

**SOME FACTORS INFLUENCING SUSTAINABLE ARABLE CROP PRODUCTION IN NIGER STATE, NIGERIA**

**BY**

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**ABSTRACT:**

Niger State is divided into three zones for agricultural development purposes. Surveys of the farming systems of two of the zones (II and III) were carried out during the 2001 and 2002 cropping seasons. The objective of the surveys was to identify the prospects of sustainable arable crops production in these zones as well as utilized and unutilized opportunities for increased agricultural production. The surveys revealed that farmers in the two zones normally practice mixed cropping like other small scale farmers in Nigeria. The most important food crops grown include yam, cassava sorghum, maize, millet, rice, groundnut and cowpea. Factors influencing the production of these crops in substantial quantities to sustain the ever increasing population of the state include availability of adequate and productive land, productive labour force, improved technologies and rural infrastructures. Areas needing research interventions for improved productivity were itemized and recommended for action by the appropriate policy makers.

**Keywords:** Small Scale Farmers, Productive Labour Force, Extension Services, Important Food Crops, Nigeria.

1. **INTRODUCTION:**

Niger State covers an estimated area of 84,000km<sup>2</sup> of which over 80% is suitable for the cultivation of arable crops. The state has an estimated human population of 2.6 million with 80% living in the rural areas (Anon, 1997). Farm households number 219,000 and these cultivate an estimated 400,000ha of arable land (Anon, 1988). At present, zones II and III of the Niger State Agricultural Development Project (NSADP) comprise seventeen Local Government Areas (LGAs), (but formerly Zone II had four while Zone III had two Local Government Areas respectively) out of the present twenty five LGAs in the state. These zones cover 53,933km<sup>2</sup> or 72% of the total land area of the state. Thus, there exists great arable land for sustainable crop production.

Farm families own land and can lease out or give to prospective farmers for specific periods to crop. Renting land for farming is not common but can be found around urban centres like Bosso, Minna, Paiko, Suleja, Kontagora, Rijau and New Bussa (Kehinde, *et al*, 1993)

The soils in the state fall within the series I – V and are either developed from basement complex of granite, genesis schist and amphiboles or Nupe sandstone (FUT, 1989) whose tops are acidic, sandy and low in organic matter (OM) and total nitrogen (TN).

Soils of Zone II belong to series I and II while those of Zone III belong to series II – IV. Soils of series I are characteristically shallow to moderate deep; they are usually well drained but require organic manure to improve their structure and water holding capacity. The series IV soils may be loamy sand, clay-loam to gravelly clay loam and are generally fairly deep. Soils of series II and III may be poorly drained depending on the percentage clay content (FUT, 1988).

The two zones fall within the Guinea Savanna vegetation zone which is characterized by a mixture of trees, shrubs, herbs and grasses. The Southern parts of the zones have pockets of forests with relatively dense tree populations (Kehinde, *et al* 1991: 1993). The Northern parts of the zones are more open with widely spaced and scattered trees amidst grasses. Dominant tree species such as *Piliostigma sp* are found in Zone II while *Daniellia diverri*, *Nauclea spp*, *Afxelina sp*, *Parkia sp*, *Butryospermum sp*; and *Terminalia sp* are common in Zone III. *Hyparrhenia*, *Andropogon*, *Pennisetum* and *Polystachion* grass species are common to the two zones (FUT, 1989).

Niger state has both human and natural resources to support production of most arable crops. The resources which include vast agricultural lands, suitable climate and vegetation have not

been fully exploited for agricultural production. Therefore, diagnostic surveys of Zone II and III were conducted to document the existing potentials or suitable factors for sustainable arable crops production in these areas of the state. This will increase the farmers' output, raise their income and reduce rural poverty in line with the current government policy on Agriculture in Nigeria.

## 2. **METHODS:**

### **Geographical Setting of the Surveyed Area:**

Niger State (Fig. 1) covers an estimated area of 58,500km<sup>2</sup> with an estimated population of 2.2 or 2.6 million, 80% of who stay in the rural areas. Zones II and III of NSADP (Fig. 2) are made up of seventeen of the present twenty-five Local Government Areas of the State. The zones cover 53,933km<sup>2</sup> or about 72% of the total land area of the state.

