Global Advanced Research Journal of Agricultural Science Vol. 1(5) pp. 117-122, July, 2012
Available online http://garj.org/garjas/index.htm

Full Length Research Paper

The Effect of *Fadama II* on Agro-Processing Among Farmers in Adamawa State, Nigeria

[1]Umar Adamu Madu and [2]John Phoa

1Faculty of Social Sciences, University Malaysia Sarawak.
2Department of Development Studies, Faculty of Social Sciences Research Fellow, Centre of Excellence in Rural Informatics (COERI) University of Sarawak, Malaysia (UNIMAS)

Accepted 03 July, 2012

The study examined the effect of Fadama II project on agro-processing among the benefitting communities in Adamawa State, Nigeria. Two hundred respondents comprising of Fadama II project beneficiaries and non-project beneficiaries outside Fadama II communities that matched were randomly selected from five Local Government Areas each. Based on propensity score matching (PSM) and double-difference estimator (DD), the data were analysed using simple statistical tool. To estimate the impact of the project, t-test analysis was used to determine the significant difference between the project participants and non-project participants. The results showed that the difference in quantity of processed products, price of processed products, amount realised from commercial processing and total income between the beneficiaries and non-beneficiaries were significant at p = 0.05. The paper recommends that much emphasis be laid on the importance agro-processing among the beneficiaries, the activities of the project be expanded to cover the whole state, other developmental project like food security project, ADP etc. should incorporate agro-processing into the mainstream of their activities as it has great potentials for poverty eradication.

Keywords: Agro-processing, *Fadama II* project, Beneficiaries, Non-beneficiaries, Income, Livelihood.

INTRODUCTION

Agriculture is the mainstay of most developing countries' livelihood especially in Nigeria. Unluckily, agriculture on its own is no longer able to provide a reliable livelihood for the growing populations in these countries (Mhazo, et al, 2003). Alternative or additional income generating opportunities are needed to support the millions of poor families who can no longer support their livelihoods from the land alone (Simalenga, 1996). Agro-processing, which is the process of turning primary agricultural products into other commodities has the potential to provide those opportunities. The overall potential of agro-processing is huge. It can reduce wastage, enhance food security, improve livelihoods for low-income groups and empower women. It is particularly important as it adds value to agricultural products which in turn translate into higher price and subsequently higher income. Processing not only increase the market value of produce, but also protect farmers from exposure to the price risks of unprocessed crops

In most developing countries like Nigeria, where 75% of the poor live in rural areas, agro-processing can play a deliberate role in pro-poor growth strategies, (Ekong, 2005). Because there are possibilities for income generation to be restricted in rural areas, rural non-farm earnings from trading, agro-processing, manufacturing, and service activities constitute a significant part of

*Corresponding Author Email: umaradamu24@yahoo.com; Tel: +60109625402

household income. For developing countries as a whole, non-farm earnings account for 30 to 45% of rural household income. They complement agricultural wages and serve household risk diversification and the evening out of consumption patterns. With low capital requirements and undemanding local marketing channels the rural non-farm economy offers opportunities for poor households (particularly women headed households), small-scale farmers and other smallholders, representing an important instrument for rural poverty alleviation (UNIDO, IFAD and FAO, 2008).*Fadama II*, which is the largest agricultural project in Nigeria, aims to increase income and access to food for the poor, by supporting small-scale, appropriate and sustainable processing businesses that are flexible, require little capital investment and can be carried out in the home without the need for sophisticated or expensive equipment.

By offering technical assistance, business advice, support and extension services, *Fadama II* has made a huge difference in the lives of its participants (NFDP II, 2007). This present study investigates the effect of the project on agro-processing and value addition among *Fadama II* communities in relation to the advisory services and productive assets acquired.

An Overview of Second National *Fadama* Development Project (*Fadama II*)

Second National *Fadama* Development Project (branded as *Fadama-II*) is a follow-up to the First National *Fadama* Development Project (*Fadama-I*), which was implemented during the period 1993-1999. *Fadama-I* focused mainly on crop production and largely ignored support of postproduction activities such as commodity processing, storage and marketing (downstream agricultural sector). The emphasis was on providing boreholes and pumps to crop farmers through simple credit arrangements aimed at boosting cumulative crop output (Nkonya *etal*, 2008). *Fadama I* worked with *Fadama* User Associations, which the states used mainly to recover loans and to decide on water infrastructure locations.

The design of *Fadama* I did not support rural infrastructure development and did not consider other resource users such as livestock producers, fisher-folk, pastoralists, and hunters, among others. The focus on crop producers contributed to increased conflicts among the users of *fadama* resource. Increased crop production increased the surplus, but the project did not support post-harvest technology, contributing to reduced crop prices and increased storage losses. And most importantly, it adopted top-down development approach or strategy.

