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Full Length Research Paper

An assessment of Fadama dry Season farming through small scale irrigation system in Jalingo LGA, Taraba state

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Dependence on rainfall represents a major constraint on agricultural productivity and rural poverty reduction in Taraba State. The vulnerability of rural people remains considerable owing to a combination of highly variable and erratic precipitation and poor development of hydraulic infrastructure. The high water resources in Jalingo Local Government Area offer great potential for irrigation, especially using simple and inexpensive technologies. Using the livelihood conceptual framework, this paper examines the activities of small scale (fadama) farmers in Jalingo LGA highlighting the factors that inhibit the sustainable small scale irrigation initiatives in the area. Structured questionnaire and participative rural appraisal method were used in generating information during field survey. The result of the findings shows that the increasing production of crops such as vegetables, sugarcane and maize in the study area has not only helped the town secure employment and livelihood opportunity for its citizen, but has also enhanced greatly the income of farmers and those involved in their trade. However, inaccessibility to irrigation farmland, fertilizer, capital and pesticides are the greatest challenges to sustainable small scale irrigation in the study area. This study recommends the need for government intervention by way of assisting the farmers with the necessary farm inputs. It also recommends the need to integrate irrigation farming into the State's poverty alleviation programme.

Keyword: Challenge, Climate Change, Development and Irrigation.

INTRODUCTION

Access to irrigation water is the key to reduce the impacts of climate variability and change on food security and regional economies. Irrigation farming is one of the most important rural development investments that can have both direct and indirect impacts on poverty and food security in semi-arid tropical countries (IFPRI, 2002; Bhattarai and Narayanamoorthy, 2004). At the moment, climate change represents an additional challenge to rainfed farming in Taraba State and a further reason for investment in irrigation farming. In view of their limited adaptive capacity, smallholder farmers, and pastoralists are among the most vulnerable to the impact of climate change. Dependence on rain fall represents a major constraint on agricultural productivity and rural poverty reduction in Taraba State. The vulnerability of rural people remains considerable owing to a combination of cultural and poor development of hydraulic infrastructure. Without investment in irrigation, it will be difficult to increase food production, reduce the financial burden of agricultural food imports and increase food security in the country. The lack of investment in irrigation contributes to the expansion of rainfed agriculture on to marginal lands with uncertain rainfall. This is forcing millions of impoverished people to farm in ecologically fragile areas. Without adequate capital, farmers have little incentive to invest in quality seed and inputs. The high water resources in Jalingo LGA offer great potential for irrigation, especially using simple and inexpensive technologies. Hence, there is need to assess whether or not irrigation farming forms a significant proportion of the farmers income to create strong reliance on it as a source of livelihood, or whether it is merely a supplement to other important income sources. The contention of this paper is that, irrigation is unfortunately neglected and that improved irrigation farming could significantly contribute to the reduction of urban and rural poverty and enhance

adaptability to climate change in the study area. Even though irrigation is both labour and time demanding, it can potentially contribute significantly to local and regional food security, which in a world of higher food prices and reduced food aid assumes large importance. This paper therefore examines the activities of small scale (fadama) farmers in Jalingo LGA highlighting the factors that inhibit the sustainable small scale irrigation initiatives in the area.

Conceptual Framework

The conceptual framework guiding this study is the body of work known as the livelihoods approach or framework (Scoones, 1998; Bebbington, 1999; Carney et al, 1999; Ellis and Freeman, 2005). A livelihood comprised of the capabilities, assets (including both material and social resources) and activities required to make a living (Chambers and Conway, 1992). Livelihoods are based on income (in cash, kind, or services) obtained from employment, and from remuneration through assets and entitlements. Different members of a household engage in different types of livelihood activities and each household member above a certain age attempts to procure different sources of food, fuel, animal fodder and cash; these sources are likely to vary according to the month of the year. In water sector, livelihoods analysis is essential because it assesses gains and losses of the rural or urban poor from irrigation activities (Lankford, 2005). It improves the knowledge of the context from the local level upwards and helps to analyse opportunities and constraints of the rural or urban poor to benefit from the changes within the given context (Nicol, 2000). It helps to identify what options have better potential to reduce poverty within the given context and what enabling conditions, policies and incentives are needed for the poor to increase the range of better livelihood options (Scoones, 1998; Ellis, 2000; Moriarty et al, 2004; Lankford, 2005). Some of the distinctive features of the livelihoods framework are that it takes an 'all-round' view of people's means of gaining a living, including the social and institutional circumstances in which people's livelihoods are embedded. At the centre of the approach is a relationship between the assets or resources that people own or can obtain access to, including land, irrigation water, skills and education levels of family members, which are categorised as natural, human, social, financial and political capitals (Scoones, 1998; Nicol, 2000; Ellis and Freeman, 2005). The households utilise these assets in their productive activities in order to create income and satisfy their consumption needs, maintain their asset levels and invest in their future activities. The access to the assets is strongly influenced by the vulnerability context and policies and institutions.

