MARKET ORIENTED AGRICULTURAL PROGRAMME (MOAP)

TRAINING IN AGRICULTURAL LITERACY

(PINEAPPLE PRODUCTION

AND

SMALL SCALE FRUIT PROCESSING AND MARKETING)

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A. PREFACE TO THE MANUAL

The Market Oriented Agricultural Programme (MOAP) is a programme funded by GIZ with the objective of promoting pro-poor, income raising business models for competitive agricultural value chains. As part of its activities, MOAP provides technical support to different actors across the pineapple and citrus value chains in the Central Region. However, low financial literacy and financial management skills among farmers and poor cash flow for servicing loans have played roles in preventing growth in the smallholder finance market. On the other hand, many local banks simply lack specific agricultural expertise in designing appropriate financial products for the agricultural sector in general and for smallholder farmers and processor specifically. They also often do not understand the economics behind crops such as citrus and pineapple and can therefore not judge whether a loan application makes sense or not. The programme therefore recognises the need for training of local banks in agricultural literacy to better understand the production cycles and investment needs of Value Chain (VC) operators to better positioned them to structure their interventions to meet the demands of smallholders along the agricultural value chain.

MOAP, with support from CDC Consult Limited, Accra has developed this manual which encompasses basic knowledge, skills and tools to support training in Agricultural Literacy (Pineapple Production and Small Scale Fruit Processing and Marketing) for selected officers of the rural bank.

B. OVERALL OBJECTIVE OF TRAINING PROGRAMME

The objective of the training is to equip selected officers with the required knowledge on production cycles and investment needs of VC actors along the pineapple value chains.

C. EXPECTED OUTCOME

It is expected that at the end of the training, selected community banks, based on their understanding of the crop cycles and activities of VC actors, will be able to develop products that meet the needs of pineapple actors along the agricultural value chain.

D. TARGET PARTICIPANTS

Target participants for the training include Credit Managers and Credit Officers.

E. USERS OF MANUAL

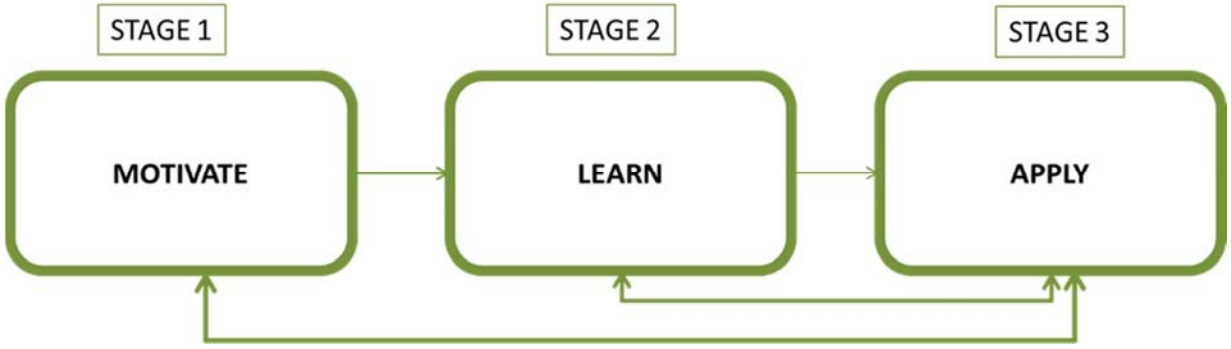
This manual is a reference document to be used by officers of the Credit Department of the bank in their day to day interactions with pineapple value chain actors.

F. COURSE CURRICULUM

Course Title	**Agricultural Literacy (Pineapple Production and Small Scale Fruit Processing and Marketing)**
Targeted Participants	Officers of the Rural Bank's Credit Department
General Objective	The objective of the training is to equip selected officers with the required knowledge on production cycles and investment needs of VC actors along the pineapple value chains.
Duration	Two (2) days

Approach and Methodology

The Agricultural Literacy Training will adapt CDC Consult's Motivate-Learn-Apply (MLA) Approach to Financial Literacy as approach for the training. The "Motivate, Learn and Apply" approach focuses on creating (Motivate) a change in mind-set. This motivation triggers the desire for knowledge acquisition (Learn). The acquired knowledge is then applied (Apply) to achieve the desire for change created in the initial stage.



