SOCIOECONOMIC SURVEY OF TRADITIONAL COMMERCIAL PRODUCTION OF COCOYAM LEAF FOR RTIMP

A REPORT ON:

PRODUCERS AND TRADERS IN THE FANTEAKWA DISTRICT

BY:
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1.0 INTRODUCTION

1.1 Background

Cocoyam, *Xanthosoma* spp., is cultivated in tropical regions for human nutrition, animal feed, and cash income for the farmers (Onwueme, 1988). Cocoyam is vegetatively propagated using the corms and to a lesser extent the cormels. As food for human consumption, the nutritional value of the various parts of cocoyam is primarily caloric. The underground cormels provide easily digested starch; and the leaves are nutritious spinach-like vegetable, which give a lot of minerals, vitamins and thiamine (Wilson, 1984; Jennings, 1987; Bown, 2000). Liefstingh (1963) indicated that the leaves have a protein content of 22.17g per 100g dry weight. In Ghana cocoyam is generally grown by small-scale farmers and therefore cocoyam farms under intensive management are highly limited. Since cocoyam tolerates shade, the crop is frequently grown in intercropping systems together with permanent crops such as banana, coffee, coconut, rubber, oil palm and cocoa (Wilson, 1984; Bown, 2000). Cocoyam leaf for example is still produced on subsistence basis and pickers who are not farmers dominate the harvesting and marketing of cocoyam leaves in areas like the Asante Akim South and district (Osei-Agyemang et al; 2003).

Despite the usefulness of cocoyam leaves as enumerated above, the cocoyam leaf industry in Ghana is beset with problems. Some of these problems are;

a) Lack of sustainable production through the year as a commercial activity. Although cocoyam leaf production and marketing has been commercialized, typical commercial farms solely for cocoyam leaf production as done in other countries (Carribean regions and Tropical Asia) is lacking in Ghana. Mostly cocoyam leaf is seen as a by-product from cocoyam production.

b) Cocoyam and for that matter its leaf production has been severely affected by the alarming rate of forest degradation in Ghana as the bulk grow in forest areas after the clearing of virgin forests and previously cocoyam cultivated areas which have been fallowed. The buried corms and cormels in the soil sprout in large populations when favourable conditions are present after clearing the vegetation cover.

c) Lack of improved varieties for commercial cocoyam leaf production. The harvesting of leaves of these local varieties as a leafy vegetable at certain stages of growth (especially at bulking) has been observed as a constraint for the crop's production and productivity. Ghana has not officially released any improved cocoyam variety for farmers, not to mention one developed specifically for leaf production as found elsewhere.

d) Cocoyam leaf poses major challenges with respect to distribution and marketing because of its highly perishable nature

e) Inadequate research on cocoyam (and for that matter commercial cocoyam leaf production) as compared to other root and tuber crops. Literature on Ghanaian cocoyam leaf production is therefore scanty and not readily available for current needs and expectations. It is therefore imperative to undertake intensive research on these critical areas of the crop.

This survey/activity being sponsored by The Root and Tuber Improvement and Marketing Programme (RTIMP) therefore seeks to address some of the problems identified above. The Root and Tuber Improvement and Marketing Programme (RTIMP) seek to enhance food security and improve livelihoods of the rural poor. The main purpose of the programme is to build competitive and market based root and tuber commodity chain supported by relevant, effective and sustainable service available to the rural poor.

1.2 Objectives

The main objective of this survey was to provide a thorough description of the traditional and/or commercial cocoyam leaf production and marketing systems from the farm to the consumer in the selected growing areas in the Ashanti, Brong Ahafo and Eastern regions. Specific objectives were the following:

1. To identify producers, traders/pickers and consumers of traditional and/or commercial cocoyam leaf and their socio-economic characteristics; location, gender, number of varieties of cocoyam grown.
2. To investigate the agronomic practices and gender specific roles, scale of production, yield per unit area of leaves and of cormels
3. To assess costs of producing a hectare of cocoyam for leaves and cormels together, or separately and the profitability of the enterprise;
4. To find out whether there are varieties that are favoured for leaf production only (because of the yield of leaves compared to yield of cormels), or varieties suitable for leaf production because of market preference for its leaves and if there are varieties suitable for cormel production only;
5. To investigate the organization of marketing, identify major market centres and roles of actors involved within the selected districts
6. To identify the seasonality of demand and supply of traditional/commercial cocoyam leaf
7. To estimate the volume of the traditional/commercial cocoyam leaf sold and frequency of sales within the selected market;
8. To find out price trends at the producer, the agent/middleman, wholesale, and retail levels;
9. To provide comprehensive description of the constraints to production and marketing of cocoyam leaf , the coping strategies; and
10. To make suggestions and recommendations based on the above for a comprehensive production and marketing strategy for cocoyam leaf.

