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## RESEARCH ARTICLE

### DARFUR AGRICULTURE FROM SELF-RELIANT TO ECONOMIC CASH CROPS PRODUCTION AT JEBEL MARRA RURAL DEVELOPMENT PROJECT (JMRDP) CENTRAL DARFUR STATE-SUDAN

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#### ABSTRACT

The study was conducted between the period of 2012-2015 to identify the progress and promotion of rural development activities mainly in major vegetable crops production. And how much forwards rural community encourage for participation and decision making in the adoption and diffusion of agricultural innovations. It was conducted at Jebel Marra Rural Development Project Central Darfur State, Sudan. Random sampling method was carried out to select 200 respondents from three sectors Zalingei, Wadialih is one of the study districts and Nyertete. Data were collected by face-to-face interviews using structured questionnaire and observation during frequent field surveys visits. Frequency distribution and percentage were used for data analysis. Furthermore statistical packages for social sciences (SPSS) used. The study findings indicated that agricultural innovations awareness was diffused out, while there is new open areas were expanded and working tools were introduced and well developed as well as in comparison with the previous ones. It is also revealed that there are well educated people involved in the agriculture work with professionalism at practices and deal with the new innovations adopted. The study proposed these recommendations to encouraging rural community to work in agricultural sector and to make the rural areas more attractive. These including provision of incentives like subsidies agricultural inputs, banking facilities and extension services, technical education, vocational skills training, to equip rural community with agricultural skills and knowledge, both the public and private sectors may establish small rural industries depending on available agricultural products as a raw materials to absorb the rural people exactly women in the workforce.

#### INTRODUCTION

Great Darfur region has engulfed with violence over the past 30 years with deferent reasons both natural and manmade. This current crisis refers to February 2003 escalating into open rebellions base with Sudan Government. In December 2013, the fighting has left 3.5 million Darfur community is under humanitarian assistance coverage, including two million internally displaced persons (IDPs). Intensified conflict in 2013 had added 300,000 people to the IDPs ranks. Analyses of this violence generally characterize it as an inevitable clash between farmers and herders from different ethnic groups in the face of diminishing natural resources. But it is a historical point of view nowadays is not a core of problems with both of them. Basically absence of development and new comer's boarder wide sharing in to the region convenes in the present crisis from different neighboring countries. Climate change is thought to have greatly exacerbated this tensions after the desert and desertification affect widely, the northern part of the

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Region force create mass community mobilized in to other regions mostly settled in Mowielhi and Abuzeid camp at Omdurman area (1985/84). However, few studies discuss the role that agricultural changes has played in steering Darfur's conflict. This paper, based on research carried out in Central Darfur State During the period of 2012-2015, examines on: \* changes in agricultural practices, land rights, and land use; \* the ways that these changes have affected traditional multiple and overlapping land use rights, mutual interdependence of different agricultural production systems, and local-level conflict-resolution institutions; \* the links to violence; and \* the policy implications of the foregoing factors. \* Animal routes from north to south, and \* community mobilization affects internal or external movement. Traditionally, people in Darfur engaged in subsistence agriculture, either small-scale, shifting crops cultivation or agro-pastoralist (livestock herding, which the herders usually couple with cultivation when they move with their animals northwards during the rainy season and vice verses in dry season), with different ethnic and tribal groups specializing in different activities.

#### Land right and usage

Therefore below 1970s, land was usually plentiful, and rights to use it were usually non-exclusive, with various overlapping

rights and non-permanent land use as the norms. Different groups of users succeeded each other in different seasons. These arrangements allowed farmers and herders to exchange production inputs and other profits, with manure from pastoralists 'herds fertilizing the soil, and farmers 'crop residues providing livestock feed after crops harvest period which is called (Eltaloga) it means the freedom of animals to move around within the pasture area after harvesting of rainy season crop in Darfur without the guidance of the definite animal routes. The different groups largely lived in a cooperative manner to share their mutual advantage. Tribal leaders allocated land use rights according to need, and plots reverted to common property status when users abandoned them.