Questionnaires were administered to 400 and 168 respondents in Zones II and III from 57 and 18 randomly selected villages respectively. In addition, village meetings and Participatory Rural Appraisal (PRA) methodology, where focus group discussion aided by semi-structured questionnaires and physical observation of crops in the field were adopted to obtain information on farmers cropping pattern, land use, cropping sequence, cropping calendar, crop protection practices, inputs, estimated yield and general production constraints.

Crops were also observed for nutrient deficiency symptoms as well as for insect pests, disease and rodent problems during the field visits. Fifty-seven Village Extension Agents (VEAs) earlier trained a week prior to the commencement of the surveys administered the questionnaires (40 in zone II and 17 in Zone III). The surveys were conducted in September 2001 and September 2002 in Zones II and III respectively as this period falls within the cropping season of the two zones.

Pre-survey and post survey meetings were held at convenient places arranged by the head farmers or village head. At such meetings the farmers were told the purpose of the visit and the meetings. They were then asked general questions about themselves, their farm activities, crop husbandry and production constraints. In cases of low turnout of farmers, they were divided into groups and the team split into two or three groups for the field visit and the interview to save time. Each village meeting lasted for about one hour.

On the field, each sub-team was accompanied by an interpreter well vested in the local language, usually an extension agent (EA) of the ADP and two farmers identified at the pre-field visit meeting. The farmers were interviewed on the various farm activities followed by the physical observation of the crops for pests, diseases and other abnormalities. Soil and affected crop samples were collected for analysis and laboratory studies. Information extracted from the questionnaires and the village meetings/visits were analyzed using descriptive statistics.

### 3. **RESULTS AND DISCUSSION:**

#### 3.1 **Existing Structures:**

The existing structures in the surveyed area that form prospective impetus for sustainable crop production as revealed by the survey include ownership of land, age of farmers engaged in crop production, farming experience, labour availability, health care delivery, water availability, educational institutions and extension services on developed technologies.

##### 3.1.1 **Land:**

Land ownership was by inheritance in the two zones and it was by no means a limiting factor to crop production. More than 50% of the interviewed farmers own lands of five hectares and above.

##### 3.1.2 **Farmers Characteristics:**

The average age of active farmers (62%) in Zone II falls within the range of 30-40 years while that in Zone III (83%) ranged from 26-50 years (Table 1). These ranges are within age limits where labour is highly productive. It is, therefore, expected that the marginal labour productivity in these zones should be positive and adequately utilized for increased crop production.

##### 3.1.3 **Farming Experience:**

Farming has been a "way of life" for some people in the surveyed area as most of the farmers claimed. Hence 50% of the farmers had farming experience of 30-35 years in Zone II, while 67% of those in Zone III had farming experience of 10-20 years (Table 1). Most farmers in the surveyed area start active farming practices at between the ages of 26-50 years and become less active after 50 years of age (Table 1).

##### 3.1.4 **Labour:**

In Nigeria, labour cost accounts for over 79% of the total cost of agricultural production (Lunning 1963, Phillips *et al*, 1996). In the two zones under study, labour was also the most important input in crop production. Labour determined the area of land to be cropped as well as operations and activities to be carried out in any given season. However, sources of labour in the two zones were from family, communal and contract and at times hired. The cost of these types of labour was, therefore, affordable to the farmer since payment in most cases was in kind. Where hired labour was engaged, payment was also made without cash, but with exchange of farm produce like sorghum,

maize, millet or rice grains in addition to provision of lunch. Where payment was involved at all, it ranged from N250-N350/manday.

Family labour consists of the farmer, his wife/wives, children and extended relatives (where available). The wives and female children participated mainly in harvesting and processing of food crops, while the male children took part in all farming operations performed by the farmer or head. This finding is at variance with claims by Okwuosa (1997) that in Africa, the level of involvement in all stages of agricultural activity by women is very high and that women are not only farmers in their own rights but also labourers on the family farms. In the surveyed zones of NSADP, male children and their fathers performed the labour while women took up planting, processing and sale of surplus crops for the sustenance of the family.