METHODOLOGY

Data Collection

The data for this study was collected in stages. During the first stage of data collection, qualitative data were collected through observation and in-depth informal and guided interviews with flexible open-ended questions, supported by the Participatory Rural Appraisal (PRA) research methods (Grbich, 1999). The structured questionnaire, drafted on the basis of the collected qualitative data, was then pilot tested in order to improve the question wording, structure and content before the sample survey. Irrigation sites in Jalingo metropolis were surveyed to assess some of the general problems affecting irrigation development in the area and the potential factors that can enhance irrigation activities in the same area. During the field survey, the interview schedule were administered to the farmers on issues regarding to the potentials and problems of irrigation, the challenges and possible ways of improving the utilization of water in the area for irrigation farming. Eighty-six (86) structured interview schedules were administered to the small scale irrigation farmers in the study area. The interview schedule was randomly administered to the irrigation farmers sighted during the field survey to the irrigation sites in the study area. Formal interviews of officials of relevant agencies responsible for irrigation development in the state were carried out. The frequency counts and item analysis method were used to analyse the data collected. The number and percentage of respondent's response was computed, after which the respondent's response were tallied and a comparison was made of the individual items of high and low response. Tables were used in data presentation.

Description of Study area

Jalingo LGA is roughly located between latitudes $8^{o}47'$ to $9^{o}01'$N and longitudes $11^{o}09'$ to $11^{o}30'$E. It is bounded to the North by Lau LGA, to the East by Yorro LGA, to the south and West by Ardo Kola LGA (Figure 1). It has a total land area of about 195.071 km^2. Jalingo LGA has a population of 139,845 people according to the 2006 population census, with a projected growth rate of 3% (Shawulu *et al*, 2008). Presently, it has a projected population (2010) of 156,606 based on the 2006 population census figure of 139,845 at 2.83% annual growth rate. The LGA has 10 wards (Turaki 'A', Turaki 'B', Sintah 'A', Sintah 'B', Majidadi, Sarkin Dawaki, Kachalla Sembe, Barade, Kona and Yelwa). The major ethnic groups of Jalingo LGA are the Fulani, Jibu Kona and Mumuye. Other ethnic groups include Hausa, Jenjo, Wurkum and Nyandang. Hausa language is widely

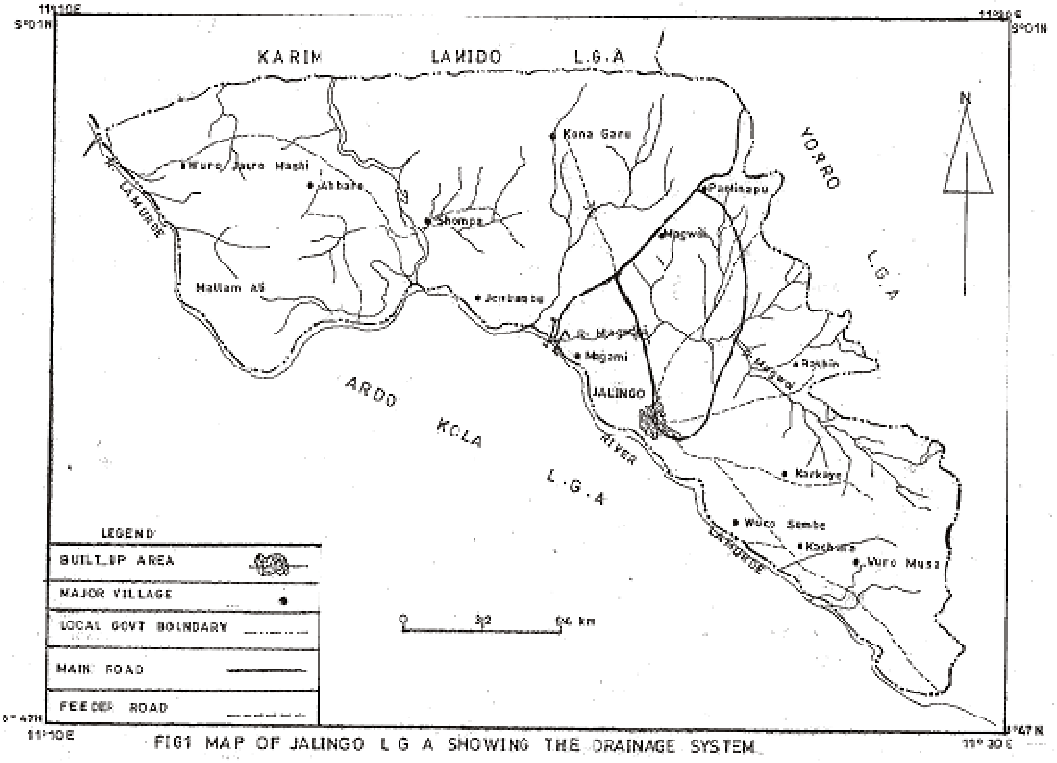

Figure 1. Study area: Jalingo Local Government Area Showing the Drainage System

spoken as a medium of communication for social and economic interactions (Oruonye and Abbas, 2010).