Fadama II was first implemented in 2005 and operated in 12 states, 9 of which were *Fadama* I states (*Bauchi, Kebbi, Niger, Benue, Taraba*, the Federal Capital Territory [FCT]*, Ogun, Oyo, and Lagos*). *Fadama* II seeks to address the shortcomings of *Fadama* I by employing paradigm shift from a top-down and supply-driven public sector development program to the community-driven development approach. *Fadama* II also includes other *fadama* resource users that the first project had ignored.*Fadama* II also supports activities and services other than production.

Community-Driven Development Approach of *Fadama* II

Community-Driven Development (CDD) is a development approach that give power to local communities and local governments to participate in the decision making, control, and management of development programs (Dasgupta and Beard, 2007; Dongier *et al*., 2001). The approach differs from programs and projects that treat beneficiaries as passive aid recipients (Labonne et al., 2007). Most CDD projects focusing on poverty reduction have five main features (Dongier et al., 2001; Dasgupta and Beard, 2007; Labonne *et al*. 2007):

1. *Empowerment of the local communities and local governments:* Community-driven development (CDD) projects are designed to empower local communities and local governments to participate in decision making and management of development programs, to negotiate with institutions and service providers on the planning and implementation of development programs, and to hold services providers accountable.

2. *Demand driven design:* Community-driven development (CDD) projects reflect the needs of local communities and governments, allowing them to determine what types of development activities and resource allocations the project should include to make it effective for them

3. *Social inclusion*: Not all CDD projects involve the poor, women, youth, and other vulnerable groups. For example, CDD projects that target commercially oriented farmers do not include poor subsistence farmers. However, CDD projects that focus on poverty reduction make deliberate efforts to include the poor and vulnerable because they are most prone to poverty.

4. *Collective action*: Because they are community based, CDD projects are designed to be implemented collectively through communities or local governments rather than individuals (Binswanger and Aiyar, 2003; Dasgupta and Beard, 2007). CDD beneficiaries collectively plan and implement project activities, budget, and other resource allocation decisions. CDD projects are also supported by public funding from central governments or donors that support the communities or local governments. However, CDD projects are not likely to succeed if they include several communities or involve beneficiaries with significant inequalities in income and other measures of poverty (Dongier *et al*., 2001; Labonne *et al.,* 2007)

5. *Support from external institutions and organizations*: As already mentioned, CDD projects receive support from governments and donors. This is one of the main characteristics that differentiate the CDD approach from the methods used by community-based organizations (CBOs), which may not receive external support. The support that CDD projects receive include strengthening the ability of beneficiaries to plan, implement, and manage development programs; to facilitate access to services that support the relevant development programs; and to strengthen the link with formal institutions and organizations (e.g., CBOs, nongovernmental organizations, traders, etc.; Dongier et al., 2001).

The design of the *Fadama* II project meets all the key features of a CDD project. Consistent with the CDD approach, project activities are centered on *Fadama* User Groups (FUGs) and *Fadama* Community Associations (FCAs). An FUG comprises *fadama* users with a common economic interest and is therefore a type of economic interest group. FCAs are the associations of FUGs operating in a given area. Each FCA designs and oversees the implementation of a Local Development Plan, which is the blueprint of the *Fadama* II's development project in that FCA. The major productive sectors that *Fadama II* supports include crops, livestock, agro-forestry, fishing, and fish farming (fisher-folk).

Addressing one of the weaknesses of *Fadama* I, *Fadama* II also supports postproduction activities that are closely linked to the project's productive activities. These include agro-processing enterprises and rural marketing service providers. As part of its targeting strategies, *Fadama* II provides special preferences to groups of youth, women (especially widows), and physically challenged persons, the elderly, and people with HIV/AIDS (vulnerable groups). Targeted groups can belong to any of the productive or service sectors supported by the project. Because the *Fadama*II uses the CDD approach, beneficiaries are given the chance to choose the kind of activities they want to pursue. However, there are some activities that the project does not support, such as activities that could lead to degradation of natural resources or large-scale changes in land use (NFDO, 2005).

Under the CDD approach of *Fadama* II, all users of *Fadama* resources are encouraged to develop participatory and socially inclusive local development plans. The 12 states benefiting under the World Bank–assisted aspects of *Fadama* II are *Adamawa,Bauchi, Gombe, FCT, Imo, Kaduna, Kebbi, Lagos, Niger, Ogun, Oyo, and Taraba*. *Fadama* II was designed to operate for six years (2004–2010) with a goal of contributing to poverty reduction in Nigeria. Actual implementation did not begin until September 2005, however. The project set a target of 50 percent of male and female *Fadama* resource users who benefit from the project-supported activities achieving an increase in average real income by at least 20 percent compared with the baseline.

