Agriculture and Rural Development in Nasarawa State 20 Years After: An Inclusive Growth Approach

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Abstract
This study examines access to farm machinery/equipment and rural infrastructure (roads) for the purpose of improving productivity and standard of living among peasant farmers in Nasarawa State 20 years after its creation**.** Farmers were interviewed and questionnaires administered. Descriptive statistical methods of data analysis (tables and graphs) were used to analyze the data. The findings showed that there is improvement in road construction and some farmers had access to farm machinery/equipment. However, a great number of peasant farmers still use manual and crude implements on farm operations that affect productivity and thus the desired poverty reduction in the state has not been achieved. The study notes that farmers will do better if they can access simple improved tools, both manually operated and motorized for their farm work. This will increase productivity and raise their standard of living and thus, enhance their participation in the economy. This study further recommends that farmers should form cooperative societies and pull resources together to purchase farm machinery and/or to obtain loans from banks. Government and the private sector still need to invest in the sectors and over time launch in to the industrial sector as the state is endowed with mineral potentials.

Key words: Inclusive Growth, Rural Development and Agriculture

Agriculture et développement rural dans l'Etat de Nasarawa, 20 ans après: une approche de croissance inclusive

Résumé
Cette étude porte sur l'accès aux machines agricoles / équipements et infrastructures rurales (routes) dans le but d'améliorer la productivité et le niveau des agriculteurs parmi les paysans vivant dans l'Etat de Nasarawa 20 ans après sa création. Les agriculteurs ont été interrogés et des questionnaires administrés. Les méthodes statistiques descriptives de l'analyse des données (tableaux et graphiques) ont été utilisées pour analyser les données. Les résultats ont montré qu'il ya une amélioration dans la construction de routes et que certains agriculteurs ont eu accès à la machinerie agricole / équipement. Cependant, un grand nombre de paysans utilisent encore des outils manuels et du brut sur les exploitations agricoles qui influent sur la productivité et donc la réduction de la pauvreté souhaitée dans l'état n'a pas été atteinte. Le procédé d'étude note que les agriculteurs vont faire mieux s'ils peuvent accéder à des outils améliorés et simples, à la fois à mécanisés et motorisés pour leur travail agricole. Cette productivité élèvera leur niveau de vie et

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va améliorer leur participation à l'économie. Cette étude recommande en outre que les agriculteurs devraient former des sociétés coopératives et rassembler des ressources pour l'achat de machines agricoles et / ou d'obtenir des prêts auprès des banques. Le gouvernement et le secteur privé ont encore besoin d'investir dans les secteurs agricoles ainsi que dans le secteur industriel comme l'état est doté de potentialités minérales.

Mots clés: croissance inclusive, le développement rural et l'agriculture

Introduction

One critical aspect of development that has occupied policy makers in Nigeria from colonial times is rural development. Therefore, the transformation of a primarily agricultural society into one on the tract of sustainable development for economic progress has been the desire of policy makers in the country. Thus, economic development aspiration in Nigeria has remained that of altering the structure of production to diversify the economy and to reduce dependence on oil and on imports to put the economy back on the path of self-sustaining growth pattern that will progressively reduce poverty.

Agriculture is the nerve of any country as it is needed for survival of mankind. In the context of any economy agriculture is vital and is linked with the secondary and tertiary sectors and therefore is essential for broad based growth necessary for development. The linkage of agriculture to these sectors is in terms of supply of raw materials to the agro-industrial and manufacturing sectors, food supply, provider of employment opportunities and income generation and a contributor to foreign exchange earnings through exports. It is also a well-known fact that the bulk of agricultural production in the developing countries is in the hands of the small holder farmers concentrated in the less-developed rural areas who depend very much on tools with very low mechanical advantage. Therefore, to enhance economic growth, it is imperative to create opportunities for these farmers and protect the vulnerable in society.

Among the key objectives of Nigeria Agricultural Policy of 2001 are the promotion of the increased application of modern technology to agricultural production and the improvement of life of rural dwellers. Under the policy, state governments are responsible for (i) promotion of the production of inputs for crops, livestock, fish and forestry (ii) development and management of irrigation facilities and dams and (iii) investment on rural infrastructure, including rural roads and water supply in collaboration with federal and local governments. The local governments are expected to take over progressively the responsibilities of state governments with respect to management of irrigation and dams, provision of rural infrastructures among others.