Jalingo LGA is underlain by basement complex rocks. The outcrop of this rock could be seen in the heart of Jalingo town popularly referred to as the Jalingo hill. Quartz, mica and feldspar crystals (in fairly equal proportion) are some of the constituent minerals that make up this rock. This rock is overlain by sandy-loam soil characterized by hydromorphic and ferruginous soils derived from the parent materials. Jalingo metropolis is drained by two rivers Mayogwoi and Lamurde which emptied there content into the Benue river system. The major ponds in Jalingo LGA are Vendu Nange, Vendu Ginnaji, Jeka Dafari, Wuro Sembe, Vendu Jodi and Vendu Lamurde. These ponds are potential sites of irrigation farming in the study area.

Jalingo LGA has tropical continental type of climate characterised by well marked wet and dry season. The wet season usually begins around late April and ends in October. The dry season begins in November and ends in March. The dry season is characterized by the prevalence of the northeast trade winds popularly known as the harmattan wind which is usually dry and dusty. Jalingo has a mean rainfall of about 1,200mm and annual mean temperature of about 29^{o}C. Relative humidity ranges between 60 – 70 per cent during the wet season to about 35 – 45 per cent in the dry season. Vegetationally, Jalingo is located within the northern guinea savanna zone characterized by grasses interspersed with tall trees and shrubs. Some of the trees include locust bean, sheabutter, eucalyptus, baobab and silk cotton tree.

RESULTS AND DISCUSSION

The result of the bio data analysis indicates a low level of education among the farmers, with 26.7% having no formal education, 39.5% with primary education and 19.8% with secondary education and 14% informal quaranic education. Most of the farmers are within the middle ages with 52.3% between the ages of 30 – 39years, 26.7% between 40 – 49 years and 20.9% between 50 -59 years. About 62.8% of these farmers are males, while 37.2% are females with a strong reliance on irrigation farming as source of income. The result also shows that 85% of the farmers interviewed were the Hausa's while 15% constitutes indigenous ethnic groups such as the Kona (6%), Mumuye (7%) and Jukun (2%).

The low level of education of majority of the farmers makes them lack basic knowledge of crop water requirement, irrigation scheduling and skills in maintaining and operating irrigation systems. These affect the productivity of the systems, as the crops are either over- or under irrigated, leading to wastages of the little available water and irrigation farmland.

Table 1. Problem affecting sustainable irrigation farming in the study area

S/NO	Problem of expansion of farmland	Percentage
1	Lack of capital, fertilizer and pesticides	26.7
2	Inaccessibility to land	22.1
3	Lack of capital	17.4
4	No response	15.1
5	Lack of sufficient water	8.1
6	Lack of farm inputs, fertilizer and chemicals	5.8
7	Lack of capital and govt. Support	4.7
	Total	100

Source: Field data, 2010

Table 2. Ways of encouraging irrigation farming in the study area

S/NO	Ways of encouraging irrigation	Percentage
1	Provision of capital and fertilizer	24.5
2	Construction of dam and provision of farm inputs	5.8
3	Provision of tractor, soft loans, fertilizer, pesticides	5.8
4	We don't depend on government for assistance	17.4
5	Govt. should partner with local farmers	12.8
6	Provision of capital and farm inputs	26.7
7	Drilling of boreholes and provision of water pump generators	7.0
	Total	100

Source: Field data, 2010

The result of the study finding shows that socio-economic factors especially those relating to capital, accessibility to irrigation farmland and farm inputs such as fertilizer, pesticide and improved seed variety are the most significant factors constraining sustainable small scale irrigation development in Jalingo LGA as shown in Table 1 above. The results indicate that farmers lack adequate start up capital and are often faced with problem of low stream flow, conveyance of water from source to farm site as well as sources of water drying up at the peak of the dry season.

The study findings also show that 73.3% of the respondent rent their irrigation farmland, 20.9% obtain their irrigation farmland on leasehold while only 5.8% owned their irrigation farmland. This goes further to show that the local natives have little interest in irrigation farming, while the Hausas are mostly the ones that engaged in irrigation farming. Since, the Hausa's are not indigenous to the area, the inaccessibility to irrigation farmland constitute a major problem to small scale irrigation development in the study area.

When the farmers were asked how they think the problems can be overcome and irrigation farming enhanced in the study area, their response ranges from provision of capital, fertilizer, pesticides, drilling of boreholes etc as shown in Table 2 above.

