

Full Length Research Paper

Prevalent agricultural credit system in River Nile State of Sudan

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Agricultural finance in Sudan is considered as one of the main factors affecting food crop production. This study provides an overarch analysis of current trends in financing the main field crops in the public irrigated schemes of the River Nile State (RNS) and analyzes various agricultural credit mechanisms that have been used in the state. It assesses a plausible framework in order to increase agricultural production and tenants returns in RNS. It was on this basis, this research undertook Elzeidab scheme of RNS as a case study. Primary data were collected by using structured questionnaires for seventy (70) randomly selected respondents from Elzeidab scheme. Statistical analysis was employed to assess current situation in financing main food crops in the scheme. The paper unveiled that these crops are described as low value crops. It also revealed that the formal finance is characterized as inefficient to serve the target part of farmers, while the informal one is limited in covering the farmers' expenditures. The paper concluded that the credit market in RNS is not well developed and the majority of households (93%) have no access to formal financial institutions. This allows for the recommendation that improving finance institutions will enable the tenants to improve their farm resources use.

Key words: Agricultural credit, field crops, public schemes.

INTRODUCTION

With the awareness of the importance of agriculture as a generator of income, employment, foreign exchange and tax revenues as well as its association with poverty reduction and the preservation of natural resources, there is still a need for increased awareness of the important role that agricultural finance for development plays in these issues. Ruben and Nienke (2009) mentioned that the great potential of agricultural finance in issues of food security, poverty reduction, and preservation of natural resources must be emphasized in order to overcome the perpetual under-investment in public agricultural produc-

tion in developing countries.

Agricultural finance in Sudan faces numerous constraints regarding the provision of short and long-term agricultural credit. One of these is mainly the low devoted percentage for agricultural sectors injected through the agricultural finance institutions. This continues to show steady but slow progress, though there is wide variation amongst the various branches with regard to performance and efficiency. These policies are reflected in a large number of farmers, particularly those in irrigated and mechanized rain-fed sectors that continue to complain of agricultural finance mechanism. Furthermore, the expected repayment by farmers was underestimated and led to the classification of high portion of farmers as defaulters. Faki et al. (2003) stated that despite that the government stressed on solving credit constraints by devoting high percentage macro-finance for the

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agricultural sector, majority of the farmers suffer from shortage of or/and have limited access to credit resources. That is, the total amount of finance provided for this sector was only 5% of the total cost of production, and that led to a high percentage of defaulters (53%) who failed to repay about 77% of the total agricultural finance.

Numerous researches mentioned that the RNS has been assumed to have a comparative advantage in perennial, cereal, corms and legumes food crops production namely, wheat, faba bean, chickpea, dry beans, onions, vegetables, spices, sorghum, maize, potatoes and fodder, besides some perennial crops. All the mentioned field crops are grown in both private and public irrigated schemes of the state, but the public ones are regarded as the main suppliers of these crops according to their areas and the high number of tenants. The production of these crops is based mainly on family members and is distinguished by using low level of commercial physical agricultural inputs.

Both formal and informal sources of finance exist in the area of study. The formal finance is usually provided by governmental institutions and banks (that is, agricultural ministries, ABS), while the informal one, by relatives, merchants and others. Besides, some farmers depend on their own resources. The paper stressed on the dominant agricultural financial system in the public irrigated schemes of RNS due to its importance in achieving the aims of agricultural development. This could be summarized as stable for the suitable farm size by using economy of scale, increasing production efficiency, enhancing the adoption of economical change, technologies and innovations, passing seasonal fluctuations related to the income, expenditure and unfavorable weather, and possessing fixed assets in short period compared to individual saving. Unfortunately, in RNS irrigation started much later than intended because cash was not available to buy water inputs (that is fuel) for the scheme pumps. Farmers frequently complain that they are forced to sell their produce to traders for a price below the floor price as they have urgent cash requirements. Credit and finance for traditional agriculture remain, understandably, at a very low level, with problems of non-viable collateral, small loan levels, geographical distance and the logistics of recovery. Attempts have been made to form cooperatives but few have had any success. The paper undertook Elzeidab public irrigated scheme as a case study to implement the study. The farm management is fully under the tenants' control, while the government is considered as a maker of agricultural policies, a water seller, and provider of agricultural credit.