Inclusive growth in agriculture is growth accompanied by gains manifested through more employment and income benefiting those sections of society which have been bypassed in the growth process. Of particular importance are the most disadvantaged and marginalized rural poor living below the poverty line. Sharma (2012) in his study observed that despite a strong growth linkage between agriculture and other economic sectors, and poverty reduction, agriculture has not received attention during the reform period in India. He further posited that the neglect of agriculture and rapid growth of non-agriculture sector has led to serious agrarian crisis and increased disparity between urban and rural incomes.

Inclusive growth places emphasis away from mere increase in growth rates, to improvement in productivity and standard of living of the poor. Thus, the African Development Bank suggested the following:

i) Electricity, storage facilities, agro-processing, irrigation infrastructure and improved land and water management in agricultural areas and growth corridors; and

ii) That institutional reforms place priority on linking remote areas and communities to markets, as a proven approach to promoting agricultural production and productivity (Benedict, Adeleke & Kazuhiro, 2014).

Economic history provides us with ample evidence that an agricultural revolution is a fundamental pre-condition for economic development (Eicher and Witt, 1964). The rural settlement pattern of Nasarawa state is largely influenced by the prevailing economic activities and, to some extent, historical and physiographic factors. The majority of the rural people is engaged in agriculture and is dominated by individual farmsteads. The major crops include maize, rice, sorghum, millet, cowpea, groundnut, yam, cassava, soya beans, beniseed, melon, bambara nuts etc. Tree crops in the state include palm tree and other citrus plants. The agricultural programmes initiated by various administrations in the state include the Nasarawa Agricultural Development Programme (NADP), State Farm Mechanization Agency (FAMA) and the BadaKoshi Agricultural Scheme. The fact that Nasarawa state has agricultural and mineral potentials, the drive to industrialization can be achieved with the necessary political will.

The study posits that the agricultural sector has the potential to be the industrial and economic springboard from which Nigeria's development can take off. Within the W.W Rostow's linear stages context, the traditional (agricultural) society needs to assume certain quantum of development in order to provide the requisite quantum of linkages for transformation to other stages. The focus of this study therefore is to examine access to farm machinery/equipment and roads among rural farmers to harness these crops to improve agricultural production and productivity with specific interest on rice the purpose of reducing poverty in Nasarawa State. The paper starts with introduction, statement of problem and literature review. It is followed by methodology, discussions and findings.

The Problem

The problems of poverty, unemployment and inequality are widespread in developing countries. In Nigeria, these indicators are prevalent in the rural areas where the highest percentage of the populace lives and is pre-occupied with agriculture at peasant level. Under the National Economic Empowerment Development Strategy (NEEDS), agriculture and rural development were projected sources of employment generation especially through increased productivity of small farmers, creation of new jobs in rural areas from rural infrastructures and increased employment from commercial agriculture (IMF, 2005).

Agricultural development in Nasarawa state has been on the front burner since the creation of the state. The vision of government in Nassarawa state as pronounced by His Excellency Abdullahi Adamu in 1999 include, rapid educational, industrial, agricultural and economic development of the state; and the empowerment of all segments of the society as a catalyst for poverty reduction. Available statistics shows that there is no significant improvement in agricultural production in the period under review. Nigeria poverty profile 2010 also indicates that poverty numbers in terms of dollar per day based on an adjusted PPP in Nasarawa state are 60.4 per cent poor and 39.6 per cent non poor (National Bureau of Statistics 2012).

The backbone of any agricultural revolution is access of farmers to modern agricultural inputs. These agricultural inputs range from improved seeds, fertilizers, and crop protection chemicals to machinery, irrigation and knowledge. As Yohanna (2004) posited, the application of these inputs and equipment has been one of the outstanding developments in agriculture. It is

against this backdrop that this paper examines rural farmers' access to farm equipment and roads 20 years after the creation of Nasarawa state as a means of enhanced agricultural productivity, employment and income generation by the peasant farmers and vulnerable in society.

