100

Annual income:

The annual income varies among and within localities; it also varies between men and women. 43% of the respondents in the project area have average income less than SDG 3000, 68% of them are females. 21% have income in the range of SDG 3000-6000, 21% have income that ranges from 6000-12000 and 15% have income of more than SDG 12000 more than half of them are women.

Table 8: Annual income distribution male and female, and among localities

Income group	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)	Average
Less than 3000	43	64	46	19	43
3000-6000	28	10	25	22	21
6000-12000	26	2	29	26	21
More than	3	24	0.0	33	15
Total	100	100	100	100	100

3.3 Results on food security and livelihoods in the study area

3.3.1 Source of livelihoods

The source of livelihoods varies within localities and among localities. In the project area; Agro-pastoralists constitute 21%, pastoralists 14%, farmers 31%, dependants on forest products 17% and trade 4% respectively. Rural Kassala and Kassala localities reflect the situation downstream for the Gash River rural and urban respectively. While Rural Aroma reflects the situation in midstream and North Delta represents the situation in rural downstream situation. In Kassala locality; 28% of the respondents are Agro – pastoralists, only 4% are pastoralists, the highest percentage 35% are farmers. 8% are paid labors mostly in farms. 13% are dependent on forestry related activities such as collection of fire wood, production of charcoal and selling dokhan wood (Wood from specific types of trees, used by women as cosmetic). 4% generate their living from trade. The highest percentage of agro-pastoralists and farming among the four studied localities are found in the North delta. In this locality, 32% are agro- pastoralists and 38% are farmers. Paid work and trade were practiced by none of the respondent in this locality. Forestry activities are only practiced by 10% of the respondent the North Delta. In Rural Aroma pastoralists and paid workers are the mostly practiced activities for livelihoods; each of them represents 27%, followed by forestry related activities 20% and 13% framers and pastoralists. 385 of the respondents in rural Kassala locality are dependent on farming followed by forestry related activities 24%, 17% paid workers, 10 % agro – pastoralists, 7% traders and 4% pastoralists. Respondents in Kassala

locality have six options for livelihoods while those in the North Delta have four options. Framing in the north delta can only be practiced when floods are good otherwise this category will have no source of living so they are the most vulnerable group and in case poor or no flood, they depend on the social support which is known as "sagodeep".

Table 9: Source of living among localities

Source of living	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)	Average
Agro-pastoralist	28	32	13	10	21
Pastoralist	4	20	27	4	14
Farmers	35	38	13	38	31
Laborers (Paid work in farm & livestock)	8	0	27	17	13
Forest products (firewood, charcoal and "dokhan" wood)	13	10	20	24	17
Trade	12	0	0	7	4
Total	100	100	100	100	100

3.3.2 Irrigation methods

The irrigation methods in the project area are mostly dependant on the Gash River and gradually change with situation of the River. People in Kassala belief that Kassala is a gift of the Gash River as peoples' lives considerably influenced with this river. The source of irrigation water in Kassala locality depends on the River; directly from flood (20%) or indirectly from the basin (55%). These together reaches 75% of the irrigation water, only 25% depend on rains.

In Rural Kassala; particularly along the eastern bank of the River, 38% of the people depend on the basin for irrigation. They mostly dependent on rains for the production of the subsistence crop "sorghum". None of them uses flood water. In Rural Aroma the irrigation by using water from the basin is 12% only in the southern part of the locality that neighbors Kassala locality. Flood represent 88% irrigation water in Rural Aroma and none of the respondents reported dependence on rain. In the North Delta; none of respondents depend on basin, they mainly depend on flood and rains 70% and 30% respectively. The table below shows that; in Kassala the three irrigation mends are used, whereas only two are used in the other three localities. This situation has its implications on livelihoods.