Irrigation farming is a very important economic activity in the study area as 54.7% of the farmers interviewed said that they are full time irrigation farmers, while 45.3% take irrigation farming as a part time activity to complement their other income sources. Most of the farmers (60.2%) plant crops twice a year under the irrigation farming system, while 22.4% and 17.4% plant once and thrice a year, respectively. When asked how they would rate irrigation farming as a source of livelihood, 29.1% rate it between 30 – 40% of their source of livelihood, while 36% rate it between 50 – 60% as shown in Table 3 below.

According to irrigation farmers interviewed, irrigation is a very rewarding socio-economic activity. Most of the farmers interviewed claimed that their income from irrigation farming in the study area ranges from US$1000 to US$1330 (N150,000 to N200,000) per annum on an average plots of 0.5 to 1 ha. The large scale irrigation farmers with average plots of 3ha make as much as US$13334 (N2,000000) per annum. Thus, the irrigation farmers income depends on the size of farmland and type of crops cultivated.

About 95% of the farmers interviewed claimed not to be getting any assistance or support from the government or its agencies. The study found that there are two agencies of the federal government; National Fadama III Programme and Upper Benue River Basin Development Authority who were involved in irrigation development in the State. Despite their existence, they have not made any appreciable impact on irrigation farming in the study area.

Table 3. How would you rate irrigation as your means of livelihood?

S/NO	Rating of irrigation by respondent	Percentage
1	30 – 40 %	29.1
2	50 – 60	36.0
3	60 – 70	14.0
4	70 % and above	20.9
	Total	100

Source: Field data, 2010

The commonest irrigation system used in the study area was surface irrigation. Water lift devices used included petrol, diesel and electric pumps and shadoof or buckets, depending on the scale of the farming activity. The sources of water included rivers and wells while the major crops were sugar cane, maize, cassava, tomatoes, onions, peppers, and vegetables. Fadama farming which, is defined as a typical form of small-scale irrigation practice, is characterised by flexibility of farming operations, low inputs requirements, high economic values, minimal social and environmental impacts, and, hence conforms to the general criteria of sustainable development. Falling water tables and the resulting increase in the energy needed to pump water will make the practice of irrigation more expensive, particularly when with drier conditions more water will be required per acre. While there is considerable potential for small scale (fadama) development especially in the numerous isolated fadama lands in the LGA's landscape, the current institutional problems, such as bureaucratic bottleneck, inconsistent government policy, overlapping and conflicting schedules, fuel scarcity, lack of access roads and non-recognition of fadama farmers' versatility, among others, tend to frustrate a sustainable fadama development in the area. The increasing production of crops such as vegetables, sugarcane and maize in the study area has not only helped the town secure employment and livelihood opportunity for its citizen, but has also enhanced greatly the income of farmers and those involved in their trade. The amelioration of these problems will enable the LGA to fully exploit it irrigation potentials. Hence, there is need for adaptation measures to support and sustain irrigation farming and to bring to minimum the impact of climate change by reducing the vulnerability of the agricultural crops. The adaptation to climate change will be carried out in various forms, which include technological innovations, changes in arable land, and changes in irrigation methods among others. Technological innovations include the creation of new cultivars and hybrids, which have higher productivity during changes in the climate. Farmers can start growing cultivars that are resistant to drought and diseases. Making irrigation land available to interested farmers, improve management; use and protection of water resources in irrigated agriculture can go a long way in increasing productivity in the study area.

CONCLUSION

Findings from the study show that climate change may be an issue for irrigation development in Jalingo Metropolis. This is more likely so because the town is located in an area with well defined wet and dry season and intermittent river flow. The sustainability of irrigation and rainfed farming systems is dependent on climate variability and their future viability may be threatened by climate change. Irrigation continues to be seen as promising avenue of public investment for solving problems of rural and urban unemployment, hunger, malnutrition and poverty. The results of the study shows that increasing public investment to provide irrigation plots to the farming community together with more favourable economic incentives such as soft loan and farm input provision might bring about the intended results of poverty reduction as well as increase food production in the study area.

RECOMMENDATION

Government, the private sector and other stakeholders must view irrigation development as a potential goldmine and consider an irrigation master plan to include;

i. Sustainable strategy for irrigated agriculture development in Jalingo LGA and Taraba State as a whole.

ii. Assessing the needs of water for irrigation of agricultural crops under climate changes and preparing long term projections for the required water resources to be used in agriculture.

iii. Encouraging the emergence of agro-allied industries such as sugar plant, flour mills and food canning industries in the LGA.

iv. Ensuring better management of soil moisture in the irrigation farming areas through efficient extension services.

v. Consider the inclusion of small scale irrigation development in the State's poverty alleviation programme.

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