In the case of the Agricultural Literacy training, the segment on Motivate helps participants to understand the relevance of pineapple production to the economy. It highlights the challenges currently faced in the economy. It also highlights the role of the Rural Bank in addressing these challenges through financial support to pineapple value chain actors.

The segment on "Learn" focuses on equipping participants with basic knowledge on pineapple production and small scale fruit processing and marketing, costs and investment needs as well as risks in pineapple production, processing and marketing. The Apply pillar is driven by the first two pillars of Motivate and Learn. It provides participants with the steps to take and tools to use in designing financial products for pineapple value chain actors.	
Modules and Sub Topics	
Introduction, Workshop Objectives, Expectations and Pre-Training Evaluation	
PART 1 – PINEAPPLE PRODUCTION	
Module 1	Pineapple Production in Ghana
Module 2	Stages and Activities in Pineapple Production
Module 3	Designing Financial Productions for Pineapple Production
PART 2 – SMALL SCALE FRUIT PROCESSING AND MARKETING	
Module 1	Small Scale Fruit Processing and Marketing in Ghana
Module 2	Stages and Activities in Small Scale Fruit Processing and Marketing
Module 3	Designing Financial Products for the Small Scale Fruit Processor

G. COURSE LEGEND

	**Activity:** This symbolizes an activity in the form of an exercise, case study, discussions etc. that will result in deepened understanding of the key issue in the session.
	**Question:** This symbolizes a question under a particular topic that participants are required to provide responses to.

PART 1 - PINEAPPLE PRODUCTION

MODULE 1.0 PINEAPPLE PRODUCTION IN GHANA

About the Module

Module 1 is designed to give participants an introduction into pineapple production, the main types produced in the country, its contribution to the economy, and the challenges faced by pineapple producers.

MODULE OBJECTIVES	SESSIONS	MODULE OUTCOME
The objectives of the module are to: • Equip participants with the relevant knowledge of pineapple production in Ghana. • Highlight the importance of pineapple production. • Discuss the challenges faced in the pineapple industry. • Discuss the role of the rural bank in addressing challenges.	1.1 Pineapple Production and Types of Pineapple Produced in Ghana; 1.2 Importance of pineapple and challenges in Pineapple Production; 1.3 Role of the Rural Bank in Addressing Challenges of pineapple production in Ghana	**At the end of this module, participants would be able to:** 1. Describe the importance of pineapple production to the economy; 2. List the challenges faced by pineapple producers; 3. Discuss their role in addressing challenges faced by producers.

PRE AND POST EVALUATION TEST ON PINEAPPLE PRODUCTION

Q1.	Agriculture is the backbone of the Economy.	Yes	No	I don't know
Q2.	Pineapple is the third most important agricultural export product in Ghana.	Yes	No	I don't know
Q3.	There are four main types of pineapple produced in Ghana.	Yes	No	I don't know
Q4.	Pineapples are highly perishable and seasonal in nature.	Yes	No	I don't know
Q5.	Pineapple production cycle goes beyond a year.	Yes	No	I don't know
Q6.	Pre-planting activities refer to all activities carried out after planting.	Yes	No	I don't know
Q7.	Ploughing, harrowing and ridging are all pre-planting activities.	Yes	No	I don't know
Q8.	Plastic mulch is not an additional cost but saves farmers money on weeding.	Yes	No	I don't know
Q9.	Grading of suckers is important because different sizes of suckers grow at the same rate.	Yes	No	I don't know
Q10.	Planting of pineapple takes place throughout the year.	Yes	No	I don't know
Q11.	Post-planting activities are activities before planting.	Yes	No	I don't know
Q12.	Weed management, pest and diseases management and forcing are all pre-planting activities.	Yes	No	I don't know