Finally, the farmers wish that the national credit situation is improved very soon with the recent initiation, followed by the signing of the North-south peace agreement, a microfinance project involving the World Bank, the Ministry of Finance and the Central Bank, and a sum of USD 269 million over a period of six years as

reported by FAO/WFP (2005).

METHODOLOGY

This study was carried out in Elzeidab public irrigated scheme of RNS. The crops are commonly produced under pump irrigation from the River Nile to some extent, as well as from underground water. The farming system of the RNS is characterized mainly as not full-mechanized system, and winter season is considered as the main season for producing cereal, corms and legume crops. Recently, the state enlarged animal production activities and oil crops. The study depends on both primary and secondary data. Primary data were collected through direct personal interviewing by using structured questionnaires for 70 randomly selected respondents through probability proportional method from Elzeidab public irrigated scheme of RNS as a case study in 2005/2006 season. The secondary data were collected from their relevant sources. The analytical technique - a descriptive statistical analysis - has been employed through the computer software program (SPSS) by using frequency, distribution, and graphical analysis to achieve the objectives of the study. The data collected consisted mainly of the sources and value of finance, mechanism of providing and repayment of finance and type of finance.

Assessment of agricultural finance in RNS

The scenarios of finance story and its evolution is difficult to be in its complete profile due to the very little information under which commercial and food crops production growth in Sudan is documented. The evolution of finance at the local level of RNS began since 1920s of the first half of the last century. It has witnessed the establishment of the major agricultural institutions in the Northern Region Sudan namely: Ministry of Agriculture and Natural Resource, Northern Agricultural Production Corporation Schemes (NAPCS) and Agricultural Bank of Sudan (ABS) as main sponsors of agricultural production in the region. The land cultivation is handled by three sections: Private (62%), cooperatives (22%) and public (16%). NPACS was directly responsible for the public schemes in the region, management and provides most of the required inputs and services only for cotton production, under Joint Account System (JAS), while production of other field crops (that is, wheat, faba bean) was done under fixed rate relationship where the farmers pay a fixed water charges per feddan according to the type of crop (field, perennial) for the scheme administration responsible for providing irrigation water and field water supervision. The second portion was the share cropping system. The whole idea was to share the crop produced equally between the pump owner and the farmer. The share cropping system is based on sharing production cost and returns to achieve mutual benefits for partnership. With the evolution of finance at the international level, a Sudan-USA program was established under the mutual security act with economic and technical assistance from the U.S in 1958.

The establishment of educational facilities and agricultural services are among the most prominent efforts of the missions in which the Sudanese Department of Agriculture was provided with technicians who worked in close collaboration with Sudanese counterpart. In 1964 to 1979, as a result of that mission, statistics relating to present age of cropping under Nile pump irrigation based on winter cropping (that is, cereal, legume crops) illustrate that the most significant shift has been from subsistence cropping of cereal to the commercial (cash) cropping of pulses, where the area under cash crops increased significantly from 17% in 1964/1965 to 27% in 1977/1978. Furthermore, the International Fund for Agricultural Development (IFAD) has signed a loan agreement with the

Table 1. Frequency distribution of the surveyed tenants according to main markets.

Market	Number	Percentage
Elzeidab	24	34
Elaliab	01	2
Elketiab	01	2
Eldamer	01	2
Local traders	40	57
Atbara	02	2
Khartoum	01	1
Total	70	100

Government of Sudan to rehabilitate agricultural scheme in the Northern Region of Sudan. Projects were established to improve irrigation systems, transfer of technology development, and attracted collaboration inputs from institutes in Sudan as well as from international organizations. Collaboration with the Sudan Government was successful in achieving their collaborated program successfully. The development programs continued from 1979 to 1995, the Nile Valley Project (NVP) was undertaken by IFAD and the International Center for Agricultural Research in Dry Area (ICARDA) as extension of IFAD projects. The NVP is considered as one of the major programs specified on wheat and legume crops. It began in 1979. The executive board of IFAD approved a technical assistance grant equivalent to US\$ 3 million to be given to ICARDA for applied research on the mentioned crops. Finally, the efforts of U.S.A aid, IFAD, ICARDA collaborated with Sudanese Government produced a vast evolution particularly on agricultural finance and main food crops production.