This peaceful, symbiotic system has undergone sweeping changes over the past 40 years. The polarization between agro-pastoral livestock herding and sedentary agriculture is a major factor in the conflict in Darfur; before (1984) ethnic and tribal groups that once cooperated peacefully are now pitted against one another due to the changes occurred in Darfur. Shifting crops cultivation has given way to settled farming that includes both staple and cash-crops production along with settled herding. The shift to settled, year-round farming stemmed in part from an effort to boost agricultural production in response to periodic droughts. These changes have blurred traditional lines between farming and herding. Land rights are now exclusive, with permanent land use and individual ownership. Land acquisition is determined by the market and inheritance, rather than by tribal leaders, as in the past with less number of people and animals. Grazing land and crops residues are no longer common property. Farming and herding no longer exchange crops residues and manure, and group interdependence has collapsed. Because of the diminishing of land cropped with durra and millet. Competition has replaced cooperation, and relationships between different resource users have become violent. Number of population and animals increased which is basically come out with competition phenomenon.

### Historical View of Darfur

This evolution of Darfur's agriculture has taken place in a context of limited economic opportunities off the farm, marginalization of the region generally, and climate variability. Both the British colonial administration (1916–1956) and the government of independent Sudan in (1956) to the present have neglected Darfur. Between 1958 and 2003, the international community provided \$13.4bn in development aid to Sudan, but only 2% went to Darfur, although the region was home to about 17% of Sudan's population prior to the independence of South Sudan. The context of this neglect is an overall allocation of public resources that favors security at the expense of development: In 2012, more than 76% of the government budget went to security expenditures.<sup>5</sup> Exclusion from the agricultural system—the principal source of livelihoods, social and political anchor of life in Darfur—could lead to destitution. Since 1972, the region has experienced 16 drought years, with a severe famine from 1983 to 1985 defined as (Ash Ragan Famine) and 1988 to 1989 called Food Gap Famine. Not to forgotten tribal conflict within 1987/89 ended by Elfasher (is the name of the head of North Darfur State base of Darfur Sultanate) agreement in July 1989 and Nyala

Comprehensive Security Conference 1997 the outcomes of recommendation was not progressed at the grassroots level to adopt and implement. Economic and ecological deprivation has resulted in tensions and a deepening sense of grievance and despair, which in turn are often expressed with violence. Furthermore what mentioned above one day new culture and opinion may appear due to long settled in IDPs camp and inherit of generation by the time factor with what they learn around.

### Indigenous Types of Onion Varieties in Darfur and the Sudan

#### Varieties

- Foria, Falatia in (Darfur) and kosti, sigau red and Kamlean yellow all over the Sudan.
- Seed rate per feddan: approximately reach 10- 12 retool / Feddan = 4200 m<sup>2</sup> (60/70 m)
- Growing Date: of before is 15 October to 15 November, but now due to climate changes it is change to end of August and 15 of September and December to 15 January for the storage purposes in May to end of July before the rainy season start (for Zalingei Area).
- Irrigation System: around 4-7 days according to time of growing and type of the soil.
- Fertilizers used: 70 kg per feddan for phosphate and 50kg for urea two times with interval period of time 30 days per each.

#### Recommended not to grow after the following types of vegetables

Potato, sweet potato, Okra and Onion itself, but accepted if it is grown after the off land in the same time according to the crop rotation system followed (Performance Report of JMRDP, 1991/98).

#### Onion as a major economic crop

Onion history of production at Great Darfur if Compare with Khartoum State Khartoum State ranks top among other states in Sudan regarding to production and consumption of vegetables that relates to the higher increase in population growth, income level and nutritional awareness (Mohammed, 2005). The common onion (*Allium cepa* L.) is one of the most popular and important vegetable crops worldwide. Onion production and consumption are steadily increasing globally (Hassan, 2008).

In the Sudan onion is also one of the most important vegetables that cultivated in about 33 percent of the total area vegetables cultivated. About 273,000 bulbs are produced each year, representing about 25 percent of the country's total vegetable production (Dawelbeit (Arabic Sudanese name) et al., 2010). Onion is produced in almost all regions in the Sudan with the exception of the southern region (Abdul-Aziz, 2008). An estimated area of about 199,920 feddan (1 feddan = 0.4ha) is grown annually during different three periods. The main season is the winter, the period of October–April, for market, limited dehydration and export. Another farmer group grows onion as an early crop, during June–January period. Third farmer group grows onion as late crop during November–June for storage (Hassan, 2008).