Q13.	Weeds cause considerable losses to pineapple farmers because they compete with the crop for water, nutrients, sunlight and space.	Yes	No	I don't know
Q14.	Artificial flower induction or forcing ensures production of homogeneous fruits on a plot.	Yes	No	I don't know
Q15.	Pests and diseases reduce yield both in quantity and in quality.	Yes	No	I don't know
Q16.	In designing a product for pineapple production, market research is necessary.	Yes	No	I don't know
Q17.	In pricing a product for pineapple production, market potential is considered.	Yes	No	I don't know
Q18.	In designing a product for pineapple production, product risk analysis must be conducted.	Yes	No	I don't know
Q19.	Pilot testing of products designed for pineapple production informs product refinement.	Yes	No	I don't know
Q20.	The conduct of product cost analysis is necessary after organizing the roll out of the product.	Yes	No	I don't know

Session 1.0: Pineapple Production and Types of Pineapples Produced in Ghana

Session Objectives

At the end of this session, participants would be able to:

1. Discuss the importance of pineapple production to the economy;
2. Identify the types of pineapple produced in Ghana.

1.1 Agriculture and Pineapple Production in Ghana

The contribution of Agriculture, the backbone of Ghana's economy, to the country's Gross Domestic Product (GDP) has continuously dropped over the past years. Within the past seven (7) years, the contribution has dropped by 12.8% from 31.8% in 2009 to 19% as of September 2015[1]. The consistent decline is a cause for concern considering that the sector employs 44.7% of the Ghanaian population that are 15 years and older[2].

Ghana's primary cash crops include cocoa, beans, palm, oil, **pineapples**, cotton, tomatoes, bananas, citrus fruits (orange, lemon, grape, guava etc.), coconut, tobacco, cashew and fresh vegetables. Even though pineapple is the third most important agricultural export product in Ghana, over the years, there has been much more priority placed on cocoa production unlike production of the other cash crops, contributing to the decline in the sector. In recent times however, there has been the need to provide the needed attention to the production of other cash crops, including pineapple.

Pineapple is a crop that thrives in almost all the agro ecological zones of Ghana with commercial production concentrated in the southern sector. Commercial production in the coastal areas are concentrated in the Accra plains, Aburi- Nsawam axis and the Kasoa and Awutu areas.

1. What are the main types of pineapple grown in Ghana?

1.2 Types of Pineapple Cultivated in Ghana

[1] http://www.myjoyonline.com/business/2015/december-7th/agric-contribution-to-gdp-in-a-7-year-slump.php

[2] http://pulse.com.gh/agriculture/declining-fortunes-the-declining-fortunes-of-ghana-s-agricultural-sector-id4383491.html

The main types of pineapple cultivated in Ghana are Smooth Cayenne, Queen Victoria, MD2 and Sugar Loaf. The types, their attributes and their images are presented in **Table 1**.

Table 1: Pineapple Types and Attributes

Pineapple Types	Attributes	
Smooth Cayenne	These pineapples have yellow flesh and have high sugar acid content. Its leaves are spineless and cylindrical. It can weigh between 2.5 and 3kg.	
Queen Victoria	These pineapples are less sweet, have rich yellow flesh, crisp texture, mild flavor, keeps well after ripening, has spiny leaves and can weigh up to 1.5 kg. Exports from this variety are about 2.5% in Ghana.	
MD2	These pineapples are cylindrical and have an intense yellow colour, sweet and clear yellow pulp and compact with lower fibre and acidity. These pineapples can weigh between 1.3 to 2.5 kg, and can contain as much as four times more vitamin C than other varieties.	

Pineapple Types	Attributes	
Sugar Loaf	Also called “Pan de Azucar”. It has a white flesh and does not have any woodiness. Weighs around 2.3 to 2.7 kg and is sweet and juicy. The plant can grow up to 5 feet and spread to up to 4 feet.	

1. What are the health benefits of Pineapples?
2. What are some of the challenges of pineapple cultivation you can identify?