RESULTS AND DISCUSSION

The formal financial system provides only small parts of credit used by farmers. Therefore, most farmers seek other informal sources of finance. Loans extended by friends and relatives, mostly without interest, constitute the non-commercial segment. In the commercial segment a range of people like traders, agricultural and professional money lenders operate (Ijami, 1994). Faki et al. (2003) mentioned that self-finance is regarded as the main source of agricultural finance in River Nile State and it covered about 67% of the total available finance, while 'Shail' system formed 17% as a second source of finance. Formal credit through Agricultural Bank of Sudan contributed only with 2 and 10% for sorghum and faba bean, respectively.

Capital circuit of main food crops in River Nile State

Food crops are considered as the most important annually produced crops with respect to their contributions to farm sustainability and farmers' income. The farmers in the area of study usually pass through different stages to achieve their harvests. During these stages, sometimes they live comfortably and possess an excess

in basic needs after harvest, while they live in balanced period which is described as an idle period with less or no farm activity. They ended these stages facing a drastically periods characterized with shortage of food and/or money at the tail of the season.

These stages occurred throughout a year and can be summarized in three periods namely, surplus, balanced and deficit periods.

Surplus period

The surplus period usually occurs during April to July. In this case the main harvesting season is once per year namely winter season under the irrigated pump schemes of RNS. The majorities of the schemes tenants sell their crops immediately after harvest and gain returns pending on the marketable surplus of food crop quantities. The paper revealed that most of the farmers (57%) trade their crops to local traders who are usually regarded as money lenders (in kind or/and in cash) (Table 1). Local traders are considered as important source of informal finance; they finance farmers by agricultural inputs, money and consumption commodities. Thus, the first decision taken by farmers after harvest is to sell their products to the traders who lend so as to cover their debts.

The crop returns created the surplus period and it can be described that the cash inflow and out flow balance is usually positive but not sufficient to establish new investment in a farm; hence, the farmers in this period are usually idle and stagnant. Efeil (1993) summarized the farm and the off farm incomes are found to be mostly used for consumption purposes and very rarely invested in the farm. The paper observed that tenant in the area of study was considered as an expert in Northern Sudan due to his capability to organize a future plan for distribution of his products. The field data (Table 2) revealed that the actual quantities of main food crops to be sold were 88% of the total production. About 77% of the total food crop production was sold immediately after harvest, while the remaining quantities of 13% went to storage. Table 2 also shows that grain and legume crops were distributed for direct sale after harvest and storage, while vegetables, spices and potatoes were sold immediately after harvest due to lack of storage and inadequate markets. The structure of marketing in the RNS has a hierarchical structure where institutions of different types are involved.

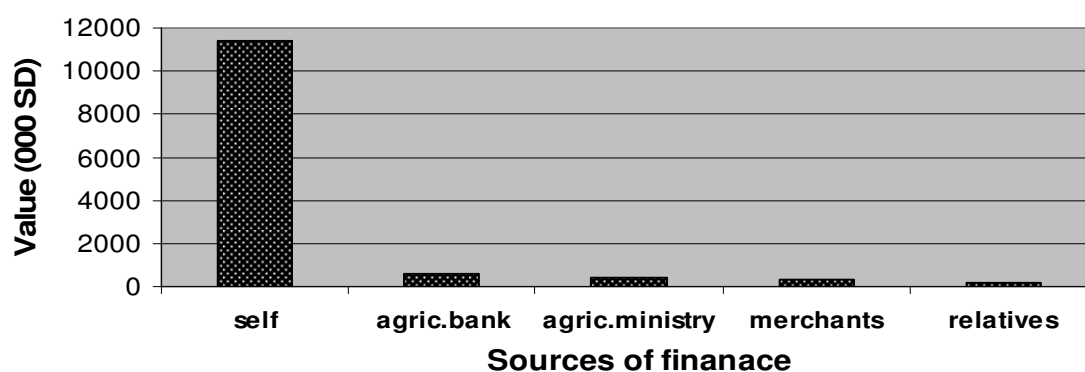
Balanced period

The balanced period is considered as a second period, in the area of study. It lies on the dead season from August to November. In this period, the farmers depend on their saved money or/and stored crops from the previous period to continue expenditure for household consumption. The major characteristic of this period is

Table 2. Distribution of main food crop quantities for the surveyed tenants.