Table 10: Irrigation methods among localities

Irrigation methods	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)	Average
Underground water/Basin	55	0	12	38	26
Flood	20	70	88	0	45
Rain	25	30	0	62	29
Total	100	100	100	100	100

59% of the respondent in Kassala locality answered the question on sufficiency of water for cultivation and availability for crops preferred by the farmers, as yes where as 41% reply was not. 30% said yes and 70% answered no. In Rural Aroma 53% relied yes, but 47% their answer was no. In the North Delta, none of respondents answered yes but 68% answered not. 32% said to some extent sufficient. The water for livestock is relatively better in Aroma where 50% answered water is sufficient for livestock. For the rest, 20% for rural Kassala, 19% for Kassala and zero in the North Delta.

Table 11: Sufficiency of water for farming and livestock

Sufficiency		Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)	Average
Water for farming	Yes	59	0	53	30	36
	No	41	68	47	70	57
	To some extent	0	32	0	0	8
Water for live-stock	Yes	19	0	50	20	22
	No	27	54	50	80	53
	To some extent	54	46	0	0	25
Total		100	100	100	100	100

3.3.3 Land ownership, cultivated areas and water rationalization

Land ownership varies across localities and within locality. In Kassala locality the main type of farming is pump irrigated farms famous as "Sawgi", 69% of the respondents own farms, 21% rent, and 10% practice share cropping. In North Delta, where farms land are communal/ tribal and depend on irregular Gash flooding, only 3% own land. None of the respondents rent land and the majority 97% practice share cropping. In Rural Aroma 19% own land, 31% rent and 50% depend on crop sharing. In Rural Kassala 31% own land, 53% rent it and 16% practice share cropping. It is noticeable that; crop sharing is commonly used within Gash scheme in Aroma and north delta localities where 97% and 50% of the respondents depend on share cropping. This indicate that some of the families either they don't own enough area or their land face irrigation problem. The amount of crop per household is low and hence the food security is difficult to achieve.

Table 12: Land ownership

Characteristics	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)	Average
Own the land/farm	69	3	19	31	31
Rent	21	0	31	53	26
Crop sharing	10	97	50	16	43
Total	100	100	100	100	100

In Kassala 8% own less than 5 feddans, 51% cultivate 5 - 10 feddans and 27% cultivate more than 15 feddans. In Rural Kassala 11% cultivate less than 5 feddans, 89% cultivate 5 – 10 feddans. 75% of the respondents in Rural Aroma cultivate less than 5 feddans and 25% cultivate 5 – 10 feddans. The land allocated for farmer by the Gash Agricultural Scheme is 3

feddans (IFAD Land Reform) for those who own 5 – 35 feddans before GSLRP/IFAD,6 for 36 – 65 Feddans, 9 for 66- 95 and 12 for more than that. No one among the respondents cultivates more than 10 feddans. In the North Delta 85% own less than 5 feddans, 3% cultivate 5 – 10feddans and 12% cultivate more than 15 feddans. The last category includes Hadendawa tribal leaders who own larger areas and they can be share croppers with others.

Table 13: Cultivated area in fadden

Cultivated area	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Less than 5	8	85	75	11
05-10	51	3	25	89
10-15	14	0	0	0
More than 15	27	12	0	0
Total	100	100	100	100

Despite the importance of rationalization of water use, in the project area only 17% in Kassala, 40% in Rural Kassala and none in either Rural Aroma or North Delta practice water rationalization. The concept and skills are lacking for farming and in a limited use for livestock as it is only used in Kassala 88% and Rural Kassala 60%.

Table 14: Water rationalization in farming and for livestock

Water rationalization		Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
in farming	Yes	17	0	0	40
	No	83	100	100	60
in livestock	Yes	88	4	10	60
	No	12	96	90	40

3.3.4 Farming production activities

Men and women play different roles in farming. In Kassala locality, 54% of farming activities are carried out by men only and no role for women alone. 56% of the respondents mention that the roles are shared between men and women. It is observed that women participate in certain activities, such as transplanting of seedling and harvesting of onions which is the main crop in Kassala and Rural Kassala localities. In North Delta vegetables production have no existence; inapplicable for 98% of the respondents. They only rarely practiced by men when conditions are favorable. In Rural Aroma locality men play all roles for the production of watermelon which is cultivated as a second crop after harvesting sorghum. In Rural Kassala 80% of the roles in vegetable production are played by men, 10% by women and 10% by youth.

