

**NRCRI**

**CIRAD**

**ANALYSIS OF AGRONOMIC YAM  
PRODUCTION SURVEYS  
IN NIGERIA**

**By NWAKAEGO EUCHARIA UZOKWE**

**May 1998**

**NRCRI**

**CIRAD**

**ANALYSIS OF AGRONOMIC YAM  
PRODUCTION SURVEYS IN NIGERIA**

**Nwakaego Eucharika UZOKWE**

**May 1998**

## **1. Introduction**

One of the objectives of this study is to eliminate constraints imposed by the use of primitive methods in production by applying available technologies innovated. This will thus intensify and improve the production of yam, thereby making it a more profitable venture.

The production survey was carried out in three major yam producing and processing areas of chips in Nigeria. These are Oyo (north), Kwara and Benue (Zaki Biam) states (In Yam valorisation: Yam chips for Urban Markets, G. C. Okwor, 1977: unplied).

### **1.1 Data analysis**

Analysis was done using Winstat, a statistical software in Window version produced by the effort of CIRAD and ITCF. Processed data entered into this software is automatically classified into different variables such

as - qualitative, quantitative and character variables, in tabular form, to aid easy analysis.

It has also been able to give automatically chosen and missing values with their means, medianes, percentages frequency, effectiveness, mode and variances with and without ponderation of the individuals. The same calculation can also be reproduce under different division in a population.

At the end, Winstat has proved a useful, very organised and simplified tool for this analysis.

## RESULTS

### YAM CHIP PRODUCTION

The questionnaire and results of the analysis is as follow;

#### 2.1 Question 2

##### Ethnic groups distributed into their various states

The result gotten is distributed into tables as follow;

ethnie	Oyo	Kwara	Benue	Total
Yoruba	18	-	-	18
Otamari	1	-	4	5
Bini	1	1	-	2
Bielebe	1	-	-	1
Baruten	1	-	-	1
Bariba	-	17	-	17
Ibaruba	-	4	-	4
Zabarma	-	1	-	1
Hausa	-	1	-	1
Total	22	24	4	50

#### •Ethnic group of the agricultural surveys.

Most of the result were attributed to Yoruba (Oyo) and Bariba ( in Kwara state), because there are more Yam producers and consumers in this area. In Benue state, agricultural production is homogenous. Other crops are produced as well as Yam.

#### 2.2 Question 3 to 5

What are the proportion of the family population, female labour force and male labour force above 10 years?

ethnie	nombre de familles	actifs masculins	actifs féminins	total actifs
Yoruba	18	4.9	3.35	13.6
Otamari	5	3.2	6.0	27.8
Bini	2	13.5	31.0	44.5
Bielebe	1	7.0	2.0	9.0
Baruten	1	7.0	8.0	15.0
Bariba	17	4.8	5.0	9.8
Ibaruba	4	3.5	5.0	8.5
Zabarma	1	9.0	7.0	15.0

Hausa	1	22	5.0	27.0
Total	50	5.5	5.6	14.8

**•Effective family mean per exploitation**

Census of people living on the farm with their various male and female labour force, capable of working on the farm were taken, and the and the ethnic group of Bini seems to be most important because of its large effective number of labour force.

It can also be seen that the number of active female is slightly higher than that of the male except for Yoruba, Bielebe, Zabarma and Hausa with insignificant proportion. This might be due to the fact that female in this area engage themselves more in some other activities such as commercialization and housekeeping than farming.

**2.3 Questions 8 to 15**

**Yam and other main crops present in the exploitations.**

CULTURE	OYO		KWARA		BENUE	
	HA	EFFECTIF	HA	EFFECTIF	HA	EFFECTIF
Igname	1.8	19	2.2	18	2.2	2
Manioc	2.6	17	1.1	9	0.4	2
Mais	5.9	14	3.3	7	0.4	1
Igname-Niebe	0.8	1	1.6	2	0	0
Igname- Manioc	0	0	2.5	4	2.4	2
Coton	0	0	3.9	6	0	0
Mais-Sorgho	2.1	5	0.3	9	0	0
Niebe	2.2	5	1.2	1	0	0
Riz	2.4	3	5.5	5	2	1
Arachid	2.6	6	0.2	1	0.8	2
Sorgho	5.3	9	1.6	9	1.7	2
Autres	3.5	5	0	0	5.2	4

**•Principal crops other than yam present in the survey.**

Looking at the most important crop cultivated and land area used, it can be seen that, although Yam sometimes has small land area, it has a very high effectiveness as in production. Production ranges from highest to lowest in Kwara, Oyo and Benue, with effectiveness of 17, 18 and 2 respectively.