Literature review and Conceptual clarification

Inclusive growth

Inclusive growth is a widely used concept by policy makers both in the developed and developing countries. Although it lacked a single shared definition, what is common across the board at the initial attempts at definitions shows some convergence in thinking on important aspects of the concept. Inclusive growth is

i) The reduction in poverty and inequality and benefit the most marginalized
ii) more than income but as having happened when other indicators of improved wellbeing, aside from income, have also improved for citizens
iii) is about participation, not just outcomes
iv) Inclusive growth requires sustainable growth
v) Inclusive growth represents growth that generates decent jobs, gives opportunities for all segments of society, especially socially excluded groups, and distributes the income and non-income gains from prosperity more equally across society (Cafod, 2014)

According to Ali and Son (2007) the key elements in inclusive growth are employment and productivity, development in human capabilities and social safety nets and the targeted intervention. Elena and Susana (2009) defined inclusive growth as that growth which can reduce poverty and allow people to contribute to economic growth and benefit from the growth process. They pointed out that rapid pace of growth is unquestionable necessary for substantial poverty reduction but for growth to be sustainable in the long run should be broad based across the sectors and inclusive of the large part of the country's labor force.

Rural Development

Rural development is the process of improving the quality of life and economic well-being of people living in relatively isolated and sparsely populated areas. Rural development has traditionally centred on the exploitation of land-intensive natural resources such as agriculture and forestry. It is the outcome of a series of quantitative and qualitative changes occurring among a given rural population and whose converging effects indicate, in time, a rise in the standard of living and favourable changes in the way of life of the people concerned. The concept of rural development in Nigeria lacks a unified definition as different scholars tend to view it from varying perspective. Olayide, Ogunfowora, Essang and Idachaba (1981) view rural development as means for the provision of basic amenities, infrastructure, improved agricultural productivity and extension services and employment generation for rural dwellers. Basically, economic activities in the rural area typically relate to the primary sector of production and processing of food stuffs and raw materials.

Agricultural machinery/equipments

Yohanna and Umogbai (2011) in their study concluded that cassava processing enterprise and equipment assessment and utilization is sustainable, hence the need to be well developed to ensure an improvement in the living standard of the rural and urban populace and ensuring a sustainable income. Dooshima (2014) examined 'trends in social and technological changes in agriculture among the Tiv of Nigeria and found that there are positive changes in agricultural operations compared to the colonial period in that subsistence agriculture has been replaced by commercial agriculture and most households produce for the market an indication.

Yohanna, Fulani and Aka'ama (2011) examined mechanization problems of the small scale (Peasant) farmers in the Middle Belt of Nigeria and found that so many farmers are on the land on small scale basis and their production has not been enough. Their farm sizes have not increased over the years due to absence of the relevant mechanization machinery. The result shows that the mechanization process being emphasized in the country is still beyond the scope of the small scale farmers who produce the bulk of the food.

Rainfall in Nigeria

Rainfall characteristics have been studied for dominant trend notably by Olaniran and Summer (1990). They found that there was a progressive early decline of rainfall over the country. Following the pattern, they reported a noticeable and significant decline of rainfall frequency in September and October which coincide with the end of rainy season in almost every parts of the country especially in the Northern and Central parts.

Ekwe, Joshua, Igwe, and Osinowo (2014) in their study showed that the monthly rainfall decreased progressively between January-May and October-December. The beginning of rainy season around May and its subsequent cessation in Octoberhas known implications on the ecosystem and agricultural practices as early and late crops are planted by farmers during these critical months of annual agricultural cycles.

Theoretical Framework

Modernization Theory

Modernization theory is used to explain the process of modernization within societies. Modernization refers to a model of progressive transition from a traditional to a modern society. The theory looks at the internal factors of a county while assuming that with assistance, 'traditional' countries can be brought to development in the same manner more developed countries have been. The capitalist version of modernization theorized that as nations developed, economic development and social change would lead to democracy.

Rostow (1962) in his Linear Stages Model argues that to achieve modernity, all countries pass through the same stages of development. According to the theory, economies can be divided into primary, secondary and tertiary sectors. The history of developed countries suggests a common pattern of structural change. The stages are:

i. Traditional (agricultural) characterized by subsistence economic activity
ii. Transitional Stage or the pre-condition for take off
iii. Take off stage characterized by increase in industrialization
iv. Drive to maturity where growth is diverse supported by technological innovation and
v. The stage of high mass consumption.