Table 15: Gender roles in farm production activities across localities

	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)	Average
Men	54	18	100	76	62
Women	1	0	0	9	3
Participatory	45	0	0	15	15
Not applicable	0	82	0	0	20
Total	100	100	100	100	100

The table below shows that income generated from farm returns is mostly support the livelihoods of the whole family as it was mentioned by 98% in Kassala, 71% in North Delta, 100% in rural aroma and 83% in Rural Kassala. Men keep part of the income for their other family needs or they may decide how to use it. It is noticeable that women and children have no any portion (0%) of the income. Youth enjoy only 2% of the income in Kassala. Most probably they use it for marriage.

Table 16: Distribution of farm returns and their share in food security of HH members

Farm return on food security	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All household members	98	71	100	83
Men	0	29	0	17
Women & children	0	0	0	0
Youth	2	0	0	0

The one who decides on the selection of the type of crop, method of production and distribution of farm returns varies in the different locations.

Table 17: Decision on the selection of the type of crop, method of production and distribution of farm returns

Selling farm product	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All household members	93	18	33	37
Men	7	73	17	63
Women & children	0	9	33	0
Youth	0	0	17	0
Total	100	100	100	100

It was mentioned in Table 5 (Source of living among localities) that; 27% of the respondents in Rural Aroma generate their livelihoods from paid work. The return from labor work goes to the different categories of the society. It is noticeable that women and children get 30% of the return and youth who normally work as labors in farms or with livestock owners. The mentioned two categories receive very little in Rural Kassala or none as in the case of Kassala and North Delta.

Table 18: Distribution of returns from labor work in farming

Paid work in farm	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All house hold members	95	98	10	58
Men	5	2	20	33
Women & children	0	0	30	9
Youth	0	0	40	0
Total	100	100	100	100

The savings from farming is used for the benefit of all HH members for example maintains the house or it can be used by a family member to meet certain need. In Kassala locality, 66% of the savings are used to meet need or interest of all the family members, 20% used by men only, 14% for women and 0% for the youth. In North Delta 100% of the savings are used by men most probably used to purchase livestock or kept for the next planting season. In Rural Aroma, 70% of the saving is used by all HH and 30% by youth who are usually supported to get marriage. In Rural Kassala, 50% of the saving is used by all HH members, 35% by men, 5% by women and 10% by youth.

Table 19: Farm savings use among family members

Farm savings	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All house hold members	66	100	70	50
Men	20	0	0	35
Women	14	0	0	5
Youth	0	0	30	10
Total	100	100	100	100

The decision on method of vegetable production is taken by men in most of the localities except in North Delta locality where decisions are participatory. In Kassala locality, 55% of decisions on the method of vegetable production are taken by men, 45% are taken by women. These results reflect support the general understanding that women in Kassala have better situation as they are educated and with different social background. They are originally farmers with strong experience in agricultural production. The contrast in North Delta where almost neither men nor women decide on the method of production, the decision is participatory and only when the conditions are favorable i.e. when water is available and technical knowledge support is provided by the government or the NGOs. In Rural Aroma 88% of the decisions on method of vegetable production are taken by men, 12% by women respectively. This result is in line with general situation where women have low contribution in agric production. In Rural Kassala the situation is similar to the one in Rural Aroma. 83% of the decisions are taken by men, 8% by women and 9% participatory.

Table 20: Gender and decision on method of production - vegetables

Vegetables	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	55	0	88	83
Women	45	2	12	8
Participatory	0	98	0	9
Total	100	100	100	100

The decision on method of fruit production is taken by men in most of the localities except in Kassala locality where decisions are taken by both of them. 59% of the decisions are taken by men and 41% are taken by women. No fruit production activities are practiced in Rural Aroma and North Delta. In Rural Kassala all decisions regarding fruit production are taken by men.