Session 2.0: Importance of Pineapple and Challenges in Pineapple Production

Session Objectives

At the end of this session, participants would be able to:

1. Describe the importance of pineapple production to the Ghanaian economy;
2. Mention the challenges that affect the cultivation of pineapple.

1.1 Importance of Pineapple Production to the Ghanaian Economy

The importance of pineapple production to the Ghanaian economy can be seen in three main areas. These are health benefits, foreign exchange earnings from export and employment opportunities to farmers and the youth.

1.1.1 Health Benefits of Pineapples

Pineapples are known to contain high amounts of vitamin C and manganese and are also a good way to get important dietary fibre and bromelain (an enzyme). The high amounts of manganese in pineapples are important for antioxidant defenses. Pineapples also contain high amounts of thiamin (a B vitamin involved in energy production) and are also fat and cholesterol free with low sodium. Studies have suggested that pineapples decrease the risk of obesity and overall mortality, diabetes, heart disease and promotes a healthy complexion and hair, increased energy and overall lowers weight. They help support the immune system, help bone strength, eye health, digestion, have anti-inflammatory benefits, reduce blood clots and help reduce sinus inflammation and common cold[3].

1.2.1 Foreign Exchange Earnings from Exports

The contribution of pineapple production and export to foreign exchange earnings in the country cannot be underestimated. Pineapple production and export has fast become a potential foreign exchange income contributor to the Ghanaian economy. The diversification of the country's economy in the early 1990s saw an improvement in the generation of foreign exchange derived from non- traditional sources, including the pineapple industry. Low productivity in the sector however caused a drop in export market share on the international market in 2014.

[3] http://www.livescience.com/45487-pineapple-nutrition.html

Presently, Ghana is only exporting about 33,600 metric tonnes of pineapple which has denied the country the millions it used to receive in foreign exchange.[4] The pineapple value chain is healthy and seemingly capable for expansion for both the domestic and export market. The internal rate of returns (IRR) for pineapple is at 144%. An increase in pineapple production would enable Ghana meet the export demand and thereby increase the country's export earnings. This can be done by promoting the production of MD2 and smooth cayenne for exports and local processing[5].

1.2.2 Employment Opportunities for Farmers and Youth

The pineapple industry's contribution to the creation of jobs in the country is high amongst the list of benefits derived from the industry. An increase in pineapple production would provide additional employment along the pineapple value chain to community dwellers and the youth as there would be the need to employ more people to cater for the various stages from pre-planting through to harvesting and post harvesting. An increase in pineapple production would also generate income for the youth and farmers as there is high demand for pineapple production and export.

1.2 Challenges of Pineapple Production in Ghana

Despite the importance of pineapple production, there are a number of challenges that affects its production and other value chain activities. Presented are some key challenges of pineapple cultivation in Ghana.

1. High cost of production and farm inputs
2. Inadequate credit for production
3. Incidence of pest and diseases
4. Lack of good storage activities
5. Low technological adoption
6. Inadequate irrigation[6]

[4] http://www.graphic.com.gh/business/business-news/48675-ghana-loses-grip-on-pineapple-exports.html

[5] https://ghanafinancialmarket.wordpress.com/2015/09/01/ghanas-pineapple-export-slumps-to-lowest-of-foreign-exchange-from-us25million-in-2004-to-us17-9million-as-of-2014/

[6] http://www.academia.edu/3077160/ANALYSIS_OF_PINEAPPLE_PRODUCTION_IN_THE_AKWAPIM_SOUTH_AREA_OF_GHANA

The problems faced by the industry are not access to markets, but rather challenges in production, productivity and response to market shifts as well as transitioning to new varieties of the product.[7]

The production of pineapple is capital intensive, as an acre of pineapple farm requires between GHS 8,000 and GHS 9,000 to cultivate.[8] Inadequate credit for production is one of the highly ranked challenges of the pineapple cultivators in the country. Most of them depend on NGOs and the government for support, as access to credit from the commercial banks is difficult. This is mainly because the banks provide pure commercial loans which are payable within a year, whereas the pineapple production cycle goes beyond a year.