#### 3.1.5 **Health Care Delivery:**

Health care delivery was found to be adequate in Zone II, but inadequate in Zone III which also of 2563 wards was serviced by only 75 hospitals or clinics (NSADP, 1990). This has to be improved because as the saying goes '**health is wealth**', only a healthy farming community will be able to produce more food for its consumption and the surplus sent for sale. It is, therefore, expected that Zone II with adequate health care facilities should have healthier farming families with greater potential for increased food production. On the aggregate, the surveyed area holds promise for increased crop production.

#### 3.1.6 **Water Availability:**

Most of the rural areas of the two zones surveyed use wells, while the urban and semi urban areas like Local Government Headquarters utilize pipe borne water or bore holes and wells. Some remote areas in the zone depend on streams, hills, rivers, ponds, dams or tankers. Water from these sources is got at different seasons of the year as it becomes available depending on the distance of the source from the home. Thus in the wet season, 69% of the villages' surveyed obtained water from streams while 51% got it from ponds in the dry season. Lack of water at any period of the year will affect the farmers and their performances in the field for any given farm operation. There is, therefore, need to increase the number of bore holes in the surveyed zones for farmers use for increased and sustainable crop production especially during the dry season.

### 3.1.7 **Educational Institutions:**

Primary, secondary and tertiary educational institutions were found to be inadequate in both Zones II and III. However, on the whole, more than 50% of the interviewed farmers were literate with basic primary education, secondary or adult education skills. Understanding and adoption of available technologies were, therefore, possible and easier. Thus increased and sustainable crop production can be easily achieved when these literate farmers accept and adopt improved technologies aimed at increasing their production capacities per unit area of land cropped.

### 3.1.8 **Extension Services:**

A few of the interviewed farmers acknowledged the existence of village extension agents and admitted gaining some improved agricultural technologies from them. These technologies were reported to be fertilizer application methods, appropriate fertilizers for specific crops and quantity applied.

Other farmers reportedly got their messages of improved technologies through neighbours, traders, school children, visitors and radios. Generally, the interviewed farmers were eager to learn and adopt new technologies compatible with their farming systems. However, the present embargo on employment has widened the ratio between extension agents to farmers for improved technology information dissemination with increased crop production.

## 3.2 **Soils, Rainfall Pattern and Production Practices:**

Effective crop production is a function of the soil. Soil is the anchor of the plant, the nutrient supplier as well as excess water drainer (Perseglove, 1975).

### 3.2.1 **Soils, Rainfall Pattern:**

Niger state has been divided accordingly into three crop zones based on soil types and rainfall patterns (FUT, 1988). In the present study, result of analysis of the soil samples obtained from the study area showed variations ranging from acidic to neutral, low organic matter (OM) and total nitrogen (TN) content and mostly sandy with patchy clay content (Table 2).

In Zone III where most of the soils are light (Table 3) proper crop management is suggested to achieve soil erosion control, increased water retention capacity as well as OM content of the soils. Such crop management should include surface mulching,

incorporation of crop residues and maintenance of living matter layer on the soil surface. Thus, the frequent or annual burning of crop residues and bushes that is common in the surveyed area should be discouraged to enhance build up of OM content. Instead, the system of allowing cattle to settle on harvested fields and feed on crop residues should be practiced as a measure of increasing soil OM for increased crop productivity.

In Zone II soil fertility maintenance is usually by incorporation of farm yard manure (FYM) where available as well as the application of different types of fertilizers. Efficient N-fixing crops like Sesbania are solicited from research for use by farmers of the zone to improve the impervious soils and enhance their OM and TN status for increased crop yields.

### 3.2.2 **Crop Production Practices:**

Ninety six (96%) and two percent (2%) of the interviewed farmers practice mixed and sole cropping respectively. The crops usually planted sole in the two zones include upland rice, sugar cane, groundnut, maize, bambara groundnut, yam, soyabean and potato. Maize, early millet and sorghum were the crops observed grown sole during the surveys. The most important crop mixtures practiced among the farmers in Zones II and III of NSADP were maize and sorghum, upland rice + maize, sorghum + maize + cowpea.

Yam + late millet, cassava + maize, yam + cowpea and groundnut + late millet in Zone II. The crop mixtures found in Zone III were: sorghum + maize; sorghum + early millet; maize + groundnut, sorghum + groundnut, millet + cowpea, sorghum + early millet + cowpea; maize + groundnut + cowpea; maize + sorghum + groundnut + cowpea and early millet + sorghum + late millet + cowpea.