Table 21: Gender and decision on method on production - fruits

Fruits production	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	59	0	0	100
Women	41	0	0	0
Participatory	0	0	0	0
Total	100	0	0	100

Table 22: Gender and decision on method of production – Sorghum production

Dura production	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	80	68	41	86
Women	0	0	0	0
Participatory	20	32	59	14
Total	100	100	100	100

Men and women decide on how to distribute the farm returns, it varies across the localities. 36% of the respondents in Rural Kassala said that men decide on the distribution of the farm returns. 5% by women and 59% are participatory. In North Delta 50% of the decisions on distribution of farm returns distribution are taken by men and 50% participatory and no decision on farm return distribution is taken by women alone. In Rural Aroma 87% of the decision on farm return distribution are taken by men, 13% by women. This result is in line with the general understanding that; women in Rural Aroma own land registered under the names of their male relatives but according to Hadandawa society they can decide fully on what they own. In Rural Kassala 82% of the decision on farm return distribution are taken by men, 18 % by women.

Table 23: Gender and decision on farm return distribution

Vegetable production	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	36	50	87	82
Women	5	0	13	18
Participatory	59	50	0	0
Total	100	100	100	100

The tables below present the situation of gender and decision on farm returns and their distribution (for fruits, sorghum and cash crops). The results confirm the common understanding that women have no or very low roles in agricultural production.

Table 24: Gender and decision on farm return distribution - fruits

Fruit	Kassala (%)	North Delta (%)	Rural Aroma	Rural Kassala (%)
Men	46	0	0	100
Women	5	0	0	0
Participatory	49	0	0	0
Total	100	0	0	100

Table 25: Gender and decision on farm return distribution – Dura

Dura	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	29	96	83	79
Women	12	4	17	0
Participatory	59	0	0	21
Total	100	100	100	100

Table 26: Gender and decision on farm return distribution - cash crops

Cash crop	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	53	0	0	100
Women	3	0	0	0
Participatory	44	0	0	0
Total	100	0	0	100

3.3.5 Livestock as a source of livelihoods

Livestock is considered a key asset for rural households in the study area and a primary livelihood, resource for rural communities to produce food and food security, generate cash income, manage risks and build up assets. In general Livestock owned by both women and men and contributing to household income. Men have the primary responsibility for cattle and Camels and also raising sheep and goats, while women have responsibility on rearing small

ruminants (sheep and goats) and poultry. In the three of the four targeted localities women are not socially allowed to do milking activity. This is only acceptable in Kassala locality but women can process milk and sell milk products. In the above table 84% of the respondents in Kassala own animals, 8% support livestock production and work as paid laborers and 8% work and get in kind ratio of the annual off spring for their work.

Table 27: Methods of livestock rearing

Method	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Common pasture	20	67	76	5
Semi-nomads	20	30	6	15
Livestock in farms	56	3	18	80
Not applicable	4	0	0	0
Total	100	100	100	100

Table 28: Ownership of livestock or being a source of livelihoods

Livestock ownership	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Own livestock	84	74	90	16
Paid work	8	0	0	84
Product sharing	8	26	10	0
Total	100	100	100	100

Table 29: Distribution of herd size for goats and sheep

Animal type	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Goats & sheep:				
1-19	44	64	94	83
20-39	39	15	6	17
40-80	3	3	0	0
More than 80	14	18	0	0
Total	100	100	100	100
Camels:				
Zero	100	70	56	83
1-5	0	19	44	17
More than 5	0	11	0	0
Total	100	100	100	100
Cattles:				
Zero	27	18	17	17
1-5	46	33	28	50
6-20	15	30	44	33
More than 20	12	19	11	0
Total	100	100	100	100

Role of women and men in livestock production varies across the localities. In Kassala 19% of the roles are played by men alone, most probably raising cattle and camels. 15% by women alone most probably raising small ruminants and the majority 66% is participatory where women and men play integral roles for the production. In North Delta 78% of the roles played by men they take the responsibility of activities that require movement outside the village and milking animals, while women take care of young animals and other activities that can take place within the village vicinity. In Rural Aroma, 56% of the roles played by men only. 44% of the roles played by women and no participatory roles motioned. In Rural Kassala, 60% of the roles played by men, 25% played by women and 15% participatory.