1.3 Scope of Work

The deliverables of this survey were as follows:

1) A comprehensive data on the socio-economic characteristics of cocoyam leaf growers and traders/pickers,

2) Detailed cocoyam leaf harvesting and marketing information (seasonality of demand and supply, major market centres, consumer preferences as perceived by traders, etc, etc),
3) Constraints to cocoyam leaf production and marketing from the perspective of growers, traders/pickers and the researcher and opportunities for improving production and marketing,
4) Detailed report covering a comprehensive review of the state of the cocoyam leaf enterprise, issues that needs to be addressed and strategies to overcome them to make the sector attractive to growers, traders/pickers, entrepreneurs towards reducing rural poverty to improve livelihoods.
5) Recommendations for Specific Varietal development and improvement in cultivation systems (Carefully designed spot interventions) that will enhance productivity
6) Recommendations for Post harvest improvement

2.0 METHODOLOGY

2.1 Selection and Sampling of Districts

Table 1 shows the districts that were selected for the assignment. Criteria for selection of survey areas include the following:

- Environmental suitability for Cocoyam production
- Scale of production/production levels
- Market accessibility
- Consumption trends using secondary data/information

Based on the above criteria selected districts for the survey were:
1. Asante Akyem district in the Ashanti region
2. Begro Area in the Eastern region
3. Asunafo North in the Brong Ahafo region

In order to ensure that the sample was adequately representative, a two-state stratified random sampling technique was used in the conduct of the survey. In each of the selected districts, a random sampling technique was used to select the required number of communities/villages from the sampling frame by the Statistics, Research and Information Directorate of the Ministry of Food and Agriculture. From this list, a simple random sample technique without replacement was applied to select the desired number of beneficiary households upon which valid inferences could be drawn for the cocoyam farming population of the entire project District.

Table 2.1: Distribution of Respondents by district

District	Freq.	%
Fantiakwa	150	33.33
Asante Akim South and North	150	33.33
Asuanfo North	150	33.33
Total	**450**	**100.0**

Source: Field Survey, 2008

2.2 Data, Research Procedure and Analytical Methods

The study collected both qualitative and quantitative data on the relevant variables stated in the objectives. Based on the objectives and scope of the work and the expected outputs as stipulated above, the consultants followed the under listed set of approaches to accomplish the assignment:

1. Start-up activities and desk studies.
2. Consultation with relevant institutions and design of instruments for data gathering.
3. Training of field officers on administration of survey questionnaires.
4. Field pre-testing of survey questionnaires.
5. Field studies (data collection) in the selected districts.
6. Data processing and analysis.
7. Preparation of draft report.
8. Key stakeholder forum of draft report for validation.
9. Submission of final report.

2.2.1 Start-up Activities

The consultant and the client signed the contract and agreed on milestones as well as coordination issues and quality assurance procedures or measures. Desk studies focusing mainly on gathering relevant literature on the assignment were undertaken. Various reports including 2000 Population and Housing Census, District Data and Implications for Planning, Development Plans of the districts, and other relevant documents from the District Assemblies and District MOFA offices were sought.

2.2.2 Recruitment and Training of Field Officers for Questionnaire Administration

Field officers were recruited and trained for the administration of the survey questionnaires in the selected districts. Preliminary consultations were held with officials of MOFA in all the districts surveyed. The visits were undertaken among other things to:

- Familiarize with the local terrain and establish working relations.
- Select enumerators for training on data collection instruments.

2.2.3 Pre-testing of Survey Questionnaires

The designed survey instruments were pre-tested in some of the selected districts. The output of this was used to improve on the data gathering instruments.

2.2.4 Detailed Field Survey

The survey was essentially participatory using the following tools:

- Key informant interviews
- Focus group discussions

- Structured questionnaires
- Semi-structured interviews
- Observations

2.2.4.1 Key Informant Interviews

Key informant interviews targeted prime stakeholders in the districts. Among these were key personnel of the District Assemblies, including District Coordinating Directors, District Planning Officers and the District Directors of Agriculture. Others were leaders of local communities and trade associations in the districts.

2.2.4.2 Focus Group Discussion

Focus group meetings were held with selected relevant groups such as producers, processors and traders of roots and tubers (Meuser and Nagel 2002; Borgatti 1999). The discussions were useful for triangulation and consensus building on key indicators. A checklist was prepared to aid the exercise and also to enhance quantitative analysis of information gathered.

2.2.4.3 Questionnaire Administration

The consultants supervised and monitored the field officers in the administration of the questionnaires. This was necessary to ensure reliable data collection.

2.2.5 Data Analysis

Data was cleaned, validated before inputting / data entry and analyzed using SPSS version 16. Both descriptive and inferential methods of analysis of data were employed. The descriptive tools included frequency tables, cross tables, charts (pie and bar), percentages and descriptive summaries (mean, median, mode etc) of the quantitative variables.

3.0 SURVEY FINDINGS (PRODUCERS)

3.1. Fanteakwa District Profile

3. 1.1 Location and Size

Fanteakwa distrcit is located exactly in the middle of the Eastern Region. It is bordered to the North by the Volta Lake, North-West by Kwahu South District, South – West by East Akim Distrcit, East by Manya Krobo and South east by Yilo Krobo Districts. The total land area of the district is 1,150 sq kilometers and cultivable area of 76,133ha. With a total land area of 1150 sq.km, Fanteakwa District occupies 7.68% of the total land area within the Eastern Region (18310 sq.km) and constitutes 0.48% of the total land area in Ghana. The district has a total of 291.42 sq. km of forest reserve.