Reasons given by the farmers for practicing crop moistures were many and diverse. The most important ones being:

- a. Maximization of their resources such as land and labour
- b. Insurance against total crop failure in case of unfavorable weather conditions such as drought and biotic stresses,
- c. High profitability
- d. Improvement of soil nutrient status by legume crops when included in the mixture



- e. Supply of food early in the season whenever a food crop, for example early maize is cropped with a cash crop like rice or other food/cash crops like sorghum.

In addition to these, mixed cropping has been reported to reduce pests' infestations (Bottengburg, 1995). Thus by practicing this culture in the surveyed areas, there is high tendency for overall increased crop production at sustainable level with reduced pest problems.

### 3.2.3 **Crop Husbandry:**

Land preparation which includes land clearing, shrub brushing, burning of felled trees, trashes and old sorghum, maize or millet stalks was reportedly done manually in both zones. However, ploughing and harrowing were claimed as being done mechanically with tractors in Zone III as well as animal traction..

In Zone II, all farming operations from land clearing to harvesting were done manually except in Rafi LGA where ox-drawn implements were used to till the soil.

In Zone III, 61% of the interviewed farmers reportedly cleared their farm lands manually while 33% claimed having access to tractor services, while 6% reportedly used animal traction for this farm operation. The abundance of work bulls in this zone could go a long way in boosting crop production if effectively harnessed and increased from the present 6% level.

### 3.2.4 **Cropping Calendar:**

In Rafi LGA of Zone II and the rest of Zone III, the period of January to April is used for land preparation for next season cropping (Fig. 3). In January also, the harvesting of the previous season sorghum started in December of the preceding year is completed in Rafi LGA of Zone II and in the rest of Zone III. Generally, planting of crops starts in April in most parts of the two zones where the rains commence on time. Where and when the rains delay, planting is equally delayed to May. Crops planted during this period include early millet, sorghum, yam and in some cases groundnut, while maize is planted in May in Zone III. These crops have adapted completely to the climate of this zone and produce marginally to sustain the people. Introduction of high yielding and adaptable crops by research to replace those with low yields should be pursued vigorously and which of course informed the present survey.

In Zone II, the same crops are planted during this period and cotton is also picked at the same time. Between May and June upland rice and other cereals and groundnut are planted in Zone II (Fig 3). This is followed by weeding and fertilization of maize and sorghum 2-3 weeks later in both zones. Planting of upland rice, groundnut and continuation of weeding between June, and July take place in Zone III. The harvesting of green maize and early millet as well as milking of yam commences in August for both zones when cowpea is also planted till September to be harvested in November and December. Earthening up of sorghum constitutes a major farm operation in September and part of October in both zones.

Yam growing areas of the Zones (II and III) have heaping as major farm operation from September to November while actual planting is done between January and March of the following year.

Harvesting is done with cutlasses, hoes (for millet, sorghum and yam) and sickle for rice. Groundnut is usually uprooted with small hoes. Maize plants harvested dry are cut, then stacked upright and allowed to dry further on the field before the cobs are finally removed. Thus the farmers have knowledge of drying their crops particularly cereals to safe moisture levels before storage.

### 3.2.5 **Major Crops Grown in the Two Zones:**

The major crops grown in Zones II and III of NSADP and the percentage of farmers growing them are shown in Table 4. Sorghum is the principal cereal crop grown by 95 and 92% of the farmers in Zones II and III of NSADP respectively. Maize follows with 80 and 83% of farmers growing it in Zones II and III respectively.

The sudden assumption of importance by maize particularly in Zone II was reported by the farmers to be due to the fact that:

- a. Maize matures earlier than sorghum and thrives in years and areas where sorghum failed
- b. It is an additional source of income to the farmer where he sells green maize in August to making for yam in September to augment for land clearing and heap making.
- c. The rainfall period has become unsteady than before, and as maize matures within the limit of the wet season, many farmers go for its production.

- d. While millet and sorghum are used for food, groundnut is produced purely for cash, while maize is produced for both cash and food. The first reason advanced by the farmers of Zone II for growing maize is suspect. Sorghum is renowned for its hardiness in drought areas while maize is very susceptible to drought and has been used as indicator plant in studies involving drought stress (Onwuene and Sinha, 1991).