Methodology

Area and Scope of the Study

The study was conducted in three local government areas (Lafia, Obi andNasarawa Eggon) of Nasarawa state, Nigeria. The questionnaires were administered amongfarmers for responses in the following communities (a) Lafia LGA- Gandu, Kafinwambai, Adogi, Maiakuya and Assakio;(b) Obi LGA- Agyragu, Dadere, Obi, Agwatashi and Akanga and (c) Nasarawa- Eggon LGA- Mada Station, Kgbu, Lambaga and Galle.

Nasarawa state occupies a total area of 27,117km^2 and a population of 2,053,720 people (NPC, 2011). It lies within the guinea Savannah region and has tropical climate with moderate rain fall of 1311.75cm.The state is made up of plain lands and hills measuring up to 300ft above the sea level at some points (Adisa 2011).

Data collection and data sources

Data for the study were collectedfrom primary sources using the cluster methodand purposive sampling techniques. The survey identified the cluster of farmers according to the villages /communities where the farmers reside. Data were collected through the use of interviews and questionnaires. Also secondary data was collected from published literature on agriculture and roads in Nasarawa State. Structured questionnaire was administered to 384 farmers within the three local government areas of the state using infinite purposive technique out of which 365 were returned. The formula for the sample determination for infinite population used in this study is as follows:

$$SS = Z^2 \text{ x } (p) \text{ x } (1\text{-}p)/C^2$$

Where SS = Sample Size; Z = Z-value (i.e. 1.96for a95 percent confidence level; p = Percentage of population and C = Confidence interval.

Personal visits were made to some areas to identify existence of roads. The questionnaire sought information on farmers' personal and socio-economic characteristics, level of education, farming experiences in years, method of cultivation and nature of farm implements and /or machinery used on their farms. Descriptive statistical methods of data analysis were used to analyze the data.

Presentation of findings and Analysis of data

Roads in Nasarawa State

The state is well linked by rail and road transportation networks making it accessible from all parts of Nigeria. Under the provisional set up, Nasarawa province had few roads. These include Loko-nasarawa-keffi-abuja, Keffi-lafia, keffi-Akwanga-Wamba, Loko-tin Fied in Lafia, Wamba-Jemaa and Akwanga-Jemaa (University of Califonia 1989). Appendix1 shows that there is improvement in road networks in the state compared to Nasarawa as a province and before the creation of the state. The following roads are currently in existence: Wamba Bye-pass, Central Primary School Akwanga, State University road network in Keffi, Awe town road, Andaha-Angwan Zaria, Agyragu-Kwara, and Sisimbaki-Kwara in Wamba LGA. Others are Tundunwada-Kaarshi I Karu LGA, Garaku-Dari road, Agwada-Udege, AngwanJaba and AngwanMaina, among others.

Socioeconomic characteristics of respondents

The entries in appendix 2 show respondents socioeconomic characteristics. Majority of the respondents (47%) of the respondents were aged between 21 and 40 years. The mean age of the respondents was 38years. On educational level, 47 per cent of the respondents had no any formal education. It is generally believed that education creates a favourablemental attitude for the acceptance of new ideas and practices. Formal education enables a farmer to seek for and utilize useful information both from print and electronic media. On their monthly income, 62 percent of the respondents received average of N1000-20000 per month with a mean of N18540 per month. However, this scenario does not apply always as there is no regularity in agricultural production. On gender, 56 percent are women while 44 per cent are men. On years of farming 36 per cent of respondents have been farmers between 21-30 years.

Figure 1(about here) is the percentage of mechanization tool level (MTL) of farmers in Lafia, Obi and Nasarawa-Eggon LGAs of Nasarawa State. The Figure shows the equipment used for the various farm operations and the number of users. Most peasant farmers still use either manual or crude implements in farming operations which affects productivity, and income generation. It further shows that no farmer uses machines in irrigation and the method prevalent in the state is Lambo where farmers use buckets to fetch water as a means of irrigation on their farmlands. The percentage of Mechanization Tool Level (MTL) for various farming operations are as follows: Land clearing 38 per cent, tillage 33 per cent, planting 11 per cent, fertilizing 02 per cent and weeding 33 per cent. Other operations include, spraying 11 per cent, crop processing 31 per cent while irrigation 0 per cent.