## 2.4 Question 6

### Number of yam field per exploitation.

Nombre de champs d'igname par exploitation	effectif
1	12
2	10
3	18
4	10
<b>Total</b>	<b>50</b>

For the above variable, its mediane is the second yam field.

## 2.5 Question 16 to 35

### Preceding crops or land use before Yam cultivation in 1996 (in % of land yearly).

année de culture avant 1996 (n) précédent cultural	n - 1 1995	n - 2	n - 3	n - 4	n - 5 1991
Igname	8.1	17.7	7.4	6.6	2.9
Manioc	3.7	2.2	0.7	1.5	19.9
Mais-sorgho	12.5	0	2.2	0	0
Niebe	1.5	0.7	2.2	0.7	0
Jachère	6.6	7.4	13.2	15.4	19.9
Jachère <10 ans	15.4	14	25	25.7	17.7
Jachère 10 - 20 ans	8.1	16.9	12.5	17.7	9.6
Jachère > 20 ans	10.3	15.4	11.8	5.15	7.4
Mais	14	13.2	3.7	1.47	2.94
Arachid	0.7	2.2	2.2	2.9	3.7
Melon	0.7	0.7	0.7	0	0
Sorgho	9.6	3.7	5.9	2.9	6.6
Mais - Niébe	2.2	0	1.5	0	0
Coton	1.5	1.5	0	0	0
Nombre total de parcelles (unité)	131	131	122	111	100
Parcelles (%) cultivées / 1996	60	46	38	36	45

**•Preceding crops.**

Total land cultivated in 1991 was 45%, and it decreases to 36% a year later, which means that the rest of the land was fallowed. In 1992, land cultivated was 2 years more than the previous year, and 1994 fallowed land decreases to 54% . This might be a good reason for the high effectiveness of yam in 1994, which means that most of the fallowed land were used up for the cultivation of yam.

**2.6 Question 36**

**Choice of fields for chip variety cultivation**

Critère de choix	fréquence des réponses (%)
plutôt derrière défriche-brûlis de jachère longue	36
choix indifférent	44
sol humid	2
Land fertile	2

**•Choice of fields.**

36% of Agriculturist prefer cultivating their yam for chips production after long fallow. That is, a very good proportion of farmers will go for fertile soil which is gotten at the end of slash and burn whereby the soil renew / regain its fertility

**2.7 Question 37**

**When you grow yam to process into chips, do you use different special technical practices from those used for other yams Yes / no (in % of response)**

	Oyo (n=22)	Kwara (n=24)	Benue (n=4)
Façon identique	5	0	0
Façon differente	91	67	100
Façon indifférence	5	33	0

**•cropping adoption.**

91% of farmers in Oyo state does not cultivate yam for chips production the same way they do for other yams uses. In Kwara state, 67% of farmers response show that yam for chip production is cultivated differently. Benue state has 100% response showing also that yam chip is not cultivated alike as in yam for other processes. Therefore, the overall result shows that the farmers will rather prefer to cultivate their yam for chip production in a special way.