In Zone II, the dominant food and cash crop is yam and is grown by 60% of farmers in 75% of the zone. Maize, sorghum, millet are the main crops in Rafi LGA of the zone. The availability of abundant land, effective labour force, adaptable crop species, clement weather and sparse vegetation in the surveyed area has demonstrated the potential of Niger State as one of the leading food production states in Nigeria.

#### 4. **CONCLUSIONS AND ASSUMPTIONS FROM THE STUDY**

- 4.1 The surveys' report has revealed that Niger State possesses great potential for increased sustainable arable crop production due to its medium dense population and vast arable land.
- 4.2 The age of the people involved in farming suits that for positive production activities on the farm.
- 4.3 Most of the rural areas where those involved in productive farming reside are linked by network of feudal and tarred roads sufficient to aid easy mobility of farm inputs and products for marketing.
- 4.4 Tertiary institutions abound in the state, particularly in the surveyed area where technologies aimed at increasing crop productivity are being generated. Equally, needed manpower is available for the dissemination of these technologies in the study area only for the present non recruitment of manpower in the extension arm of the service as the result of dwindling state resources. Farmer education in technology acquisition and adoption is therefore, feasible.
- 4.5 The absence of high population of big trees in the two zones will make mechanization and clearing of vast areas of land possible. As a result of the absence of thick bushes and scattered trees, average farm size in the two zones will always be larger than what obtains in the forest zone of Nigeria.
- 4.6 Improved collaboration activities between research and extension as revealed by the present study will ginger increased sustainable crop production using correct technologies.

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## REFERENCE

- Anonymous 1988. Second Multi-State Agricultural Development Project File – Working Papers Vols. 1 – 3
- Anonymous 1997. Niger State Agricultural Development Project (NSADP) Report Pp 39 – 62 In: Proceedings of the 9<sup>th</sup> Middle Belt Zonal OFAR/SPAT Workshop. Held at FCT (Abuja) ADP, Gwagwalada, 11 – 14 March 1997.
- Bottengburg, H. 1995. Farmers Perceptions of Crop Pest Control Practices in Kano, Nigeria. *Int. Journal of Pest Management*. 41(4): 195-200.
- FUT, 1988. Federal University of Technology Minna. Preliminary report on Ecological Zoning of Niger State.
- FUT, 1989. Federal University of Technology, Minna Research Project on Ecological and Land Use Mapping of Niger State Phase II Report.
- Kehinde, J.K., Ikejimba, D.U., Wada, A.C. and Shiawoya, E.L. 1991. Diagnostic Survey of Farming Systems of the Zone II of Niger State Agricultural Development Project 65pp A & S Printers Nig. Minna.
- Kehinde, J.K., Shiawoya, E.L., Ukwungwu, M.N., Adegbehin, J.O., Amosun, A., Ikejimba, D.U. and Kolo, R.E. 1993. Diagnostic Survey of Farming Systems of Zone III of Niger State Agricultural Development Project Technical Bulletin (3). 75pp. Pub. By FACU, FDA, Abuja.
- Lunning, H.A. 1963. An Agro-Economic Survey of Katsina Province, Kaduna Local Government Printers, Nigeria.
- NSADP 1990. Niger State Agricultural Development Project Zone III zonal report
- Okwuosa, C. Ada, 1997. Women and Food Security in the Context of Household Economy and Rural Food Systems. Pp 199 – 211 In: Shaib, B., N.O. Adedipe, N.O., Aliyu, A. and Ijir, M.M. (eds). *Integrated Agricultural Production in Nigeria: Strategies and Mechanisms of Food Security*. Publ. NARP Monograph No. 5. By Fairchild Designs and Prints; Ibadan.
- Onwuene, I . C . and Sinha, T. O. 1991. Field Crop Production in Tropical Africa. CTA Publications, Wageningen. The Netherlands, 480pp.
- Phillips, A.O. and Ajakaiye, D.O. 1996. Economic Background to the National Agricultural Research Strategy Plan Pp 25 – 27 In: Adedipe, N.O., Bakshi, J.S., Odegbaro, O.A. and Aliyu, A. (eds). *Evolving the Nigerian Agricultural Research Strategy Plan: Agro-Ecological Inputs*.
- Purseglove J W, Editor, 1975. Tropical crops dicotyledons, 719pp. London: Longman.
- Wada, A. C., Kehinde, J. K., Ukwungwu, M. N., Adagba, M. A., & Usman, A. (2013). Some Factors Influencing Arable Crop Production in Niger State, Nigeria. Open Science Repository Agriculture, Online(open-access), e23050458.