The project designed the following five components to achieve its targets:

1. *Rural infrastructure investment* to support creation of economic infrastructure and local public goods that would improve the productivity of households using *Fadama* resources. Under this component, beneficiaries are required to pay 10 percent of the costs of constructing rural infrastructure, including rural roads, culverts, market stalls, cold storage, boreholes, and irrigation infrastructure, among others.
2. *Pilot productive asset acquisition support* to enhance the improvements in the productivity and income *Fadama* resource users by facilitating the acquisition of productive assets by individuals or FUGs. Under this component, *Fadama* resource users are required to pay 30 percent of the cost of the productive assets acquired.
3. *Demand-responsive advisory services* to support advisory services that will enable *Fadama* resource users to adopt output-enhancing techniques and more profitable marketing practices in their enterprises
4. *Capacity building* to increase the ability of its beneficiaries to assess their needs, participate in planning, and implement and manage economic activities, and to increase the capacity of the project coordinators to conduct monitoring and evaluation. *Fadama* II provides capacity building through trained facilitators. In addition, FUG members are trained to negotiate and manage contracts and to conduct basic financial analysis.
5. *Conflict resolution* to address the shortcoming of *Fadama* I by increasing the capacity of FUGs to manage conflicts, which were particularly serious and more frequent between pastoralists and crop farmers. More than 98 percent of conflicts among *Fadama* resource users involved pastoralists and farmers (NFDO, 2005). The project set an objective of reducing the number of conflicts by 50 percent by 2010.

METHODOLOGY

The study was conducted in Adamawa State, Nigeria. The population of *Adamawa* according to NPC (2006) was estimated at about 3,194,781. However, only the beneficiaries of *Fadama-II* in the state and the neighboring communities were used for this study. There are ten *Fadama-II* benefiting LGAs out of the 21 local government areas that make-up the state namely: *Yola-South, Yola-North, mubi-North, Michika, Gombi, Song, Fufore, Ganye, Guyuk* and *Lamurde* with the total number of the beneficiaries estimated at 52, 366. The study was conducted in five *Fadama-II* projects benefiting LGAs randomly selected at 50 percent. The benefiting LGAs

selected include: *Ganye, Mubi-North, Gombi, Guyuk* and *Fufore.*

Sampling Procedure

A multi-stage random sampling technique was used for selecting respondents for this study. In each of the randomly selected five LGAs, 50 percent of the FCAs were randomly selected and in each selected FCAs, five households were also selected randomly. A total of 100 households were therefore selected for the entire beneficiaries in this study. Similarly the same numbers of households were selected from non-beneficiaries outside *Fadama II* LGAs. In all, a total number of 300 households that matched were then selected for the study. All the economic interest groups (EIGs) such as crop farmers, fisher folks, pastoralists, hunters, widows, processors among others were represented in the sample.

Data Collection

A survey instrument in form of structured questions was employed in this study. The interview schedule was written in English and was interpreted to the respondents in *Hausa* language at the point of interview. The data were collected on the socio-economic characteristics of the respondents, household income a, quantity of processed products, price of processed products and value of commercial processing.

To obtain data on the impact of the *Fadama* II project on beneficiaries, the sampling frame was divided into two strata: (1) direct project participants, (2) respondents living in communities in *Fadama* resource areas outside the *Fadama* II LGAs but with socioeconomic and biophysical characteristics comparable to the *Fadama* II communities. The design of this stratification will allow for estimation of the direct impact of *Fadama* II. Comparing *Fadama II* beneficiaries to similar households in similar communities not included in the project provides a better estimate of the total impact of the project on beneficiaries, assuming that spillovers are not affecting households in the communities outside the project. Baseline data for *Fadama II* were collected using recall information. The project was implemented in September 2005, only slightly above four years before the survey was conducted; therefore, it is expected that respondents would be able to remember the baseline data required for two years before the survey—that is, for the crop years October 2004 to September 2005 (2004–2005) and October 2009 to September 2010 (2009–2010). These marked the years before and after the end of the period of *Fadama II* project in the State. Most households based their responses on memory recall because of the time lag, though not too long (Iheanacho et al, 2007).