**2.8 INVENTORY OF VARIETIES USED FOR PROCESSING INTO CHIPS**

**2.8.1 Question 43 to 83**

**Varietal inventory**

variété	nbre buttes	buttes/parcel.	parcelle/var.
Ikokoro	260703	7667.7	34
Olodo	7430	1857.5	4
Efunyebe	8402	1680.4	5
Iyawokolorun	4902	2451	2
Alakisa	18427	2047.4	9
Ehura	23725	2372.5	10
Aimo	120	120	1
Okumade	3000	1500	2
Akoko	9900	3300	3
Kemi	34701	3470.1	10
Kokumo	1500	1500	1
Arasinri	3300	1100	3
Gbenra	14380	2876	5
Lansinri	3000	3000	1
Keregbe	3000	3000	1
Keso	3000	3000	1
Aro	2000	1000	2
Tampanu	4000	4000	1
Ijejo	4500	2250	2
Obegi	3460	3460	1
Koko	42215	6030.7	7
Tandura	95355	4767.8	20
Shakuru	40701	2142.2	19
Agara	1875	1875	1
Sabunkori	600	600	1



Osunkp	7600	3800	2
Nwese	2450	2450	1
Agatu	10340	3446.7	3
Amula	20760	6920	3
Damancha	24670	8223.3	3
Sandpap	2310	1155	2
Agbo	2980	1490	2
Alakpa	920	920	1
Pop totale	666226	4087.3	163

From the table in figure 2.8.1, five main varieties for producing yam chips in Nigeria are Ikokoro, kemi, Ehura, Tandura and Shakuru. Out of all this, Ikokoro is most preferred by the population with a total mound number of 260703 and 34 field per variety is used.

## 2.8.2 The importance of the crops

	variété à cossettes		surface cultivée
	buttes / exploitation	moyenne / buttes	ha
Oyo	274100	13052	2.72
Kwara	454689	18945	4.97
Benue	72960	18240	1.43
Total	801749	16362	2.48

### •Crops importance

Crop importance here is related to mound density. Kwara state has a higher mound density than Oyo by 274100 mounds against 454689 mounds. Benue state has the lowest number of mound. This might be attributed to low soil fertility, thereby bringing about the need to carry out more studies on the soil fertility for yam production. Their surface area per buttes are 2.72, 4.97, and 1.43 respectively.

## 2.9 The cropping calender

### 2.9.1 Planting period

### 2.9.2 Harvesting period

A good proportion of cropping and harvesting is done within the month of November and February. This normally start after harvesting other crops such as, Guinea corn, cotton, cowpea and so on, in order not to bring about a delay in the cultivation processes of other crops.

## 2.10 Destination of fresh tubers and their chips

critère	Total
Proportion moyenne de tubercule transformée en cossettes	35.28
% de cossette vendues effectif	0.5% 1
% de tubercules frais vendues effectif	6.97% 14

The proportion of yam tuber transformed to chips is about 35%. 0.5% of the transformed yam was sold. Fresh tuber sold was 6.97%. This means that the chips transformed must have been used for other purposes.

## 2.11 Types of chips produced

Approximately 48% of chip produce is big sized. 3% of farmers like their chips small, while 16% like it mixed. From the above, it shows that most of the farmers would rather produce large sized chips.

## PROCESSING OF CHIPS FOR COMMERCIALISATION

### 2.12.1 Questions 93 to 95

In what months do you process into chips (in number of response)

Fabrication de cossettes	mois le plus important	2ème mois	3ème mois
Novembre	-	-	1
Décembre	11	1	5
Janvier	23	20	3
Fevrier	15	21	7
Mars	-	6	8
Avril	-	-	2
Total	49	48	26

### •Transformation calender.

Yam chip processing is mainly between December and February with January having the highest period of processing. This can be related to the very dry period of harmattan, which facilitate easy / rapid drying of the chips.

### 2.12.2 Question 100

Do you parboil the chips?

### If yes for what reasons

Non, jamais	
6	
Oui, toujours	
44	
Oui, pour certains cas	
0	

44 out of 50 farmers parboil their yam chips. This shows that parboiling is a necessity, which facilitate the progelification of the chips and might also prevent chip colouration if well taken care of.

### 2.12.3 Question 103

**Do you add something (vegetal products) in addition to the tubers during parboiling?**

Non, jamais	16
Oui, toujours	27
Parfois	5

27 farmers add vegetable product, in order to prevent overcooking of the yam and also prevent it from burning and eventually sticking to the bottom of the pot.