Nasarawa State Paddy Rice Production (1997-2014)

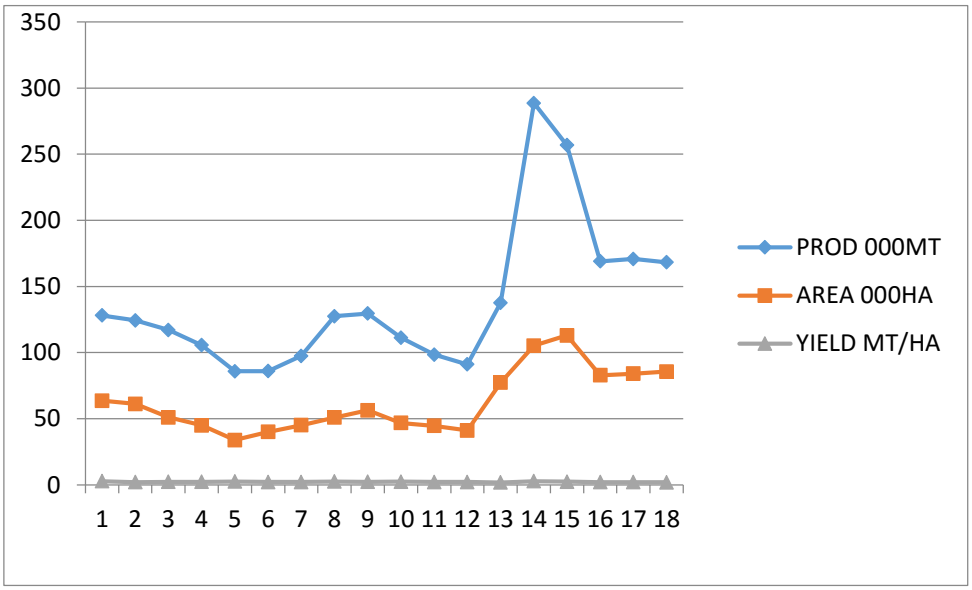

Figure 2: Nasarawa State Paddy Rice Production 1997-2014.

Figure 2 shows the trend of production, area of cultivation and yield of paddy rice in Nasarawa state between 1997 and 2014. It is revealed that the trend has been fluctuating and had the highest production and area of cultivation in 2010. From the investigation, it was further revealed that the fluctuations were as a result of the following factors:

i) Cost of inputs and farm machinery

ii) Inadequate rain fall in some years
iii) Grazing activities of herdsmen
iv) Inter communal crisis
v) Labour cost

Figure 3 (about here) shows rainfall in Nasarawa State between 2002 and 2011. Rainfall between 2010 and 2011 had an average of 1341.26mm and an average of 78 days during the period. From the investigation it was revealed that lack of rainfall is contributing factor for low productivity of agricultural sector in the state. All crops need water to grow and produce yield. The most important source of water for crop growth is rainfall. When rainfall is insufficient, irrigation water may be supplied to guarantee good harvest. However, one of the main problems of the irrigator is to know the amount of water applied to feed the water needs of the crops; in other words, the irrigation requirements need to be determined.

Summary of findings

The study found that there is improvement in provision of access roads in the state compared to the colonial period and before the creation of the state. In the post state creation period, the number of roads increased. However, many communities are still yet to be linked. The study also found that although some rural farmers have access to modern farm machinery/equipment, a great number of these farmers' still use manual and crude implements on farm operations that affect productivity. The findings are similar to that of Yohanna and Umogbai (2011) that identified need for farm equipment to be well developed in order to ensure an improvement in the living standard of the rural and urban populace and ensuring a sustainable income.

Conclusion

The findings reveal that most farmers still use manual or crude implements in farm operations. Thus farmers will do better if they can access simple improved tools, both manually operated and motorized for their farm work. This will increase productivity and raise their standard of living and thus, enhance their participation in the economy. Based on the findings the study recommends the following:

i. The private sector should be encouraged to set up agricultural machinery industries which should be purchased by farmers or hired out to small scale farmers at subsidized rates by government to increase the level of mechanization of certain farm operations to benefit farmers in Nasarawa State.
ii. Farmers should form cooperative societies and pull resources together to purchase farm machinery and/or to obtain loans from banks
iii. Government should also strive to construct more rural roads to make transportation of farm produce easy to market locations.
iv. Irrigation should also be encouraged to supplement the low rainfall in the state.