3.1.2 Demographics

The 2000 Population and Housing Census put the population of the Fanteakwa District at 86,154 with annual rate of growth 2.5% per annum. The population is made up of 42,625 males and 43529 females with an average family of 5.7. The indigenous tribe is Akims but the Krobo dominate the district. Other tribes are Hausas and Ewes. Immigrants comprising Frafras, Dagartis, Ewes and others move into the district to engage in farming activities as employment source. With respect to religion, Christians dominates with 86.3% of the population, followed by Moslems 11.2% and traditionalists 2.5%.

The district is basically a rural community with about 73.3% of the population living in the rural areas. Urban settlements in the Fanteakwa district include Begroro, Bosuso and Osino. The Fanteakwa District has a potential labour of 63.3% which is higher than the national figure of 50.3%. Dependency is of two types, thus age dependency and economic dependency. The age and economic dependency of the district are 1:0.58 and 1:1.36 respectively, compared with the regional figure of 1:0.95 and 1:05 and national figure of 1:0.96 and 1:1.3 respectively

3.1.3 The Local Economy

The local economy is predominantly agric-based. Agriculture constitutes (62.5%) the main source of income for the people followed trading 16.8%, by remittances 12.5%, salaries 6.7%, Pension 1.1%, Industry 0.3% and Rent or Lease 0.1%. Despite the fact that agriculture is the highest income earner, expenditure on food takes about 39.7% of the total expenditure of the people. This is followed by education 20.2%, health 5.8%, clothing 5.6%, transport 5.6%, farming 5.1%, business 5.0%, energy 3.8%, funerals 3.1%, and religion 2.9%.

The Fanteakwa District offers a wide range of opportunities which can be exploited for both financial and social benefits by the private and public sectors alike. In the field of agriculture, the district has a vast arable land which can be used in the cultivation of both traditional and non-traditional crops. Irrigation scheme that operates along the Volta basin at Dedeso, Nakpanya, Adakofe and Petefour can promote irrigation farming, especially cocoyam leaves during the dry season. Major market centers in the district are located at *Bosua, Abuorso, Obooho, Ahomahomasu, Miaso,, Ehiamankyne* and *Begoro*

3.1.4 Agriculture

Agriculture is the predominant economic activity and it employs over 81.8% of the economically active labour force (2000 PHC Reports) in the Fanteakwa District. Crops produced are maize, cassava, plantain, cocoyam, yam and vegetables. Average farm size is 1 hectare. Average yield of cocoyam production is 8.1 mt/ha. Acreage under cocoyam production in 2006 was 9430 ha and total production of 76,383Mt (SRID, 2006). Major areas of cocoyam production in the district include *Apaah, Feyiase, Ehiamankyne* and *Begoro*. An irrigation scheme operates along the Volta basin at Dedeso, Nakpanya, Adakofe and Petefour

Livestock and poultry are the main animals kept. Theses include cattle, sheep, goats and poultry. The cattle is found in the northern fringes of the district along the lake where the grassland vegetation is predominant.

3.2. Cocoyam /Cocoyam Leaf Production

3.2.1 Characteristics of Farmers

Table 3.1 provides information on the socioeconomic characteristics of farmers interviewed in the Fanteakwa district.

Table 3.1a: Socio-economic Characteristics of Cocoyam/cocoyam leaf Producers

Characteristics	Frequency	Percent
Gender of household head		
Males	104	94.5
Females	6	5.5
Gender of Respondent		
Males	82	74.5
Females	28	25.5
Level of Education		
No formal education	62	56.4
Primary/ JSS/Middle	31	28.2
Secondary/SSS	17	15.5
Marital Status		
Married	96	87.3
Single	10	9.1
Widowed	4	3.6
Religion		
Christianity	103	93.6
Islam	6	5.5
Traditionalist	1	0.9
Ethnic affiliation		
Akan	94	85.5
Ga	7	6.4
Ewe	2	1.7
Northerner	7	6.4
Main Occupation		
Farming	104	94.5
Trading	2	1.8
Fixed Salary based job	4	3.6
Type of producer		
Cocoyam Cormel only	9	8.2
Cocoyam Cormel and leaf	101	91.8
Main Source of capital		
Own funds	99	90.0
Banks	4	3.6
Friends/Relatives	7	6.4
Awareness of RTIMP		
Yes	32	29.1
No	78	70.9
Beneficiary of RTIMP		
Yes	10	9.1
No	100	91.9

Source: Field Survey, 2008

Table 3.1b: Socio-economic Characteristics of Cocoyam/cocoyam leaf Producers

Characteristic	Descriptive Statistics
Age of respondents	
Minimum	18
Maximum	73
Mean	43
Std. Deviation	9
Family size	
Minimum	1
Maximum	10
Mean	5.5
Std. Deviation	1.9

Source: Field Survey, 2008

- Majority (74%) of the farmers interviewed were males and heads of their households (94%). Approximately 87% were married, 9% singled and 4% widowed. In terms of educational background of respondents, approximately 56% had had no Formal Education, 28% Primary/JSS/Middle and 16% had Secondary School education. Mean age of respondents was 43years with an average family size of 6. Majority (94%) were Christians and of '*Akan*' ethnic affiliation (86%).

Farming was the main income generating activity for approximately 95% of respondents. Ninety percent (90%) used their own capital to finance farming activities, 4% sourced funding from Banks while 6% obtained financial assistance from relatives/friends. Level of awareness of RTIMP activities on cocoyam was very low. Only 9% claimed to be beneficiary of RTIMP.