Data Analysis

The Propensity Score Matching (PSM) method, which matches project beneficiaries with comparable non-beneficiaries using a propensity score (the estimated probability of being included in the project) and the double-difference (DD) estimator, which compares changes in outcome measures (i.e., change from before to after the project) between project participants and non-participants, rather than simply comparing outcome levels at one point in time, was used in this study to estimate the impact of the project. Combining Propensity Score Matching (PSM) with the Double-Difference (DD) estimator, controls for differences in pre-project observable characteristics

The impact of *Fadama II* on agro-processingwas analyzed using matched samples. In the analysis, the quantity of processed products, average price of processed products amount realized from commercial processing and income change between*Fadama II* beneficiaries and non-beneficiaries were compared.Further testing of the comparability of the selected groups was done using a "balancing test" (Dehejia and Wahba, 2002), which tests for statistically significant differences in the means of the explanatory variables between the matched groups of *Fadama II* participants and nonparticipants. The study employed paired t-test statistics because of its suitability and applicability in assessing effects (impact) by comparing responses from beneficiaries and non - beneficiaries of the programs.

The adoption of paired t-test statistics is based on similar works, which assessed the impact of credit on total production, productivity, farm size and operating expenses as well as a study that compared crop output, farm income, farm size and labor of the beneficiaries and non-beneficiaries of selected rural development programs (Nwanchukwu and Ezeh, 2007).

RESULTS AND DISCUSSIONS

Theanalysis of the result shows that Fadama II beneficiaries are more likely to be females, have larger households, larger farm sizes and reside further away from all-weather roads. The result also suggests that Fadama II project participants consist more of the aged and younger group members. This suggests that Fadama II is targeted to vulnerable groups and communities in remote locations.

The findings of the study also indicate that processing among the beneficiaries has improved tremendously as a result of participation in *Fadama II.* For instance, the quantity of produce processed and price of processed products as shown in table 1 varies greatly between the beneficiaries and non-beneficiaries of the project. This means that the beneficiaries are more into processing than the non-beneficiaries. This is an evidence of the

Table 1. T-test Analysis of Variables used to estimate impact on Agro-processing

Variables	FII Beneficiaries	Non Beneficiaries	t-test	P value
Quantity of Processed Products (kg)	9.5806(17.08566)	1.2813(5.45112)	3.731	0.000**
Average Price of Product Processed (N)	1000(1950.20)	936.29(2963.05)	1.314	0.001**
Amount Realized from Commercial Processing (N)	3241.61(7573.09)	1403.22(7064.07)	1.596	0.013**
Average income of respondents (N) per annum,	91818(111535)	42278(17429)	2.038	0.043**

Source: Field work, 2011.FII = *Fadama II*, Number in brackets are standard deviation of the corresponding means, ** significant at 5% level.

manifestation of the effect of the emphasis which *Fadama II* project lay on post-harvest handling, particularly processing. In the same direction, the amount realized from commercial processing was greater for the beneficiaries than their counterpart of the non-beneficiaries (see also table 1). The reason for this difference is not far-fetched. It could be attributed to the processing assets like milling machines which the beneficiaries acquired through *Fadama II* project. Statistical test for difference at p = 0.05 shows that there significant difference for the quantity of product processed, price of processed products and amount realized from commercial processing between*Fadama II* beneficiaries and non-beneficiaries of the project (Table 1).

Further analysis on the incomes of the project beneficiaries and non-project beneficiaries follow the same trend. Remarkable divergence cropped-upbetween the beneficiaries and the non-beneficiaries. The statistical test for difference as well shows that income changes was significantly higher at p= .05 among the project participants compared to non-project participants. This development is not unconnected with the adoption of agro-processing which serves as a means of diversification of income among the project beneficiaries. The huge achievement realized may be attributed to the project's commitment in fulfilling its role of empowering the communities as set against its mandate.

As mentioned earlier*, Fadama II* project which is the largest agricultural project in Nigeria aims to reduce poverty by supporting communities to acquire infrastructure, post-harvest processing technology and productive assets, providing demand-driven advisory services andincreasing the capacity of communities to manage economic activities (Nkonya et al, 2007).This also agrees with IDA (2009) that CDD operations produce two primary types of results: more and better distributed assets, and stronger, more responsive institutions through which they seek to improve service delivery, empower communities and expand livelihood opportunities.

CONCLUSION

Agro-processing is vital instrument for enhancing income increases among the small scale farmers. Findings of this study have suggeststhat benefiting communities in Adamawa Statehaveacquired knowledge on agro-processing. The adoption of the agro-processing has helped diversified income generating activities among the beneficiaries. The quantity of processed products, the price of processed product and amount realized from commercial processing are higher for the beneficiaries than the non-beneficiaries. This has expedited increase in income more for the beneficiaries than the non-beneficiaries. Greater chunk of the respondents have attributed the success to participation in *Fadama II.* It is thus worthy of mention that the project has made significant impact on agro-processing. This is a reflection of the ability of the project to encourage the project communities to participate in postproduction and other non- farm activities as a measure for diversification of income generation activities.