Crop	Production (kg/fed)	A. Harvest sale (kg)	H.H consumption (kg)	Seeds of next season (kg)	Future sale (kg)
Wheat	2461.5	1554.48	181.44	336.96	388.62
Faba bean	1739.7	1161.36	100.8	187.2	290.34
Chickpea	387	291.6	8.82	16.38	72.9
Dry bean	1080	720	63	117	180
Onions	4820.4	3568.32	126	234	892.08
Spices	2999.7	2999.7	-	-	-
Vegetables	1491.78	1480.89	10.89	-	-
Sorghum	4072.5	2422.8	365.4	698.6	605.7
Maize	1845	1080	173.25	321.75	270
Potatoes	4000	4000	-	-	-
Fodder	3550	-	3350	-	-

The prevailed sources of finance according to Elzeidab surveyed tenants in '000 SD'

**Figure 1.** Prevailed sources of finance in Elzeidab scheme.

that the cash inflow and out flow balance is usually negative and the farm activities continue to be idle. Thus, the farmers in this period plan more than work. They devote 32% of the stored amounts as seeds for the next season and 26% for household consumption, while the future sale quantities were found to be 42% as illustrated in Table 2.

Deficit period

The deficit period starts from the beginning of December and continues to the end of March. In this period, farmers continue expenditure in two main items namely, establishment of farm crops and household consumption. The farmers in this period always suffer shortage of money due to the expenditure of the remaining saved money or/and stored crops, on one hand; and on the other hand, the commodities required for household

consumption. The major characteristics of this period are absence of cash inflow and high expenditures than the other previous period, and shortage of farm operation requirements affecting crop productivity. The farmers depend on credit for meeting their immediate cash needs for different agriculture operation, as well as for household consumption. In this period most of the farmers depend on their own source (sale of assets and animals) to finance their crops. The other sources of credit include "Shail" system and governmental institutions (that is, State Ministry of Agriculture and Agricultural Bank of Sudan) (Figure 1).

Yield and yield gap of main food crops in the scheme

To achieve socio-economic development objectives in a country well developed, effective and efficient agricultural credit system is needed. Finance is an instrument that

Table 3. Average farm area, yield and production of seasonal crops of surveyed tenants in the scheme as compared with ARTC yields.

Crops	Yield (kg/fed)	ARTC yield (kg/fed)	Yield gap (%)
Wheat	676	2000	66
Faba bean	489	1500	67
Chick pea	414	1250	67
Dry bean	54	12000	55
Onions	2880	1200	76
Spices	63	Na	Na
Vegetables	1853	10000	81
Sorghum	1005	1700	41
Maize	855	1700	50
Potato	4000	10000	60
Fodder	4000	2000	80

Table 4. Average value by different financial sources in RNS.

Source of finance	Average value '000' SD	Time of received	Time of repayment	No. of tenants	Tenants (%)
Self-finance	2.379	-	-	55	93
ABS	6000	Nov.	May	01	01.4
MAS	400	Dec.	April	01	01.4
Merchant	170	Nov.	April	02	02.8
Relatives	150	Oct.	April	01	01.4

simplifies the temporary transfer of purchasing power from one individual or institution to another. However, credit provides the base for increased productivity through specialization of function (Babiker, 2002). The crop combination adopted by the scheme's tenants is illustrated in Table 3.

From Table 3 the average crop yields achieved by Elzeidab surveyed tenants were generally low when compared to research yields reported by the Agricultural Research Corporation (ARC).

Yield gaps of 47 and 81% apply for dry bean and vegetable crops, respectively, indicating that much potential gap exists in increasing the scheme's yields of seasonal crops.

Current situation of agricultural finance in area of study

The research unveiled that formal finance in the River Nile State usually comes from Agricultural Bank of Sudan and State Ministry of Agriculture. The form of finance is often in kind with small percentage in cash. Formal finance can be described as insufficient to meet the actual cost requirements for farm operations. On the other hand, the informal finance is regarded as main sources of financing the main food crops in the study area (Table 4 and Figure 2).

Table 4 illustrates that 93% of surveyed tenants have to depend on their own resources of about SD 2379 for a farm, while the other informal financing sources represented 2.8% from village merchants (about SD 170,000) and 1.4% for relatives (SD 50,000). The study revealed that both of the formal sources of finance mentioned above provided means for only a small percentage (1.4%) of the total respondents. The average value provided by ABS and MAS were found to be SD 600,000 and SD 400,000 respectively, as illustrated in Figure 3.