3.2.2 Scale of Production and yields

Majority (92%) of the farmers interviewed cultivated cocoyam for both the cormel and leaf. Only eight percent (8%) cultivated cocoyam purposely for cormels only. Scale of production was small. Average acreage cultivated per farmer (for both cormel and leaf) was 2 acres; Maximum of 4 acres. Cocoyam was cultivated once in 18 months.

Table 3.2: Average acreage cultivated per farmer - 2007 Cropping Season

Crop	Acreage cultivated (Acres)	Yield/Acre (kg/bag)
Cocoyam leaf	1.45	72
Cormel	1.52	50 bags/2758 kg
Cocoyam leaf and cormel	2.04	-

NB. A mini-bag of cocoyam weighs 91kg

3.2.2 Land Acquisition and related problems

Table 3.3 shows the methods farmers use in Fanteakwa District to acquire land for cocoyam/cocoyam leaf production and general agricultural activities. Close to 50% of farmers

interviewed practiced share cropping. About 31% of farm lands were rented while 18% of farmers interviewed used family lands for farming.

Table 3.3: Method of land use/acquisition

Acquisition method	Freq.	%
Renting	34	30.9
Purchase	2	1.8
Share cropping	51	46.4
Family land	20	18.2
Others	3	2.7
Total	110	100.0

Source: Field Survey, 2008.

Table 3.4 shows that high rent charges on land is the main problem associated with land acquisition in the Fanteakwa District. Other problems are non-availability of land and difficulty in obtaining land.

Table 3.4: Problems associated with Land acquisition

Problem	Freq.	%
Difficulty in obtaining land	8	7.3
High rent	24	21.8
Non-availability of land	10	9.1
NA	68	61.8
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.2.3 Varieties grown

Generally local varieties of cocoyam were grown in the Fanteakwa district. There were two main local varieties; red and white varieties. The leaves could be dark green or light green but usually difficult to differentiate the leaf colour by variety. However, some farmers indicated that the leaves of the local white variety dehydrate faster, itchy and not very good for consumption.

Table 3.5: Cocoyam/cocoyam leaf Varieties grown in Fanteakwa District

Response	Freq.	%
Local red coloured	90	81.8
Local white coloured	9	8.2
Both red and white	11	10.0
Total	**110**	**100.0**

Source: Field Survey, 2008.

Table 3.6 provides the distribution of farmers according to what they considered as the superior qualities of RTIMP varieties over the traditional varieties. Positive responses on the

superior qualities of cocoyam such as early maturing, high yielding, and resistance to disease/pest, good pounding ability and high self life were rather low. Apparently there was o lack of knowledge on any such varietal improvement in the case of cocoyam.

Table 3.6: Advantages of RTIMP varieties over traditional varieties

Advantage	Yes		No	
	Freq.	%	Freq.	%
Early maturity	-	-	110	100.0
High yielding	16	14.5	94	85.5
Resistance to disease/pest	2	1.8	108	98.2
Good pounding ability	16	14.5	94	85.5
High shelf life	-	-	110	100

Source: Field Survey, 2008.

Table 3.7 shows that majority of cocoyam/cocoyam leaf farmers were not aware of any improved cocoyam varieties

Table 3.7: Awareness of improved cocoyam cormel /leaf varieties

Response	Freq.	%
Yes	13	11.8
No	97	88.2
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.2.4 Source of planting material

Table 3.8 presents the various sources of planting materials. Over 60% of the respondents obtained planting materials from their own farms. About 40% obtained planting materials from their friends/relatives. None of the farmers obtained planting materials from the Ministry of Food and Agriculture and Research Institutions.

Table 3.8: Sources of planting materials

Planting material source	Yes		No	
	Freq.	%	Freq.	%
Farmer's own output	68	61.8	42	38.2
Family/Friends	44	40.0	66	60.0
Local planting material dealers	9	8.2	101	91.8
MoFA	-	-	110	100
Research Institutions	-	-	110	100
Others	-	-	110	100

Source: Field Survey, 2008.

Table 3.9 shows that non-availability and high cost of planting materials were the main problems associated with the acquisition of planting materials.

Table 3.9: Problems faced in acquiring planting materials

Problem	Yes		No	
	Freq.	%	Freq.	%
Non-availability	48	43.6	62	56.4
High cost	26	23.6	84	76.4
Transportation cost	11	10.0	99	90.0
Others	3	2.7	107	97.3

Source: Field Survey, 2008.

3.2.5 Cultural/Husbandry Practices in cocoyam/cocoyam leaf production

Farming system in the Fanteakwa district is bush fallow alongside slash and burn. Mixed cropping and inter cropping are the main cropping systems. Since cocoyam tolerates shade, the crop is frequently grown in intercropping systems with permanent crops such as oil palm, and cocoa. Intercropping is usually done with plantain. Table 3.10 reveals cropping system adopted by farmers in the Fanteakwa district. There was no mono-cropping or cocoyam farms under intensive crop management practices. In some communities in the Fanteakwa district, cocoyam was grown in forestry management systems. In such situations, farmers had to practice shift cultivation when trees are grown or when the canopy closes after 3 years.

Table 3.10: Cropping system adopted by farmers

Cropping system	Freq.	%
Mixed cropping	106	96.4
Shifting cultivation	4	3.6
Mono-cropping	-	-
Total	**110**	**100.0**

With respect to the crop planting method, Table 3.11 shows that approximately 65% of farmers interviewed planted anyhow while 35% planted in rows.