Table 1: **Percentage age group and number of years involved in farming y farmers of Zones II and III, Kontagora, NSADP (Zone II, n = 400; Zone III, n = 168)**

<b>Zone</b>	<b>Age Group</b>	<b>% Age Group</b>	<b>No of Years on Farm</b>	<b>% Years on Farm</b>
II	21.25	5.60	1 – 5	6.25
	26.30	10.30	6 – 10	10.50
	31.35	16.00	11 – 15	16.75
	36.40	15.00	16 – 20	33.50
	41.45	20.10	21 – 25	4.00
	46.50	25.00	26 – 30	6.00
	51.55	5.00	31 – 35	7.00
	56.60	2.00	36 – 40	16.00
	61 and above	1.00	41 and above	0.00
III	21.25	17.19	1 – 5	7.45
	26.30	12.58	6 – 10	10.39
	31.35	16.17	11 – 15	10.53
	36.40	23.95	16 – 20	18.01
	41.45	13.77	21 – 25	18.62
	46.50	16.17	26 – 30	12.00
	51.55	2.99	31 – 35	10.00
	56.60	3.39	36 – 40	8.00
	61 and above	4.79	41 and above	4.00

Table 2: Chemical and Mechanical Analysis of Top Soil (0-15cm) in Zone II

Location	LGA	PH	% Organic Matter	Total Nitrogen (%)	Available $\mu\text{g/g}$	K (cm)	Sand (%)	Clay (%)	Silt (%)
Gidigori	Rafi	5.9	0.80	0.3.	2.58	0.23	78.8	9.2	12.0
Gidigori	Rafi	5.0	1.19	0.05	5.17	0.29	85.6	7.2	7.2
Yakila	Rafi	4.6	2.38	0.05	1.29	0.31	80.4	9.6	10.0
Kuta	Shiroro	4.6	1.19	0.03	5.60	0.23	89.6	5.2	5.2
Fuka	Shiroro	5.2	3.18	0.05	3.87	0.68	78.8	13.6	7.6
Kafinkoro	Chanchaga	4.5	1.59	0.05	3.44	0.15	85.0	9.6	9.4
Maikunkele	Chanchaga	5.1	1.19	0.03	3.44	0.64	90.4	5.6	4.0
Zariawa	Suleja	4.7	1.19	0.075	0.86	0.44	77.0	13.6	9.4