In formal finance of main field crops the ABS and agricultural ministry, a small number of farmers received physical inputs (that is, fuel, seeds, land preparation, harvesting etc). A large number of farmers were unable to buy these inputs at the proper time and with reasonable price to capture the season because of lack of funding. Thus, a valuable opportunity will pass under knees of farmers to obtain food crop harvests and their returns.

Finance of perennial crops in Elzeidab scheme

Historically, most of the perennial crops have been farmed in the RNS for hundreds of years ago. They provide options for income diversification and pathways out of poverty. Many Studies consistently show that the

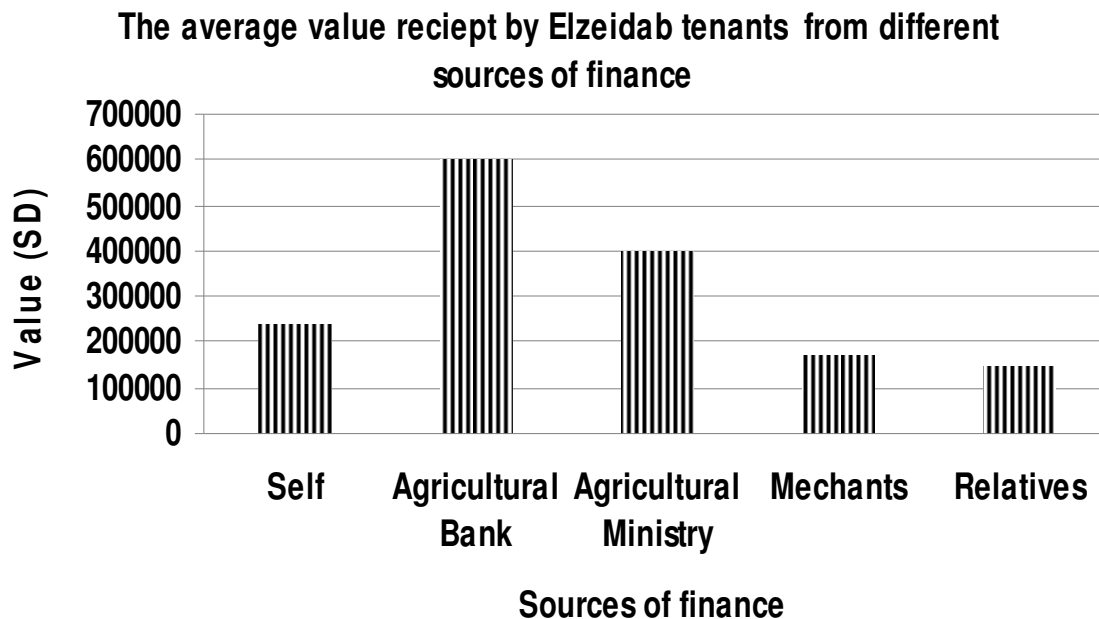


Figure 2. Average value provided by the main financial sources.

Percentage share of the operation cost items for Elzeidab perennial crops in season 2005/2006