**The endogenous crops production in Darfur**

The popular main ones are durra, melt, Sudanese ground net and Sesame grown in rainy season but the irrigated ones are onion potato and okra. Now the introduce beans as third cash crop after Onion and potato. In addition to other fresh used vegetable crops like carrot and radish. Before the JMRDP was introduced the concepts that modulated the agricultural ideas and adoption of agricultural innovation techniques the some crops practices was classified as women role to play men not responsible for that. But form 2000 up to date all the cash crops was followed in wide range by men, due to the high agricultural cost.

**Advantages of Traditional Methods over Modern Methods of Agriculture**

- Traditional farming tolerated the unpredictable environment better than modern farming that relies heavily on modern procedures and equipment.
- Traditional farming may yield less, but there is sufficient quality attached to its yield. On the other hand, modern farming may fall short of quality as far as its yield is concerned thanks to the overuse of the modern and technological equipment in its processes and procedures.
- Traditional farming needs great amount of labor and hence, the job opportunities provided to laborers are more. On the other hand, modern farming does not need great amount of labor since the machines take care of everything.
- During the harvest methods used to select the next season seeds.

**Advantages of Modern Methods over Traditional Methods of Agriculture**

- Modern farming methods are done a lot quickly which brings in more profit for farmers.
- Modern, artificially-selected breeds are efficient converters of management inputs to higher production.
- Optimal use of resources in general.

**The well known animal route organize by traditional leader’s norms**

Official 9 animal routes cross Great Darfur from North to South 5 route at the Eastern side of Jebel Marra and 4 at the Western side. The major 4 crossed the long main road Nyala, Zalingei Elgeneina is (Head of West Darfur State) in the cross points: al these are local Arabic names of villages in Central Darfur State at West Jebel Marra as Koramla in Fogodigkoh,

Ajicarray North junction at junction at wadi Azoum valley North Zalingei. The width of animals route agreed to be 1km and in the nearest agricultural land to minimize in to half of km from North to South border wide. The Jebel Marra Area as Horticultural zone was neglected for it economic point of view and it is a profit and value for all citizens as general.

**MATEIALS AND METHODS**

The study was conducted Jebel Marra Rural Development Project Central Darfur State- Sudan. The total area of Jebel Marra is estimated to be about 2000km2. jebel Marra area was considered and documented in many reports (FAO, 1968 Mohamed, 1997 and Adam,1998) which is rich in diversity with climate, soil, crops and animals (Abduelaziz, 2014). The high massif of mountains modifies its climate and increases the amount of participation, particularly on western slopes. Rainfall normally occurs during may- September with more than 60% of the rain occurring July- August reached about 800-1000mm/year. With very limit variation in the amount of the annual rainfalls. Temperature decreases by approximately 6 C per 1000metres rise (FAO1968). The average maximum temperature is about 30C while the minimum is around 6 C (Mohamed1997). The importance of Jebel Marra from an ecological and tourism view in addition to the great potential resources equipped which makes it a rich area for further studies and development opportunities. Primary data were collected with face-to-face interviews by using a pretested questionnaire and observation. The Secondary data was obtained from the relevant sources of information’s.

The collected data were analyzed in form of percentages, Liker scale, chi-square and correlation. Grassroots participation was used to defined, and seek the impact of it relation on the adoption and diffusion of the improved onion seeds at the JMRDP Area among settled permanently IDPs or at least for the last twelve’s years in their camps and still holding the previous skills practiced the same worked. And Great Darfur is about 549000 km2 with the size of the population approximately eight million (Dosa, (Sudanese Author Name) 2013).