Table 3.11: Planting method adopted and other husbandry practices

Planting methods adopted		
Land preparation method	**Freq.**	**%**
Row/line planting	38	34.5
Planting anyhow	72	65.5
Total	**110**	**100.0**
Other husbandry practices		
Husbandry practice	**Freq.**	**%**
Weeding	110	100
Fertilizer/manure application	-	-
Pest /disease control	3	2.7

The use of fertilizer and agrochemicals among farmers interviewed was limited. Close to 60% of farmers interviewed had no idea of any improved pest/disease control measures as shown in Table 3.12. However, there were agro-chemical shops in 40% of the farming communities visited (Table 3.13).

Table 3.12: Main reason for not using any improved pest/disease control measures

Reason	Freq	%
Not aware of improved method	65	59.1
Expensive/high cost	40	36.4
Time-consuming	2	1.8
Others	3	2.7
Total	**110**	100

Source: Field Survey, 2008.

Table 3.13: Presence of agro-chemical shops in community

Response	Freq.	%
Yes	44	40.0
No	66	60.0
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.2.6. Labour use

Table 3.14 shows type of labour used by farmers interviewed for the various farming activities. Land clearing was mostly done with hired labour. Planting, weeding and harvesting were done with both family and hired labour.

Table 3.14: Labour use by farmers interviewed

Activity	Type Of Labour
Land Clearing	Mostly Hired
Planting	Family And Hired
Weeding	Family And Hired
Harvesting	Family And Hired

3.3. Harvesting of Cocoyam Leaf

Generally cocoyam is cultivated purposely for cormels. Harvesting of leaves therefore starts when cormels are matured after a year. Harvesting is usually scattered so as to get fresh leaves weekly. Most farmers indicated that harvesting was not encouraged during rainy season because of low price. It was also mentioned that some people just pick from the forest (wild) and fallow farms.

3.3.1Mode of harvesting

Harvesting of cocoyam in the surveyed district is done either by hand without a knife or by hand with a knife or both. As shown in table 3.15, majority harvested cocoyam leaves by hand with a knife.

Table 3.15: Mode of harvesting of cocoyam leaves

Response	Freq.	%
By hand without a knife	18	16.4
By hand with a knife	66	60.0
Mixed	26	23.6
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.3.2. Gender group involved

Table 3.16 shows gender group involved in harvesting of cocoyam leaves. Harvesting was predominantly a female activity.

Table 3.16: Gender group involved in cocoyam harvesting

Response	Freq.	%
Male	4	3.6
Females	102	92.7
Both	4	3.6
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.3.3 Maturity of harvestable cocoyam leaf

Table 3.17 shows the maturity of harvestable cocoyam leaf or how long it takes cocoyam to be ready for its leaves to be harvested. Generally, cocoyam leaf is usually harvested when the cormels are matured. Majority harvested cocoyam leaf 12 months after planting.

Table 3.17: Maturity of harvestable cocoyam leaf

Response	Freq.	%
3 months	5	4.5
6 months	30	27.3
12 months	75	68.2
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.3.4 Desirable qualities of harvestable cocoyam leaf

Table 3.18 presents desirable qualities used in selecting a potential leaf to be harvested. These include tenderness, freshness, shape, disease free and greenish colour of leaves as well as the maturity of cormels,

Table 3.18: Desirable qualities used in the selection of harvestable cocoyam leaf

Desirable quality	Yes		No	
	Freq.	%	Freq.	%
Long size	-	-	110	100
Tender/soft leaves/young leaves	60	54.5	50	45.5
When cormels are matured	59	53.6	51	46.4
Green Colour	110	100	-	-
Fresh leaves	83	75.5	27	24.5
Normal shape	108	98.2	2	1.8
Disease free	110	100	-	-

Source: Field Survey, 2008.

3.3.5. Factors limiting the availability of harvestable cocoyam leaf

Table 3.19 presents factors limiting the availability of harvestable cocoyam leaves. The key limiting factors are dry season and inadequate rainfall as reported by 47% and 26% of farmers interviewed respectively.

Table 3.19: Factors limiting the availability of harvestable cocoyam leaves

Limiting factor	Yes		No	
	Freq.	%	Freq.	%
Dry season	52	47.3	58	52.7
Inadequate rainfall	28	25.5	82	74.5
Wildfires	4	3.6	106	96.4

Source: Field Survey, 2008.

3.3.6. Factors causing deterioration of cocoyam leaves before harvesting

Table 3.20 present factors causing deterioration of cocoyam leaves before harvesting. These include inadequate rainfall, dry season, wildfires, leaf colouring and pests and diseases in decreasing order of importance.

Table 3.20: Factors causing the deterioration of cocoyam leaves before its harvesting

Limiting factor	Yes		No	
	Freq.	%	Freq.	%
Dry season	39	35.5	71	64.5
Inadequate rainfall	59	53.6	51	46.4
Wildfires	28	25.5	82	74.5
Pests and Diseases	6	5.5	104	94.5
Leaf colouring	14	12.7	27	87.3

Source: Field Survey, 2008.

3.3.7 Problems associated with harvesting of cocoyam leaves

Problems faced by farmers during harvesting of cocoyam leaves include itching of hands, waist pains, stains and drudgery in decreasing order of importance (Table 3.21).