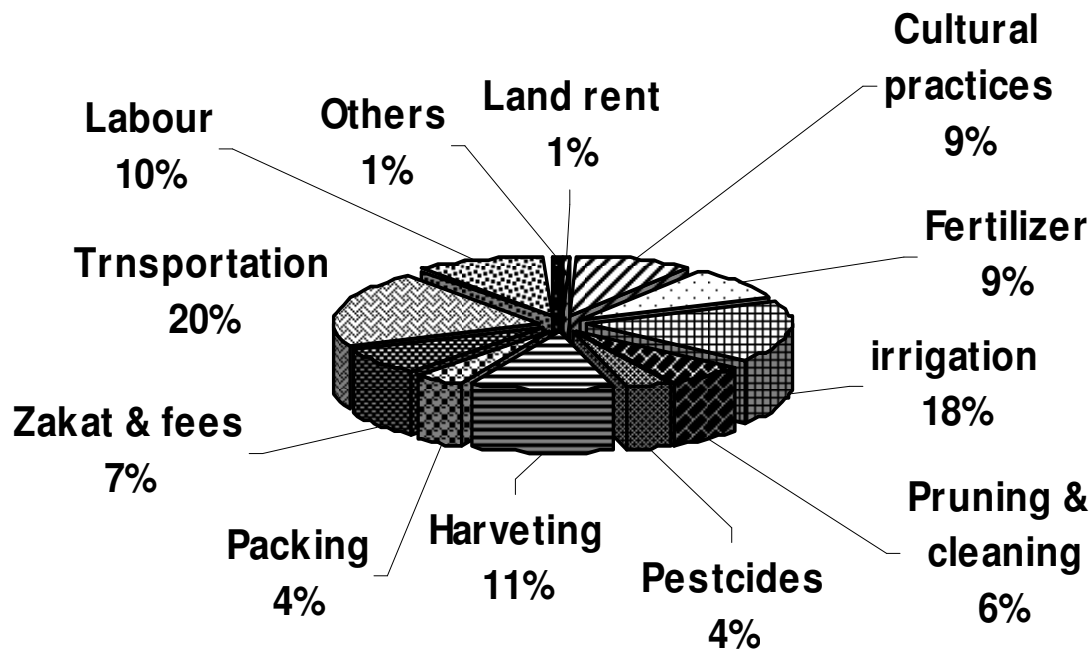


Figure 3. Percentage shares of the variable cost items for the perennial crops.

ratio of benefits to costs for fruit and vegetable crops is two times higher than the corresponding ratio for predominant cereals and pulses. Perennial crops in RNS

are well-established and economically important products that make significant contribution to livelihoods in the irrigated farming systems (Figure 3). They include citrus,es,

Table 5. Total variable costs of the perennial crops produced in Elzeidab scheme for the surveyed tenants, season 2005/2006 (SD/fed).

Crops	Date	Citrus	Mango	Guava	Alfalfa
Items					
Total variable cost	139224.49	311704.4	203119.99	158506	147549.14

Table 6. Distribution of income sources of Elzeidab tenants'.

Source of farm income	Value (SD)	Percentage	Total (%)
Seasonal crops returns	437528.7	32	
Perennial crops returns	786154.2	56	
Livestock returns	158333.3	12	
Total average farm income	1382016.02	100	64
Total average off-farm income	639230.77		36
Total average income of tenants	2021246.79		100

Table 7. Distribution of sources of off-farm income for surveyed tenants.

Source of off-farm income	No. of tenants	Value (SD)
Formal job	13	430461.54
Trading	3	573333.33
Private work	7	1392857.1
Remittances	1	389000
Other	2	195000

mango, guavas, date palm and alfalfa crops. A major obstacle to expanding and realizing the potential of perennial crops is the high cost of establishing new plantations and the recurrent cost of financing crops for the four to five years that are generally required before yields and revenues become significant. For the small, poor farmer, these costs may be beyond reach and not sustainable without external subsidies or other support from chain partners. The surveyed tenants of the scheme reported that the formal financial system was absent, and they depend on their resources totally for financing their crops by high amount of money as mentioned in Table 5 and Figure 3.

Income sources of the surveyed tenants

Farmers may receive income from many sources, but the most common source is the sale of produced crops and livestock and other products raised or bought for resale. Off-farm income is still one of the principal options for Elzeidab tenants to meet their farm and household expenditures. Farm income under study reflects the economic status of Elzeidab surveyed tenants.

The average total farm income was assessed as a

summation of farm incomes from different farm activities and off-farm income from different sources. The results showed that the surveyed tenants seek off-farm opportunities due to their weak capabilities to face expenditure requirements of production seasons in addition to their household expenditures. Furthermore, the returns of agricultural activities became insufficient to cover the basic needs of their lives.

The main off-farm sources in study area are mainly remittances and contributions of the family members, formal employment, trade, and other off-farm private activities as mentioned in Table 6. The results in Table 6 revealed that 37.5% of Elzeidab tenants earned off-farm income besides their farm income, while 62.5 of the total surveyed tenants relied only on the farm returns. The average annual off-farm income was found to be SD 639231 representing 36% of the total tenant's incomes. Table 7 shows the detailed sources of off-farm incomes. The table also shows that the tenant's private work had the highest value. On the other hand, the farm income distribution depicted in Figure 4 shows three main sources, namely seasonal crops, perennial crops and livestock. The shares of the these sources were respectively 56, 32, and 12%, while the total annual farm income gained by the tenants was SD 1382016