Table 3: Chemical Properties of the Soil of NSADP Zone III

Sample Description	pH	Organic Carbon (%)	Organic Matter (%)	Total Nitrogen (%)	Available P $\mu$ g/g	A(3+)	Exchange Cations (kg)			CEC	EA	Sand (%)	Silt (%)	Clay (%)	Fe $\mu$ g/g	
							Na	K	Ca							Mg
Mariga	0-20	0.67	1.15	0.06	5.74	Trace	0.11	0.15	1.09	0.17	1.56	0.04	87.7	87.7	7.4	5.27
Mariga	20-40	0.36	0.62	0.03	1.44	Trace	0.10	0.12	0.65	0.10	1.07	0.1	77.2	77.2	5.2	0.91
Tunga Bunu	0-20	0.93	1.6	0.08	2.87	Trace	0.10	0.45	2.07	0.75	3.44	0.07	52.8	52.8	17.2	3.10
Tungan Bunu	20-40	0.66	1.14	0.06	1.44	Trace	0.11	0.19	2.96	1.21	4.61	0.14	49.7	49.7	27.4	33.00
Wushishi	0-20	1.86	3.2	0.16	2.16	1.06	0.11	0.41	1.9	1.11	10.15	5.56	11.7	11.7	47.4	0.09
Wushishi	20-40	0.74	1.27	0.06	1.44	0.66	0.10	0.14	1.45	0.76	9.80	6.59	11.5	11.5	49.2	5.50
Rijau	0-20	0.49	1.84	0.04	4.31	Trace	0.11	0.27	0.88	0.21	1.57	0.1	75.2	75.2	7.2	21.00
Rijau	20-40	0.34	1.12	0.06	2.87	Trace	0.08	0.24	1.05	0.39	1.91	0.15	75.5	75.5	11.2	1.00
Salka	0-20	0.63	1.08	0.05	48.79	Trace	0.11	0.23	3.05	1.28	4.77	0.10	91.5	91.5	3.3	15.60
Salka	20-40	0.24	0.41	0.02	4.31	Trace	0.10	0.1	0.36	0.13	0.74	0.05	81.5	81.5	11.2	2.60
Danrangi	0-20	0.13	0.22	0.01	1.44	Trace	0.10	0.12	0.39	0.08	0.79	0.10	87.5	87.5	5.2	0.08
Danrangi	20-40	0.18	0.31	0.02	25.11	Trace	0.10	0.08	0.28	0.06	0.57	0.00	87.5	87.5	5.2	0.76
Rafingura	0-20	2.01	3.46	0.17	45.92	Trace	0.10	0.1	0.71	0.15	NA	NA	83.5	9.3	7.2	0.86
Rafingura	20-40	1.16	3.43	0.17	48.79	Trace	0.10	0.22	2.52	1.07	4.00	0.09	87.5	5.3	7.2	2.07
Babban Rami	0-20	0.96	1.65	0.08	10.76	Trace	0.11	0.1	0.57	0.14	1.01	0.09	81.5	13.3	5.2	16.00
Babban Rami	20-40	0.09	0.15	0.01	1.44	Trace	0.11	0.11	0.19	0.56	0.56	0.12	89.5	3.3	7.2	0.62
Gulbin Boka	0-20	0.55	0.95	0.05	7.18	Trace	0.10	0.26	2.29	0.57	3.35	0.13	72.1	20.9	7.0	7.70
Gulbin Boka	20-40	0.36	0.62	0.03	2.87	Trace	0.11	0.14	2.442	0.59	3.37	0.09	72.1	14.9	13.0	3.9
Tungan Wawa	0-20	0.53	0.91	0.05	5.74	Trace	0.10	0.07	1.6	0.56	3.03	0.12	89.5	5.3	5.2	3.20
Tungan Wawa	20-40	0.76	1.31	0.07	1.44	Trace	0.11	0.18	0.62	0.13	1.14	0.1	82.1	10.5	7.4	3.2
Kaboji	0-20	1.21	2.08	0.1	1.44	Trace	0.09	0.26	2.89	0.22	4.58	0.12	57.9	20.7	21.4	1.4
Kaboji	20-40	0.54	0.93	0.05	1.44	Trace	0.11	0.38	1.98	0.70	3.23	0.06	34.1	28.5	37.4	3.9
Shambo	0-20	0.81	1.39	0.07	5.74	Trace	0.11	0.19	2.28	0.43	3.15	0.14	76.1	10.5	13.4	3.30
Shambo	20-40	0.76	1.31	0.07	2.16	Trace	0.10	0.26	1.46	0.46	2.39	0.11	68.1	14.5	17.4	0.7
Urungwa (T/Wada)	0-20	0.82	1.41	0.07	14.35	Trace	0.10	0.13	1.3	0.60	2.20	0.07	85.5	5.3	5.2	2.6
Urungwa (T/Wada)	20-40	0.34	0.58	0.03	2.87	Trace	0.11	0.15	0.49	0.32	1.20	0.13	87.7	4.9	7.4	0.4
Tungan magajiya	0-20	0.94	1.62	0.08	11.48	0.79	0.11	0.31	1.77	0.99	8.05	4.08	69.7	16.9	13.4	3.4
Tungan Magajiya	20-40	0.57	0.98	0.05	2.16	Trace	0.10	0.20	2.22	0.03	3.65	0.1	57.7	12.9	29.4	12.1



Table 4: **Major Crops and the Percentage of Farmers growing them in Zones II and III of Niger State Agricultural Development Project**