RECOMMENDATIONS

(1) As the potential of agro-processing is found to be huge, there is need for the project to lay much emphasis on it among all the beneficiaries of the project for them to benefit hidden potentials.

(2) The project's activities should be expanded to cover all the 21 local government of the state, to give opportunity for those communities that are not benefitting also enjoy the benefits of agro-processing.

(3) Finally, all the other development projects in the state like Special Programme on Food Security, Agricultural Development Programme (ADP) etc. should incorporate agro-processing into the mainstream of their activities to help foster growth among their target communities.

REFERENCES

Alston JM, Pardey PG (2001). Attribution and other problems in assessing the returns to agricultural R&D, *Agricultural Economics* 25: 141–152.

Binswanger H, Aiyar S (2003). Scaling up Community-Driven Development: Theoretical Underpinnings and Programme Design Implications, World Policy Research Working Paper No. 3039 Washington, DC.

Dasgupta A, Beard V (2007). Community-driven development, collective action anelite capture in Indonesia. *Development and Change* 38(2): 229–249.

Dehejia R, Wahba S (2002). Propensity score matching methods for non-experimental causal studies. *Review of Economics and Statistics* 84(1): 151–161.

Dongier P, Van Domelen J, Ostrom E, Rizvi A, Wakeman W, Bebbington A, Alkire S, Esmail T, Polski M (2001). Community-Driven Development. In J.Klugman, eds.,"*A Sourcebook for Poverty Reduction Strategies"* Vol.1. Washington, DC: World Bank.

IDA(2009). "Community-Driven Development: Delivering the Results People Need" The World Bank. July, 2009

Iheanacho AC, Ndagu A, Haruna L (2007). Beneficiary' Assessment of the Second National Fadama Development: A draft report submitted to Adamawa SFDO, 2007.

Labonne J, Biller D, Chase R (2007). *Inequality and relative wealth" Do they matter for trust? Evidence from poor communities in the Philippines*.Social Development Papers, Community-Driven Development, PaperNo. 103. Washington, DC: World Bank.

Mhazo N, Hanyani-Mlambo BT, Proctor S, Mupanda K, Nazare R(2003). Constraints to Small-Scale Production and Marketing of Processed Food Products in Zimbabwe: The Case of Fruits and Vegetables. Paper presented at the Food Africa International Working Meeting, 5-9 May 2003, Palais des Congrès, Yaounde, Cameroon

National Fadama Development Office (NFDO) (2005). "Poverty reduction through increased productivity and empowerment" Abuja, Nigeria:

National Population Commission (NPC) (2006). "Population and Housing Census of the Federal Republic of Nigeria Report" Abuja, Nigeria.

NFDP II (2007). Fadama-II Poverty Reduction through Empowerment.A Publication ofPCU-NFDO, Abuja, Nigeria.

Nkonya E, Davis K (2008). The statistical challenges of attributing Impact of demand- Driven advisory services programs and farmer school in Africa. Paper Presented at the Workshop on: Rethinking Impact: Understanding the Complexity of Poverty and Change. Columbia, March 26-29, 2008. IFPRI.

Nkonya E, Philip D, Mogues T, Pander J, Yahaya MK, Adebowale G, Arokoyo T, Kato E (2008). "Community-Driven Development in Nigeria" IFPRI discussion Paper 00756, IFPRI Washington.

Nwanchukwu IN, Ezeh CI (2008)."Impacts of Selected Rural Development Programmes on Poverty Alleviation in Ikwuano, LGA, Abia, Nigeria" *Afr. J. Food Agric. Nutr. and Develop.* (7):5

Ravallion M (2005). "Evaluating anti-poverty programs" Policy Research Working Paper No. 3625. Washington, DC: World Bank.

Rosenbaum PR, Rubin DB (1983) "The central role of the propensity score in observational studies for causal effects"*Biometrika* 70(1): 41–55.

Simalenga TE (1996). Small-scale decentralised agro-processing. Paper presented at "Small-Scale Decentralised Agro-Industry Seminar", Harare.

UNIDO IFAD, FAO (2008). "Importance of Agro-industry for Socio-Economic Development and poverty Eradication". Discussion Paper: UN Commission on Sustainable Development. 16th Session, New York, 5 – 16 May, 2008.