Main sources of farm income for Elzeidab surveyed tenants

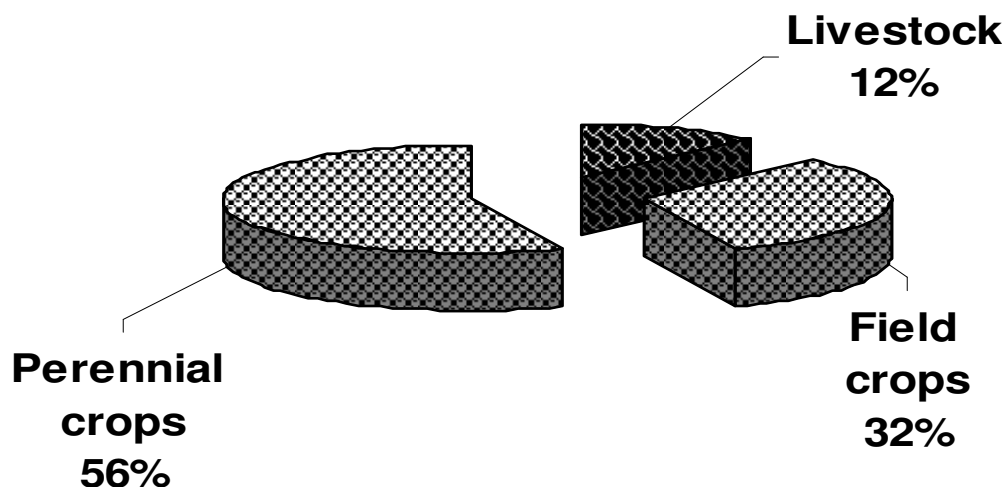


Figure 4. Distribution of farm income sources for the surveyed tenants.

forming 64% of total income of tenants.

CONCLUSION AND POLICY IMPLICATION

This paper explore some of the findings of the field survey for Elzeidab area in RNS, and it described role of agricultural finance for producing main food crops in the public irrigated schemes of the River Nile State and conclusion drawn obtained from numerous analytical tools found that:

- 1) The farmers in the area of study usually pass through different stages to achieve their harvests indicating irrationally allocation of their time and resources due to lack of awareness about investing in dead season and saving behavior.
- 2) The financial capacities of tenants were very low returns and they affected their saving and the production of food crops.
- 3) Most of the crops under study are usually sold immediately after harvest at very low farm gate prices; the reason that obliged farmers to sell immediately after harvest is the need for cash.
- 4) Yields of the food crops in the area of study were lower when compared with average research yields.
- 5) Perennial crops in RNS are well-established and economically important products. A major obstacle to expanding and realizing the potential of perennial crops is the high cost of establishing new plantations and the recurrent cost of financing crops for the four to five years that are generally required before yields and revenues become significant particularly for small poor farmers. Furthermore the finance for these crops is absent in the

area of study.

6) Very low income characterizes the majority of field food crops and they achieved only 32% of the farm.

7) Off-farm income was very important source for the surveyed tenants to improve their livelihood that 37.5% of Elzeidab tenants earned off-farm income besides their farm income.

8) Self-finance is regarded as the main source of agricultural finance in River Nile State and 93% of the surveyed tenants depend on their own resources.

9) The unavailability of formal finance and limited informal finance as well as high cost of food crops production usually decreases yield and farmers' returns.

Accordingly, the study proposed the following recommendations:

- 1) Collaboration of farmers' union, lending institutions and the state should plan agricultural finance to increase the abilities of the small poor farmers at low interest rate, easy terms of repayment, simple procedures in obtaining credit and encouragement of effective use of loans by the farmers.
- 2) Relevant policies may include reducing production costs or interventions to purchase them at reasonable prices and providing agricultural finance through an easy mechanism to enhancing farmers for achieving harvests.
- 3) Raising the tenant's awareness that saving will enable the tenants to improve their resources use and significantly increase their farm returns.
- 4) Application of Islamic financial system in agricultural credit can be preferred due to its low transaction cost and characterized as joint account in cost and profit (that is, '*mudarbat*', '*musharakat*'). However, '*selem*' also can

greatly handle the credit market as Islamic mode because it can be acceptable price (market price) and in case of season failure, it provides compensation; while it prevents the loan of credit institution at the same time.

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