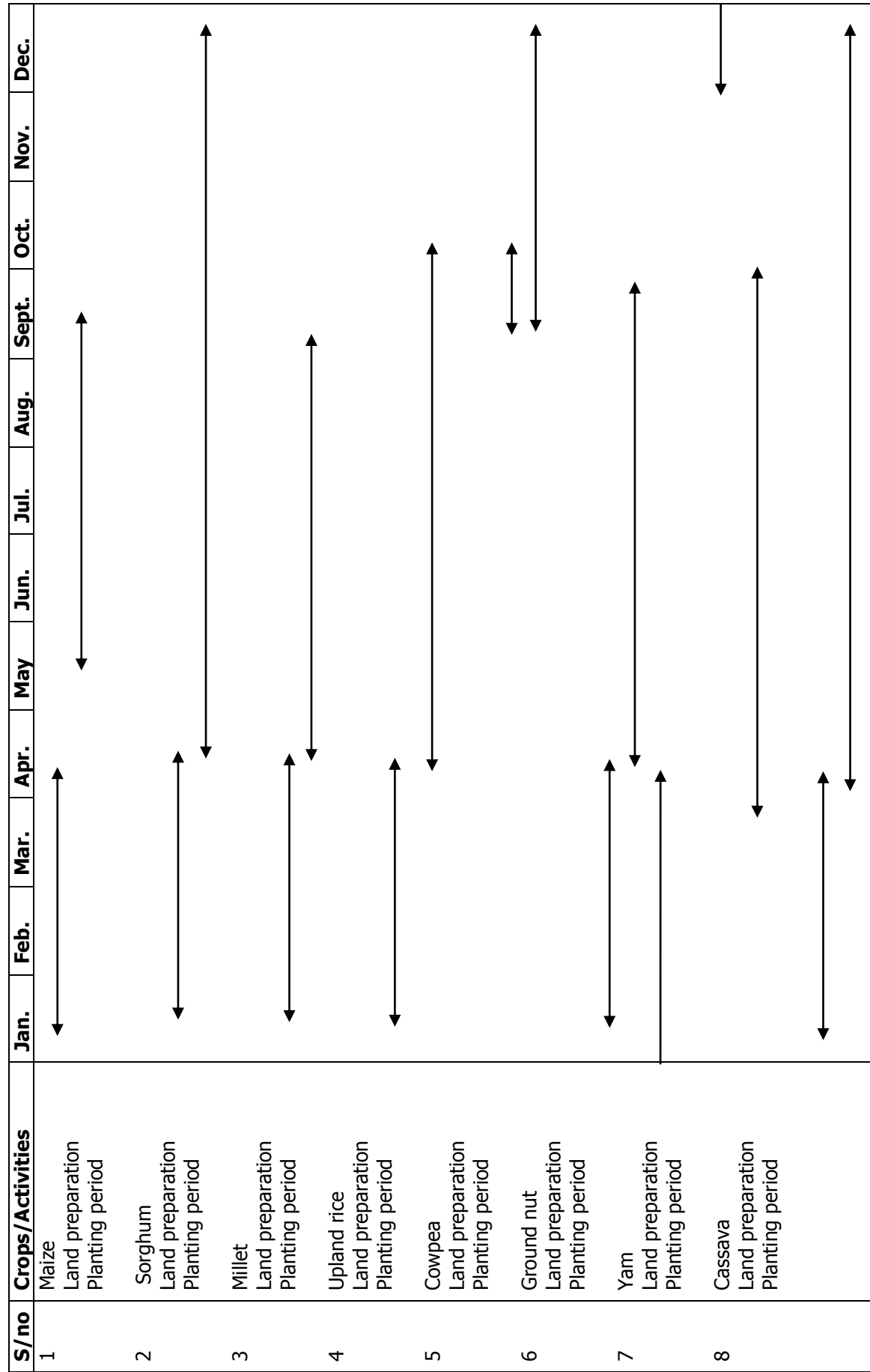
<b>Zone</b>	<b>Crop</b>	<b>% of Farmers</b>
II	Yam	60
	Sweet potato	25
	Maize	80
	Sorghum	95
	Late millet	75
	Groundnut	80
	Pepper	40
	Soyabean	25
III	Maize	83
	Sorghum	92
	Millet	58
	Groundnut	65
	Cowpea	48
	Upland rice	35
	Sugar cane	15



**Fig 1: Map of Niger State**



Fig 2: Map of Niger state showing Agricultural zones



**Fig 3: Cropping calendar for major crops in zones II and III of Niger state**