Table 30: Gender roles in livestock production - milk production

Milk production	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	19	78	56	60
Women	15	15	44	25
Participatory	66	7	0	15
Total	100	100	100	100

Family members benefit from the returns of livestock with different ratios across the localities. In Kassala 92% of the return goes to all family members, 4% goes to men in particular and 40% goes to the youth to support them to establish their livelihoods source. Nothing goes to women and children they benefit from what availed for the whole family. In north Delta 86% goes to the whole family, 7% to men only, 7% to women and children and nothing goes to youth, they benefit from what provided by the family. In Rural Aroma all or 100% of returns from livestock are availed for all family members.

Table 31: Livestock returns and their share in food security of HH members

Food security	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All household members	92	86	100	97
Men	4	7	0	3
Women & children	0	7	0	0
Youth	40	0	0	0
Total	100	100	100	100

The decision on the type and method of livestock production is crucial for any development in this sector. In Kassala locality 23% of the decisions on type and method of livestock production, are taken by men. 12% are taken by women and 65% are taken by men and women. In North delta 93% of the decision on type and method of livestock production are taken by men and 7% by women. In Rural Aroma, 44% of the decisions on type and method of livestock production are taken by men, 12 % by women and 44% both men and women participate in the decision. In Rural Kassala 71% of the decisions on type and method of livestock production are taken by men and 29% by women.

Table 32: Gender effect on decision on type and method of livestock production

	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	23	93	44	71
Women	12	7	12	
Participatory	65	0	44	0
Total	100	100	100	100

The decision of livestock returns distribution within the household varies within locality and among localities. 24% of the respondents think that decisions are taken by men, 22% women and 54% participatory. In the North delta 75% of the decisions are taken by men, 22% by women and only 3% of the decision are participatory. In Rural Aroma the respondent think that 62% of the decision are taken by men, 16% by women and 12% participatory. In North Delta 100% of the decision are taken by men. The highest level of participation is mentioned by the respondents in Kassala and the lowest is found in Rural Kassala followed by North Delta.

Table 33: Gender effects on decision on livestock return distribution within the household

Decision on livestock returns	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	24	75	62	100
Women	22	22	16	0
Participatory	54	3	12	0
Total	100	100	100	100

3.3.6 Forestry activities

Poor people who don't own land or livestock depend on forests products for their livelihoods. In Kassala 22% of them depend on forests reserves, 56% depend on trees in the neighboring areas and 22% depend on purchasing forests products and resell them. In North Delta and Rural Aroma localities they are 100% dependants on trees in the neighborhoods. In Rural Kassala 33% depend on trees in the neighborhoods and 67% are dependent on purchasing and selling of forests products.

Table 34: Availability of forests resources

Forests resources	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Reserved forests	22	0	0	0
Trees in neighboring areas	56	100	100	33
Purchase and resell forestry products	22	0	0	67
Total	100	100	100	100

Respondents from Kassala and Rural Kassala consider the forestry resources as a source of their livelihoods is sufficient. In Kassala 59% of the respondent think the resource is sufficient and 44% in Rural Kassala think that the resource is sufficient. The other two localities think that the resource is insufficient.

Table 35: Sufficiency of forestry products to generate income

Sufficiency of forestry products	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Yes	39	0	0	44
No	61	100	100	56
Total	100	100	100	100

Table 36: Gender effect on decision of type of forestry products to utilize as a source of livelihoods

Decision on type of forestry products	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	53	90	94	35
Women	18	10	6	65
Participatory	29	0	0	0
Total	100	100	100	100

Table 37: Gender effect on decision of choosing forestry production method

Decision of choosing forestry production	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	29	100	100	44
Women	12	0	0	44
Participatory	59	0	0	12
Total	100	100	100	100

The decision of forests production returns distribution within the household members varies within locality and among localities. 94% of the respondents in Kassala think that the returns are shared by all house members i.e. men, women, boys and girls and provide the living for the family. 6% goes to men only. 84% of the returns go all family members. 16% goes to men only. 100% of the returns in North Delta and Rural Kassala go to all family members.