### 2.12.4 Question 104

**If yes or sometimes, what kind of product do you use.**

Panicule des sorgho rouge :	
8	
Feuilles d'arbre	
22	
Plusieurs produits	
7	
Rien	
18	
total : (réponses)	
50	

The product used are mainly leaves from trees, red sorghom panicle and thick shoots.

### 2.12.5 Question 108

#### Why do you use these products?

option utilisée	nombre de réponse (50)
sur le champs de récolte	17
Dans le campement de brousse	17
Dans la maison au village	7
Champ et campement de brousse	3
Champ et maison au village	2
Campement et maison au village	1
Lianes d'igname au champ	3

The farmers process their yam chips directly on the harvested field because of transport problem, or in a hut / farm near the farm.

### 2.12.6 Question 109

#### On what surface do you dry chips?

Usage	nombre de réponses
Sur le sol directement	7
Sur de la paille ou des feuilles	18
Sur des rochers	11
Sur le plate-forme	4
Sur lianes d'ignames	9
Sur paille et sur rocher	1

Majority of the chips are dried on a bed - like surface lined with yam pines or leaves, followed by drying on rocks. Drying on platform is rarely used.

## CONSERVATION

### 2.13.1 Question 110

**Do you use chemicals or natural products to protect chips during storage?**

(number of response based on 50 individuals)

Non, jamais	19
Toujours	12
Parfois	10
Indifferent	9

A good proportion (12 responses) used chemical product to store their processed chips, which depends on the duration of the storage.

### 2.13.2 Question 111

**If yes what product do you use?**

Insecticides	4
Acetic 2%	7
Nuvacron	1
Fumigant	1
Phostoxin	5
Chimique en poudre	2
Gamalin	28

About 80% of the product used, which constitute Gammalin and other powdered chemicals are dangerous to health, if enough care is not taken.

### 2.13.3 Question 112 to 134

**Yield measuring on ten mounds per cultivars**

variétés (effectif)	poids moyen tuber. en kg	tubercules /pied	rendement en t/ha
Olodo (7)	19.04	42.33	11.92
Ikokoro (14)	17.87	33.50	12.75
Ehura (3)	14.00	25.33	10.61
Field 1 (1)	30.80	24.00	14.46
Agara (1)	14.60	22.00	11.41
Shakuru (1)	28.30	26.00	18.92

Although, yam weight in tuber of Olodo (7) is 19.04, Ikokoro (17) is more effective than it, with yield per hectare of 11.92 and 12 tonnes respectively.

#### 2.13.4 Question 135

##### Choice of tubers to be processed into chips

Selection of tubers used for chips production depends on the region or state and also on the variety used. In Kwara and Oyo state, the farmers prefer using both small and big sized tubers. In Benue state, the farmers prefer the medium size tuber for processing yam.

#### 2.13.5 Question 136

##### What do you do with unprocessed tubers?:

usage	effectif
consumption	45
sales	1

Most of the unprocessed chip is rather consumed by the farmer and their family.

### COMMERCIALISATION

#### 2.14.1 Question 137

##### Usually for how long do you store yam chips before selling them (in month)

Durée minimum	effectif	Fréquence	Durée maximum	effectif	Fréquence
1 mois	4	8.51	2 mois	3	6.12
2 mois	7	14.89	3 mois	3	6.12
3 mois	24	51.06	4 mois	5	10.20
4 mois	4	8.51	5 mois	12	24.49
5 mois	2	4.26	6 mois	9	18.37
6 mois	6	12.77	7 mois	6	12.24
			8 mois	7	14.29
			12 mois	2	4.08
Total	47	100		49	96.92

75% producers conserve their yam chips within the minimum period of 1 and 3 months, while 49% conserves at the maximum period of 6 and 12 months.

or

---

régions (effectif)	minimum	(écart-type)	maximum
Oyo 22	3.6	(1.5)	6.2 (2.1)
Kwara 24	3.0	(1.3)	5.0 (1.7)
Benin 4	2.8	(1.3)	7.8 (3.1)
Total (50)	3.2	(1.4)	5.8 (2.1)

---

•storage period of chips (maximum and minimum in month after processing)

The storage period of chips is mainly between 2 and 7 months with the lowest in Benue state.