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Appendix

Table 1: Roads in Nasarawa state

Roads as at Nasarawa Province	Roads before state creation	Roads in Nasarawa from 1996
1 Loko-Nasarawa-Keffi-Abuja	1. Andaha-Jos 2. Gudu-Kokona-Garaku 3. Tundu-Wada 4. Wamba bye pass	1. Loko-Nasarawa 2. Doma-Agwashi-Rukubi-Akpanaga 3. Nasarawa-Eggon-TashanMada

2 Keffi-Akwanga-Wamba 3 Loko-tin field in Lafia 4 Wamba-Jeema 5 Akwanga-Jeema	5. Loko-Nasarawa 6. Doma-Agwashi-Rukubi-Akpanaga 7. Gitata-Panda-Gurku-Maraba 8. NAPD-Markurdi 9. Diamond Bank-Jos road loop 10. Andaha-Angwan Zaria 11. Agyragu-Kwara 12. Sisimbaki-Kwara 13. Tundunwada-Karshi 14. Agwada-Udege 15. Lafia-B.A.D roads 16. AngwanMaina	4. Obi-Keana 5. Adogi-Arikya 6. Sisinbaki-Maina-Kwara 7. Akwanga-Gudi Station-Kokona-Agbade-Udege 8. Nasarawa-Ara 9. Gitata-Panda-Gurku-Maraba 10. Johnbosco-Guest House 11. NAPD-Markurdi 12. Lafia-East-Govt House-Shendam 13. New Market-Makurdi 14. Diamond Bank-Jos road loop 15. Wamba bye pass 16. Central Primary School Akwanga 17. State Universityrood network Keffi 18. Awe town road 19. Andaha-Angwan Zaria 20. Agyragu-Kwara 21. Sisimbaki-Kwara 22. Tundunwada-Karshi 23. Garaku-Dari-Amba 24. Agwada-Udege 25. Lafia-B.A.D roads 26. AngwanJaba 27. AngwanMaina

Sources: (a) University of Califonia (1989). Retrieved 28/4/2016 (b)The Nation, May 28 2015(c) Field survey 26th -28th March 2016

Table 2: The distribution of respondent's and their socio-economic characteristic (N=365)

Socio-economic characteristics	Frequency	Percentages (%)
Gender		
Male	205	56
Female	160	44
Total	365	100
Age		
21-40	173	47

41-60	128	35
Above 60	64	18
Total	365	100
Educational level		
Non formal education	137	37
Primary school	108	30
Secondary school	75	21
Tertiary education	45	12
Total	365	100
Monthly income level (N)		
1000-20000	226	62
21000-40000	53	15
41000-60000	35	10
61000-80000	28	07
Above 80000	23	06
Total	365	100
Years of farming		
0-10	71	19
11-20	108	30
21-30	132	36
30 and above	54	15
Total	365	100

Source: Field survey of researcher

Table 3: Equipment used in Farm Operations and the number of users (n= 365)

Operation	**Equipment Used (frequency)**			**Mechanization tool level (%)**
Land clearing	Cutlass & Hoe 224	Plough 43	Herbicide 99	**38**
Tillage	Hoe 244	Plough 44	Zero/Herbicide 77	**33**
Planting	Cutlass & Hoe 254	Hand Planter 70	Tractor 41	**11**
Spraying	Knap sack 199	Machine 41	None 125	**11**
Fertilizing	Manual 256	Machine 73	None 36	**02**
Weeding	Cutlass & Hoe 246	Machine 77	Tractor 42	**33**
Harvesting	Manual 280	Reaper 85	None -	**23**
Crop processing	Manual 252	Machine 113	None -	**31**
Irrigation	Manual 365	-	-	**-**

Source: Field survey of researcher

Appendix 4: Nasarawa State Paddy Rice Production (1997-2007)