**Sample size and data collection**

To progress the study achievements the whole area were divided in to three categories mainly: Zalingei, Wadisalih and Nyertete which they are mostly internally displacement persons (IDPs) Camps temporary. Approximately 2000 farmers in the State level practices agricultural activities, so the study targeted

**Distribution of respondents according to their sex, age, education level, marital status, land ownership and types of work (N=200)**

| Sex            | F   | %    | Age            | F  | %    | Education  | F   | %    |
|----------------|-----|------|----------------|----|------|------------|-----|------|
| Male           | 145 | 72.5 | 18-25          | 20 | 10   | illiterate | 24  | 12   |
| Female         | 55  | 27.5 | 26-33          | 50 | 25   | khalwa     | 54  | 27   |
|                |     |      | 34-41          | 49 | 24   | formal     | 77  | 38.5 |
|                |     |      | 42-49          | 42 | 21   | university | 42  | 21   |
|                |     |      | Above50        | 39 | 19   | post       | 3   | 1.5  |
| Marital status |     |      | Land ownership |    |      | Work type  |     |      |
| single         | 33  | 16.5 | owner          | 89 | 44.5 | farmer     | 126 | 63   |
| married        | 156 | 75   | rent           | 91 | 45.5 | Trading    | 9   | 4.5  |
| divorced       | 6   | 3    | grand          | 2  | 1    | Industry   | 5   | 2.5  |
| widowed        | 9   | 4.5  | Crop share     | 18 | 9    | handicraft | 3   | 1.5  |
| husband abse=  | 2   | 1    |                |    |      | employee   | 57  | 28.5 |

Source: field survey

10% for sample size to enable distribution of the structured questionnaire form for 200 farmers by accidental random selection and geographically directed. Field survey, observations and face to face contact with farmers were covered.

### Data analysis

The data collected by the questionnaire were treated and analyzed using statistical packages for social sciences (SPSS), joint with frequency table's repeatability percentages. With full discussion for the study results appearing the fruitful means.

## RESULTS AND DISCUSSION

The revealed that 2/3 were men well committed with onion growing more than women with the proportion of 72.5% mostly official educated by 61% and married with 75%. But on the lease system of land due to their presence in IDPs Camp far from the home land or origin (displaced). The targeted population was farmers with 63% and employee by 28.5% practice farming due to the situation changes.

### Conclusion

On the stand of the previous base of the JMRDP as historical points of view to understand what the achievements was fulfilled in the field of farms development. Ways brought to the attention of the agricultural producers it appears that these have chosen the increase in crop production as means for development. Established of network of (60) extension assistant, within the potential 1200 farm families. Distribution 200,000 seedlings annually within agro-forestry activities in (1989) followed with provision, installation and credit services on small irrigation pumps and wells. Feeder road improvement and maintenance in difficult areas to link the active adaptive research programme on both rains fed and irrigated crops. Choice which is influenced by the legal status of the farms studied men and women competition in Onion growing before 1980 it is generally practice by women only but after the skills learned with JMRDP was introduced the idea of cash crop and onion raise as a major choice within the vegetables. Simultaneously with the production increase the agricultural producers subsequently consider the increase in farm size as means for development, having a percentage of 72,5 % for men proportion and women with 27,5 %.

Although the choice of increasing the farm size is not affected by the legal status of the farms studied, but the changes of situation during the displacement period since (2003). People from different villages exchange experiences during present time in camps and still search for the daily livelihoods activities mainly in agriculture. The agricultural producers wish to increase crop production of their farms by increasing the farm surface besides applying other crop technologies like potato and beans. The popular main ones are durra, melt, Sudanese ground net and sesame grown in rainy season but the irrigated ones are onion potato and okra. Now the introduce beans as third cash crop after Onion and potato. In addition to other fresh used vegetable crops like carrot and radish.

Before the JMRDP was introduced the concepts that modulated the agricultural ideas and adoption of agricultural innovations techniques the some crops practices was classified as women worked and role to play, but men not responsible for that as a culture. Form 2000 up to date all the cash crops was followed in wide range by men, due to the high agricultural cost and inputs facilities.

### Recommendations

- Concrete wells were requested with priority to add or fix.
- Agricultural inputs to be adapt locally.
- Irrigation facilities and accessories (engines and pips).
- Funding possibilities like lawns during cultivation seasons.
- Marketing skills and value chain edit for the products further studies to address.

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