### 2.14.2 Question 139 and 140

#### What periods do you sell more chips

In Oyo state, selling is mostly in July and August. While in Kwara state, June and July, and also in Benue state. Therefore we can say that globally in Nigeria, chip can be gotten cheap within the period of June and August.

### 2.14.3 Question 141 and 142 When do you consume mostly chips:

Consumption in Oyo state mainly takes place between March and July, while between February and August in Kwara state. Benue state consume most of its yam chips within March and July. Overall, consumption is virtually distributed over the first 8 months of the year.

### 2.14.4 Question 143 and 144

#### How much chip do you commercialise last year 95 / 96

---

ethnie	1-vente déclarée en kg	2-vente déduite en kg
Yoruba	3679	335
Otamari	315	105
Bini	5355	2677
Bielebe	105	105
Baruten	9803	105
Ibaruba	1817	817
Zabarma	0	454
Haua	250	250
moyenne	21429	612

---

The highest amount of chip is sold in Baruten (9803 kg) in Kwara state.

### 2.14.5 Question 145

#### How do you commercialise chips

ethnic (effectif)	vente sur le champ	stockage	vente sur le marché
		et vente à la maison	du village
Yoruba (18)	16	22	44
Otamari (5)	0	0	100
Bini (2)	0	100	0
Bielebe (1)	0	0	100
Baruten (1)	0	100	0
Bariba (17)	6	76	0
Ibaruba (4)	25	25	25
Zabarma (1)	0	100	0
Hausa (1)	0	100	0
quantité vendue en kg	105	917.94	1502

The Yoruba, Bielebe and Otamari ethnic group carry most of its chip to sell in the market. While the Bini, Baruten, Zabarma and Hausa (100%) sell their's at home. This might be due to the fact that it is the women who sell yam chips, and due to religious reason will prefer to stay at home and sell because they cannot go out.

### 2.14.6 Question 148 to 150

#### Evolution of yam chip production

Cossette d'igname évolution	Oyo (22)			Kwara (22)			Benue (4)		
	↑	↓	→	↑	↓	→	↑	↓	→
production	27	68	5	46	54	0	75	25	0
vente	27	68	5	50	50	0	25	75	0
autoconsomation	86	9	5	96	40	0	100	0	0

↑ : plus → : moins ↓ : indifferent

**production:** In Oyo and Kwara state 68 % and 54 % response show that yam production is decreasing, but 75 % response shows that yam production is increasing in Benue state.



**sales:** Less yam chips (68 % and 75 %), is sold in Oyo and Benue state respectively, While there has been uniform sales of yam over the year in Kwara state.

**Autoconsumation:** Result showed that more yam is being consumed in the 3 states (86 %, 96 % and 100%) respectively.

### 2.14.7 Question 151 and 152 : Do you also process and commercialise cassava into chips?

More yam is produced in Oyo state than cassava, while equal amount is produce in Kwara state. In Benue state, more cassava is produced than yam. More yam is sold in Oyo and kwara, while same number of yam and cassava are sold in Benue state.

### 3 Conclusion

In the survey, results were mainly evaluated from 22 villages in Oyo, 24 villages in Kwara and 4 villages in Benue state. This can be term a very good sampling survey across Nigeria. The villages are as follows:

Village	exploitation enquêtées
<u>Région d'Oyo (22 villages)</u>	
Idi - Apa	3
Tede	3
Alakuko	2
Temileke	2
Oge Ilua	2
Kanko	1
Baabo	1
Egbeda	1
Orioke Ataye	5
Eri oko	1
Ilesha	1
<u>Région de Kwara (24 villages)</u>	
Ilesha Baruba	12
Kenu	4
Yashikira	3
Sina toko	2
Chikanda	3
<u>Région de Benue (4 villages)</u>	
Shor, Zaki, Mbamana, Tse - uzo zaki	4