YEAR	PROD 000MT	AREA 000HA	YIELD MT/HA
1997	128.14	63.69	2.81
1998	124.36	61.26	2.03
1999	117.04	51.11	2.29
2000	105.63	45	2.35
2001	85.84	33.93	2.53
2002	86	40	2.15
2003	97.49	45.13	2.16
2004	127.46	50.99	2.5
2005	129.56	56.33	2.3
2006	111.23	46.79	2.38
2007	98.41	44.7	2.2

2008	91.03	41.19	2.21
2009	137.66	77.35	1.78
2010	288.67	105.22	2.74
2011	256.75	113.02	2.46
2012	168.94	82.92	2.03
2013	170.84	84.1	2.03
2014	168.2	85.6	1.97

Source: NADP PME survey 2015

Table 5: Nasarawa State Rainfall 2002-2011

Year	Rainfall (mm)	Rainy Days
2002	1364.6	63
2003	1,108.60	89
2004	1,394.90	89
2005	1,285.50	67
2006	1,269.70	77
2007	1,608.10	80
2008	1,147.00	77
2009	1,575.30	91
2010	1,365.70	73
2011	1,293.20	74

Source: PME Department NADP – Lafia

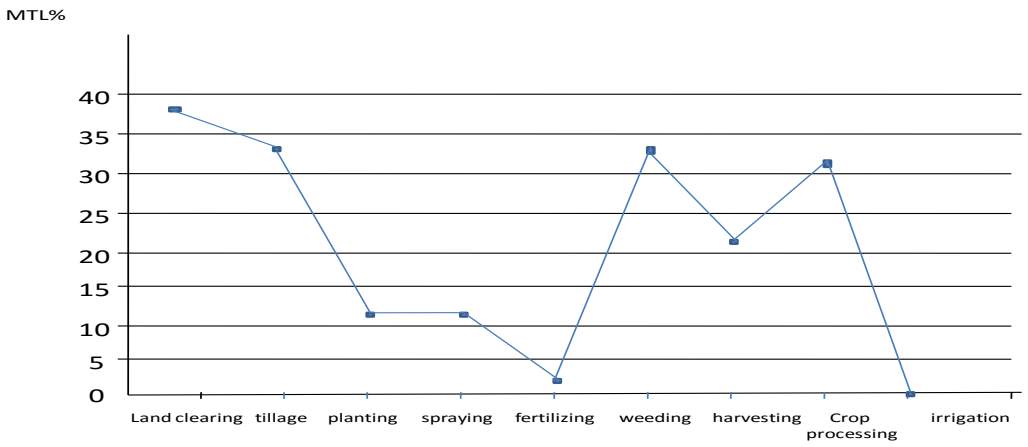

Fig. 1: Machinery/Equipment used in Farm Operations and the number of users

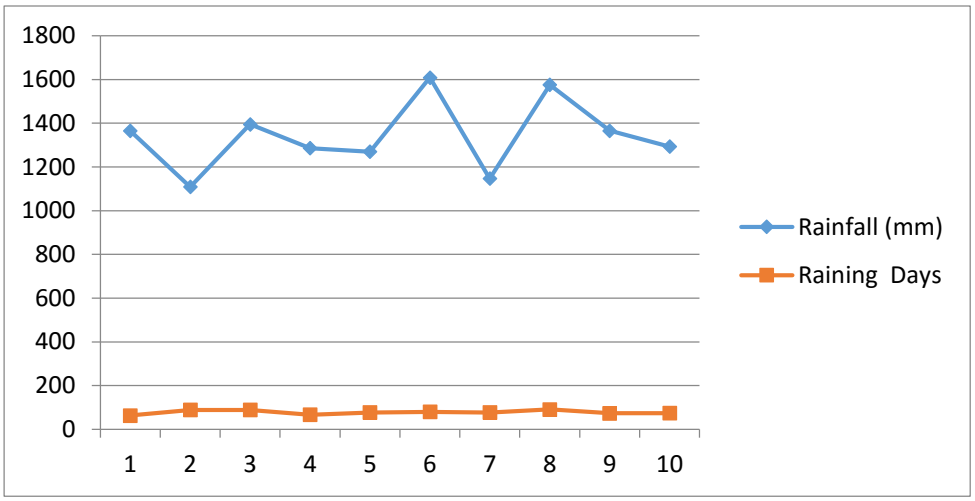

Fig. 3: Nasarawa State Rainfall 2002-2011