Table 38: The decision on forests production returns and its distribution within the household members

Decision on forests production returns	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Food security: All household members	94	84	100	100
Men	6	16	0	0
Women & children	0	0	0	0
Youth	0	0	0	0
Total	100	100	100	100

The cash generated from selling forestry products is used meet HH needs of all family members without differentiation in Kassala, North Delta and Rural Kassala. The situation in Rural Aroma is different where one third of the retunes utilized by all family (34%), one third goes to women and children specifically and one third goes to youth. It is noticeable that no any ratio of the return goes to men in all localities. There is a common social understanding that; money generated from selling of fire wood (mainly branches and dead wood) or *dokhan* woods are for women, none of it go to men in all localities. The interpretation of the share of the return by the youth in Rural Aroma is due to their support to their mothers (women headed households) in selling fire wood in the near villages.

Table 39: Cash from selling of products

Cash from selling of products	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All household members	100	100	34	100
Men	0	0	0	0
Women & children	0	0	33	0
Youth	0	0	33	0
Total	100	100	100	100

The table below can be read with previous table where the returns from paid work are partially specified to men in Aroma locality. In North Delta no one of the respondents work as labor in forestry activities. In the other two localities, income generated form paid work goes to all HH members to meet their basic needs.

Table 40: Cash from paid work

Cash from paid work	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
All household members	100	0	84	100
Men	0	0	16	0
Women & children	0	0	0	0
Youth	0	0	0	0
Total	100	0	100	100

Forestry related activities are seasonal and HH need to make some savings to meet their needs during the rainy season which extends for three month. Respondents in North Delta and Rural Kassala have no saving to sustain their livelihoods during these months. In Kassala the respondents think that, 73% of the savings goes to all family members and 27% goes to women and children. In Rural Aroma 75% goes all family members and 25% goes to women and children's livelihoods.

Table 41: Savings from livestock activities

Savings	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
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All household members	73	0	75	0
Men	0	0	0	0
Women & children	27	0	25	0
Youth	0	0	0	0
Total	100	0	100	0

The gender effect on selection of methods of forest products as a source of livelihoods varies within localities. It varies from zero for women in the North Delta locality to 50% in Rural Kassala.

Table 42: Gender effect on selection of methods of forest products as a source of livelihoods

Selection of methods of forest	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Men	23	100	67	50
Women	33	0	0	50
Participatory	44	0	33	0
Total	100	100	100	100

Table 43: Gender effect on decision on forest products return and its distribution

	Kassala (%)	North Delta (%)	Rural Aroma	Rural Kassala (%)
Men	17	100	17	44
Women	33	0	0	44
Participatory	50	0	83	12
Total	100	100	100	100

3.3.7 Products marketing

The availability of marketing organizations facilitates selling of product and help men and women who cannot go to market to get better price for their products.

Table 44: Existence of marketing organizations for farm, livestock and forestry products

Marketing organizations: <i>farm products</i>	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Yes	44	1	0	22
No	56	99	100	78
Total	100	100	100	100

3.3.8 Extension services

The extension services are important for improving the production and hence support food security in the study area. In Kassala, Rural Aroma and Rural Kassala; one third of the respondents receive good services that provided to male and female producers. In North Delta the services are irregular and provided for some females.

Table 45: Provision and distribution of extension services in agriculture, livestock and forestry

Service provider	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Government institution	42	3	0	30
Private sector	20	3	0	70
No extension service provided	38	94	100	0
Total	100	100	100	100

Table 46: Quality & distribution of extension services

Quality & distribution of extension services	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Good and provided for male & female	30	0	33	33
Irregular and for some people	63	1	33	12
Irregular and provided for some females	7	99	34	55
Total	100	100	100	100

The role of government departments' activities for women empowerment in agriculture, livestock and forestry sectors is described as good in three localities and not good in Rural Aroma. Not effective or to some extent is the case in most of the localities.