Table 3.21: Problems faced in the harvesting of cocoyam leaves

Problem	Yes		No	
	Freq.	%	Freq.	%
Itching of hands	59	53.6	51	46.4
stains	39	35.5	71	64.5
drudgery	12	10.9	98	89.1
Waist pains	42	38.2	68	61.8

Source: Field Survey, 2008.

3.4 Post harvest handling, preservation and packaging

3.4.1 Handling/preparation of cocoyam leaf after harvesting

Table 3.22 shows preparation and packaging methods at the farmer level. Generally farmers just select the marketable leaves based on the desirable qualities already discussed and tie in bundles. There is virtually no processing of cocoyam leaves at the farmer level before marketing except for sorting and cleaning.

Table 3.22: handling/preparation of cocoyam leaf - the farmer level

Response	Freq.	%
Select, clean and tie in bundles	8	7.3
Select and tie in bundles	96	87.3
Others	6	5.4
Total	**110**	**100.0**

Source: Field Survey, 2008

3.4.2 Preservation Methods at the farmer level

Preservation of cocoyam leaves at the farmer level is done by either keeping in an airy place (30%) or leaving in the open overnight/exposing to early morning dew (70%). Excessive heat

was the main factor causing deterioration of cocoyam leaves at the farmer level. Table 3.23 shows farmer respond to the question of how long does cocoyam leaf stay to maintain its consumer desirable qualities.

Table 3.23: How long does cocoyam leaf stay to maintain its consumer desirable qualities?

Response	Freq.	%
One day	2	1.8
Two days	56	50.9
Three days	46	41.8
Four days	3	2.7
One week	3	2.7
Total	**110**	**100.0**

Source: Field Survey, 2008

Usually cocoyam leaves stay fresh within 3 days after harvesting at the farmer level. Beyond this period farmers are discouraged to sell.

3.4.3. Packaging of cocoyam leaf for sale

Table 3.24 presents packaging methods used by the farmers interviewed. After selection and tie of cocoyam leaves in bundles farmers either packaged in baskets or jute sacks. Only 5% of farmers interviewed packaged cocoyam leaves in polythene bags.

Table 3.24: packaging of cocoyam leaf

Response	Freq.	%
Carried in baskets	38	34.6
Packed in jute sacks	66	60.0
Packed in polythene bags	6	5.4
Total	**110**	**100.0**

Source: Field Survey, 2008

Majority (93%) of farmers sell their cocoyam leaves immediately after harvesting as indicated in table 3.25. Majority (76%) of the farmers interviewed sold at the main market in the district as shown in table 3.26.

Table 3.25: Sale of cocoyam leaf immediately after harvest?

Response	Freq.	%
Yes	108	92.7
No	2	7.3
Total	**110**	**100.0**

Source: Field Survey, 2008.

Table 3.26: Produce sale points

Sale point	Freq.	%
Farm gate	7	6.4
Main district market	83	75.5
Other markets in the district	14	12.7
Market outside the district	6	5.5
Total	**110**	**100.0**

Source: Field Survey, 2008.

3.5 Constraints faced cocoyam/cocoyam leaf farmers

Constraints faced by cocoyam/cocoyam leaf farmers interviewed are bulleted below:

- Land acquisition
- Cost of planting material
- High cost of transportation
- Lack of knowledge on improved varieties
- Lack/ limited access to credit
- Soil born diseases such as stunted growth

3.6 Costing of cocoyam/cocoyam leaf Production

Table 3.27: Variable Cost per acre of cocoyam/cocoyam leaf production

VARIABLE COST PER ACRE OF COCOYAM /COCOYAM LEAF			
Item	No of Man days	Cost per Man day (GHC)	Amount (GHC)
Land preparation	7	3.5	24.5
Seed/Suckers	-	-	20
Planting	8	3.5	28
Weeding (3x)	10	3.5	35
Fertilizer/Agrochemicals	-	-	-
Fertilizer Application	-	-	-
Harvesting	15	4	60
Haulage/Transportation	10	3.5	35
Total	50	-	242.5

Table 3.28: Fixed Cost per acre of cocoyam/cocoyam leaf production

FIXED COSTS	Quantity	Unit Cost(GH¢)	AMOUNT (GH¢)	Useful Life(years)	Amount per year(GH¢)
i. Land	-	-	-	-	30
ii. Cutlass	2	4	8	1	8
iii. Hoes	2	4	8	1	8
iv. Baskets	3	3	9	1	9
v. Other materials	-	-	-	-	3
TOTAL FIXED COST					58

Table 3.29: Net Revenue per acre of cocoyam/cocoyam leaf production

Item	Cocoyam Cormels	Cocoyam Leaf
Yield per acre (kg)	2566 (28 mini bags)	40 maxi bags
Yield per acre (Mt)	2.57	
Selling price per Mt	249	
Total revenue	640	
Total Cost	300.5	
Net Revenue	339.5	

NB. A mini-bag of cocoyam weighs 91kg

3.6 Extension Services

Table 3.30 shows that majority (76%) of the farmers were visited more than 10 times last year by Agric Extension Agents. Only few (less than 7 %) indicated that they were not visited at all.