Table 47: Role of government departments' activities for women empowerment in agriculture, livestock and forestry sectors

Government departments and women empowerment	Kassala (%)	North Delta (%)	Rural Aroma (%)	Rural Kassala (%)
Good	33	52	0	52
No effect	31	48	44	48
To some extent	36	0	46	0
Total	100	100	100	100

4. Conclusions and recommendations

4.1 Conclusions

Securing water is crucial in achieving food security and improving rural livelihoods, particularly in arid and semi- arid areas FAO/GWA/GEWAMED (2013). Women's secure access to water and land is central to achieving the Sustainable Development Goals (SDGs) in reducing poverty, hunger, gender equality, decent work and economic growth...etc. The study highlighted the gap between benefits gained by respondents in the upstream and those living downstream, as well the evident gender gap between urban and rural people in the study area. Food production requires a number of different factors of production, including labor, land and capital, inputs and intermediate goods such as animal and mechanical power, seeds,

fertilizer and water. Women contribution to food production in the study area is very limited. In the study area, women vary from having all necessary skills and inputs in Kassala locality (upstream and urban) to a limited knowledge and skills in North Delta (downstream and rural). It varies from production of fruits and vegetables in the upper stream (Kassala) to the irregular production of few types of vegetables (green leafy plants, tomatoes and water melon) in good floods years only. Some women work as skilled labors in the upper stream (Urban), where water is pumped from underground water source, on the other hand women contribution to agric production in midstream and downstream is confined to harvesting sorghum (*dura*) and rarely other crops. The last production areas depend on floods or rains where uncertainty is very high and accessibility to land and water, technology and financial services, which are the pillars for any development are lacking.

Access to, control over and ownership of assets including land and livestock, homes and equipment, and other resources enable people to create stable and productive lives FAO (2014). Assets unequally distributed between rich and poor, but they are also unequally distributed between men and women, nationally as well as within communities and households.

Agricultural development programs are increasingly seen as a vehicle for poverty alleviation, nutrition and food security as well as agricultural growth, yet relatively little is known about how they affect or affected by differential access to land and control over assets between men and women or how the interventions lead to differential accumulation of assets by men and women. The relationship between ownership and control of tangible assets such as land, livestock, machinery, and the patterns of agricultural growth showed that the combination of asset inequality and market failures has a negative impact on growth, and that inequalities tend to reproduce inequalities World Bank/IFAD/FAO (2014).

Women limitation and their exclusion from participating in decisions places them in an impossible situation where they are obliged to take the burden of keeping the family livelihood but yet restricted from managing the land or the resources in the way they see fit or within the sense of their priorities.

The future investments should consider gender mainstreaming during planning, implementation and management of projects and programmes. This implies the assessing the implications of any intervention on women, men, girls and boys through participatory approach while designing gender sensitive interventions. The expected outcome will improve performance of water management projects and systems, while strengthening the position of rural women and men or any other disadvantaged groups.

4.2 Recommendations for gender inclusive investments in GAS

4.2.1 General activities

For gender inclusive investment, different level of analysis is required:

At the field level the focus is on people, including women and men as individuals, the socio-economic differences among households, and communities as a whole to be investigated and discussed with both women and men.

At the intermediate-level, the focus is on structures, such as institutions and services, that function to enable the links between the macro and field levels, including communications

and transportation systems, credit institutions, markets and extension, health and education services.

The macro-level, focuses on policies and plans, international and national, economic and social, including trade and finance policies and national development plans.

The consideration of findings from the field, intermediate and national or international have to be considered in the development of interventions to address gaps between men and women in the project cycle, from the time of identification to the project evaluation. The typical project cycle has six components:

1. Project idea and preliminary design
2. Preparation: detailed design of the project addressing technical and operational aspects
3. Appraisal: analysis of the project from technical, financial, economic, gender, social, institutional and environmental perspectives
4. Proposal preparation, approval and financing: writing the project proposal, securing approval for implementation and arranging sources of finance
5. Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback
6. Evaluation: periodic review of project with feedback for next project cycle

4.2.2 *Specific major activities*

Based on the results on gender income, opportunities and decision making, the following activities are recommended to support gender within the current context and gender roles to improve livelihoods of women and their role in providing support to family. The activities are differentiated to:

A) Upstream: include Rural Kassala and Kassala localities

Small livestock diary and milk processing:

- Build capacity at household level on appropriate methods of milk products handling, preservation, value addition and storage
- Improvement of livestock nutrition
- Genetic improvement of the existing stock
- Provision of extension and awareness services to change culture and attitude towards traditional hoarding of livestock for prestige purposes and improve production capacity particularly in Rural Kassala,
- Provide support to build the capacity of the service providers both government and private sector to ensure sustainability

Promote forestry with managed *revegetation*

- In collaboration with Forests National Corporation (FNC) identify suitable locations for women.
- Formation of women communal forestry groups and build their capacity to manage natural resources and apply agro silvi pastoral system
- Provision of extension service to support seedling production, tree planting and forest conservation and management. This is in addition to energy conservation and use of improved cooking stoves to save energy and time to get involved in learning some skills,

- Establishment of model/demonstration community forests in selected locations and support the production of all possible types of forest products from firewood to honey.
- Link producers to markets.

B) Downstream: include Rural Aroma and North Delta localities

Improving small ruminants and poultry:

- Build capacity at household level on appropriate methods of milk products handling and preservation
- Improvement of livestock nutrition
- Genetic improvement of the existing stock of goats, sheep and poultry,
- Provision of extension and awareness services to change culture and attitude towards traditional hoarding of livestock for prestige purposes and improve production capacity
- Provision of livestock services specially drinking water and vaccination.

Promote forestry with managed revegetation

- In collaboration with Forests National Corporation (FNC) identify suitable locations for women activities.
- Formation of groups from interested women and men (separately) for the establishment of communal forestry and build their capacities to manage natural resources for better livestock production and income generation.
- Provision of extension services to raise awareness, train on different forestry related subjects and adopt participation as a tool for sustainable forest management.
- Establishment of demonstration plots for community forests in selected locations and support the production of all possible types of forest products from firewood to honey.

5. References

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Annex

Definitions:

Empowerment is about people - both women and men - taking control over their lives through:

- ☒ Setting their own agendas, gaining skills, building self-confidence, solving problems and developing self-reliance
- ☒ No one can empower another: only the individual can empower herself or himself to make choices or to speak out
- ☒ Institutions including international cooperation agencies can support processes that can nurture self-empowerment of individuals or groups

Gender Equality means that women and men have equal conditions for realizing their full human rights and for contributing to, and benefiting from, economic, social, cultural and political development. Gender equality is therefore the equal valuing by society of the similarities and the differences of men and women, and the roles they play. It is based on women and men being full partners in their home, their community and their society.

Gender Mainstreaming is defined by United Nations Economic and Social Council (ECOSOC), 1997 as: Mainstreaming a gender perspective is the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in any area and at all levels. It is a strategy for making the concerns and experiences of women as well as of men an integral part of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres, so that women and men benefit equally, and inequality is not perpetuated. The ultimate goal of mainstreaming is to achieve gender equality. United Nations Economic and Social Council (ECOSOC), 1997

Gender Equity is the process of being fair to men and women. To ensure fairness, measures must often be put in place to compensate for the historical and social disadvantages that prevent women and men from operating on a level playing field Equity is the means; Equality is the result.

Food Security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996). In general, food security is a measure

of food availability, food access and food utilisation for purposes of this assessment, household food security will be determined through analysis of food access indicators.

According to the International Fund for Agricultural Development (IFAD), there is also a long-term and short-term aspect to food security. When a household is regularly unable to meet the food requirements of its members over a long period of time, characterised by short periods of good and bad moments, this is known as chronic food insecurity. The short-term problem can affect any household regardless of the current situation. Shocks like crop failure, seasonal shortages or reduced income due to illness or underemployment of productive members may temporarily reduce household access to adequate amounts of nutritious food, leading to transitory or acute food insecurity.

Resilience Building is ‘increasing the ability of individuals, households, communities and systems to be better prepared, mitigate, adapt to and recover from shocks and crises so as to be able to meet basic food and nutrition requirements’.