Table 3.30: Frequency of extension visits last year

Frequency of visits	Freq.	%
None	7	6.4
Once	10	9.1
2-5 times	4	3.6
6-8 times	5	4.5
>10 times	84	76.4
Total	**110**	**100.0**

Source: Field Survey, 2008.

It may be evident from Table 3.31 that farmers were generally satisfied with the quality of extension services. About 52% and 48% rated the usefulness of extension services as useful and very useful respectively.

Table 3.31: Rating of the usefulness of extension visits

Rating	Freq.	%
Not useful	-	-
Useful	57	51.8
Very useful	53	48.2
Total	**110**	**100.0**

Source: Field Survey, 2008.

4.0 SURVEY FINDINGS (TRADERS)

4.1 Socio-economic Characteristics of Traders

Table 2.1.1 provides information on the socio-economic characteristics of cocoyam leaf traders interviewed in the Fanteakwa district.

Table 4.1a: Socio-economic Characteristics of Cocoyam leaf Traders in Fanteakwa District

Characteristics	Frequency	Percent
Gender		
Females	54	100.0
Level of Education		
No formal education	21	38.9
Primary/ JSS/Middle	31	57.4
Secondary/SSS	2	3.7
Marital Status		
Married	41	75.9
Single	9	16.7
Divorced	1	1.9
Widowed	3	5.6
Main Occupation		
Trading	40	74.1
Farming	12	22.2
Fixed Salary based job	2	3.7
Secondary Occupation		
Trading	8	14.9
Farming	16	29.6
None	30	55.5
Type of trader		
Wholesaler	24	44.4
Retailer	13	24.1
Wholesaler/Retailer	17	31.5
Main Source of capital		
Own funds	48	88.9
Banks	2	3.7
Friends/Relatives	4	7.4

Source: Field Survey, 2008

Table 4.1b: Socio-economic Characteristics of Cocoyam/cocoyam leaf Traders

Characteristic	Descriptive Statistics
Age of respondents	
Minimum	14
Maximum	73
Mean	37
Std. Deviation	11
Family size	
Minimum	0
Maximum	14
Mean	5
Std. Deviation	2.7
Years of trading in cocoyam leaf	
Minimum	1
Maximum	21
Mean	5
Std. Deviation	4

Source: Field Survey, 2008

4.2 Major Sources of Supply and Demand

4.2.1 Main Source of Produce Supply

Table 4.2 presents information on the source of produce supply for traders interviewed. From the Table, it can be seen that majority of the traders (85%) obtain their stock (produce) from their farms. About 39% and 22% also sourced produce from other farmers and pickers within the district. Thus in terms of ranking, the primary source of produce was own farms followed by other farms and pickers.

Table 4.2: Main source of produce supply for wholesaler or itinerant trader

Response	Freq. (Yes)	%
Own Farm	46	85.2
Other Farms	21	38.9
Pickers	12	22.2

Source: Field Survey, 2008

4.2.2 Marketing Channel for cocoyam leaf

Table 4.3 presents information on the marketing channels for cocoyam leaf in the district/community.

Table 4.3: Marketing channels for cocoyam leaf at the trader level

Response	Freq (Yes).	%
Farmer - Wholesaler – itinerant trader outside community	47	87.0
Farmer - Wholesaler - Local retailer - Final consumer	41	75.9
Farmer - Retailer - Final consumer	31	57.4

Farmer - Wholesaler – Commission agent - itinerant trader	4	7.4

Source: Field Survey, 2008

4.2.3 Consumer preference

Table 4.4 presents information on respondents' perceived preference for cocoyam leaf at the trader level. Freshness, colour and tenderness of cocoyam leaf were the most important preferences for consumers' choice of cocoyam leaf. Other desirable qualities consumers may consider when buying cocoyam leaf include disease free, cleanliness, shape and presentation/packaging especially in the open markets.

Table 4.4: Consumer Preference for cocoyam leaf

Preference	% Response			Ranking	
	Yes	No	No Resp.	Rank	% Resp.
Freshness	94.4	5.6	-	1	74.1
Colour	50.0	31.5	18.5	2	16.7
Tenderness	98.2	1.8	-	3	9.3

Source: Field Survey, 2008

4.2.4 Packaging and Preservation

Table 4.5 presents methods of preparation and packaging of cocoyam leaves for sale. Usually, farmers' package cocoyam leaves in bundles before bagging in jute sacks/fertilizer sacks/ baskets. Traders select, clean and tie in bundles (37%) or just select and tie in bundles without cleaning (55.6%). Preservation of cocoyam leaves is done by either keeping in an airy place (48.1%) or leaving in the open overnight (51.9%). Excessive heat was the main factor causing deterioration of cocoyam leaves at the trader level.

Table 4.5: Preparation and Packaging of cocoyam leaf at the trader level

Response	Freq.	%
Select, clean and tie in bundles	20	37.0
Select and tie in bundles	30	55.6
Others	3	5.6
No response	1	1.9
Total	**54**	**100.0**

Source: Field Survey, 2008

4.3 Seasonality of Demand/Supply and Price Trends

Demand and supply of cocoyam leaf is highly seasonal. High supply/lowest price months are April/May – September/October while low supply/highest price months are December/January – March/April depending on the rainfall pattern in a particular year.

Table 4.6: Seasonality in Pricing of cocoyam leaf

Seasonality	Purchasing Price (Mean)	Selling price (Mean)	Difference
Highest price/bundle	0.13	0.42	0.29
Lowest price/bundle	0.09	0.24	0.15
Highest price/basket	2.23	4.7	2.47
Lowest price/basket	1.23	2.23	1.00

Source: Field Survey, 2008

Determination of Selling Price of Produce

Table 4.7 presents information on how the selling price of produce is determined. From the Table, it can be seen that majority of the traders (73.3%) fix/determine the price of their produce. However, the cooperative society also exhibits a smaller force (6.7%) in the determination of the produce price.

Table 4.7: How selling price is determined

Response	% Yes	% No	% No Resp.
Negotiate price with buyer	96.3	3.7	-
A certain mark-up on buying price	24.1	51.8	24.1
Take current market price	75.9	24.1	-

Source: Field Survey, 2008

4.4 Mode of Transportation

Table 4.8: Mode of transportation - Farm-gate to assembly point

Mode	Freq.	%
Head load	54	100.0
Vehicle	-	-
Total		**100.0**

Source: Field Survey, 2008

Table 4.9: Mode of transportation - Assembly point to local market

Mode	Freq.	%
Head load	23	42.6
Vehicle	24	44.4
No Response	7	13.0
Total	54	**100.0**

Source: Field Survey, 2008

Table 4.10: Mode of transportation - Local market to urban/sub urban market

Mode	Freq.	%
Head load	3	5.6
Vehicle	51	94.4
Total	**54**	**100.0**

Source: Field Survey, 2008

Table 4.11Transaction cost:

Item	Cost/unit volume			
	Minimum	Maximum	Mean	Std. Deviation
Transportation	0.00	5.00	0.38	0.72
Storage	0.00	0.00	0.00	0.00
Taxation	0.00	0.50	0.26	0.19
Packaging	0.00	0.50	0.13	0.20
Total	-	-	**0.77**	-

4.5 Major Challenges Faced in Marketing of cocoyam leaf

Table 4 presents information on the major challenges in marketing of cocoyam leaf at the trader level. Risk of quality deterioration, risk of price changes, limited supply, low patronage, transportation difficulties were some of the challenges mentioned in decreasing order of importance. The issue of limited supply/ low patronage was seasonal.

Table 4.12: Major Challenges facing cocoyam leaf traders

Constraint	Response	Freq.	%
Limited Supply	Yes	40	*74.1*
	No	11	*24.1*
	No Response	1	*1.8*
	Total	***54***	***100.0***
Risk of quality deterioration	Yes	48	*88.8*
	No	3	*5.6*
	No Response	3	*5.6*
	Total	***54***	***100.0***
Risk of price changes	Yes	29	*53.7*
	No	20	*37.0*
	No Response	5	*9.3*

	Total	***54***	***100.0***
Low patronage of produce/products	Yes	16	*29.6*
	No	24	*44.4*
	No Response	14	*26.0*
	Total	***30***	***100.0***
Transport difficulties	Yes	5	*9.3*
	No	35	*64.8*
	No Response	14	*25.9*
	Total	***54***	***100.0***

Source: Field Survey, 2008

Limited supply usually occurred during the dry season while low patronage was commonly experienced in the rainy season. Risk of quality deterioration was probably due to inadequate preservation methods and lack of storage facilities

5. 0. Recommendations

The following recommendations are made for a comprehensive production and marketing strategy for improvement of the cocoyam leaf industry.

5.1 Production side Issues that need to be addressed

- The issue of lack of improved cocoyam/cocoyam leaf varieties. Crop improvement practices should consider superior qualities of cocoyam such as early maturing and high yielding. Others are resistance to disease/pest, good pounding ability and high self life especially in the case of cocoyam production for cormels.

- The issue of lack of mono-cropping of cocoyam/cocoyam leaf farms under intensive crop management practices. To stimulate supply/production response to high market demand during the dry season, intensive crop management practices need to be encouraged.

- Key limiting factors of availability of harvestable cocoyam leaves such as dry season and inadequate rainfall need to be addressed. For commercial production of cocoyam leaf in the dry season (peak demand period), irrigation facilities are inevitable.

- Inadequate preservation methods and lack of processing techniques need to be addressed to improve on shelf life.

- To enhance commercial production and marketing of cocoyam leaf in the dry season, semi-processing techniques of cocoyam leaf need to be researched into.

- A comprehensive study on yields of cocoyam leaves.

5.2 Marketing side Issues that need to be addressed

- Major challenges in marketing of cocoyam leaf at the trader level need to be addressed. These include risk of quality deterioration, risk of price changes, limited supply, low patronage and transportation difficulties.

- Improved preservation methods and adequate storage facilities needed to address the issue of risk of quality deterioration. Excessive heat was the main factor causing deterioration of cocoyam leaves at the trader level.

- Consumer preferences for cocoyam leaf such as freshness, colour and tenderness should be considered in the development of preservation and processing techniques.

- Preservation of cocoyam leaves is done by either keeping in an airy place (48.1%) or leaving in the open overnight (51.9%).

- Demand and supply of cocoyam leaf is highly seasonal. low supply/highest price months are December/January – March/April depending on the rainfall pattern in a particular year. Therefore commercial production under irrigation need to encouraged during the dry season

- Development of business plan for the cocoyam industry needed for commercial scale investment decisions.

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