The pineapple farmers face some challenge in accessing inputs on credit basis and also face challenges with disease and pest infestation which calls for them to treat the pineapple suckers in order not to expose them which comes with some cost. Pests and diseases such as mealybug wilt disease, Phytophthora, soil pests, affect the production and quality of harvest.

Soil fertility, weeds, harvesting and post-harvest handling methods as well as environmental degradation also affect pineapple production.[9]

Pineapples are highly perishable and seasonal in nature, and require equipment that can be used to store it for some time. Lack of good and adequate storage facilities put pressure on the farmers to sell their products at low prices to avoid the risk of produce rot.

[7] http://www.fao.org/3/a-ar708e.pdf (Analysis of Trade Impacts on the Fresh Pineapple Sector in Ghana)
[8] https://www.modernghana.com/news/496615/fruit-processing-companies-look-offshore-for-fruits.html
[9] http://www.actahort.org/books/425/425_8.htm

Session 3.0: Role of Rural Bank in Addressing Challenges in Pineapple Production

Session Objectives

At the end of this session, participants would be able to:

1. Identify the roles that rural banks and financial institutions in general can play to address challenges faced in the pineapple industry.

1. Identify 5 roles that your Rural Bank can play in addressing challenges faced in the pineapple industry.
2. What will be the face of the pineapple industry if this support is provided?
3. What will be the effect of these challenges, if addressed, on:
    - The Pineapple Farmer
    - Your Community
    - The Country

MODULE 2 STAGES AND ACTIVITIES IN PINEAPPLE PRODUCTION

About the Module

This module is designed to enhance participants' understanding on the various stages in pineapple production. It highlights the costs incurred under the various activities as well as risks faced in production.

MODULE OBJECTIVES	SESSIONS	MODULE OUTCOME
The objective of this module is to: • Discuss the stages and activities in pineapple production; • Identify the costs in pineapple production; • Identify the risks faced at the various stages.	• Session 1.0: Stages and Activities in Pineapple Production • Session 2.0: Summary of Operational Costs for Pineapple Production	At the end of this module, participants would be able to: • Describe the various activities in pineapple production; • Describe the cost incurred in pineapple production; • Identify the risks faced in pineapple production.

Session 1.0: Stages in Pineapple Production

Session Objectives

At the end of this session, participants would be able to:

1. Describe all pre-planting activities for pineapple production;
2. Describe all planting activities for pineapple production;
3. Describe all post-planting activities for pineapple production.

There are series of activities that small holder farmers undertake in growing pineapple fruits. These include site selection, spatial organisation and infrastructure planning; land preparation; sucker selection and sucker treatment; planting; cultural practices; harvesting and post harvesting; etc. All these activities can be categorized under three main stages as presented in Figure 1.

Figure 1: Stages in Pineapple Production

For each of the categorized activity, it is important for you to understand the various inputs, cost and risks to be able to provide the appropriate financial products and services to the smallholder farmer.

1.1 Pre-Planting Activities

1. What are pre-planting activities?
2. What are some of the pre-planting activities undertaken by the pineapple farmer?

Pre-planting activities involve all activities carried out before planting. Pre-planting activities for a typical pineapple farmer includes site selection, land preparation, plastic mulching and sucker selection and sucker treatment.

A. **Site selection:** Site selection involves all the activities that the smallholder farmer undertakes to ensure that the site for planting pineapple is adequate enough for high production and

quality. Site selection is crucial for pineapple production because a wrong choice of site immediately reduces the potential yield of the pineapple crop. The area selected should have a clear dry period because pineapple requires a dry period at maturity.

1. What are the soil and agro-climatic factors affecting site selection for pinepple production?
2. What is the implication of the factors affecting site selection on the pineapple farmer?
3. What considerations must the rural bank make in providing loans for farmers who request for loans to purchase land?

Factors considered by the pineapple farmer during site selection include the type of soil, rainfall pattern, availability of source of water, accessibility, soil drainage, topography of the land, etc. The higher the quality of the land, the higher, among other factors, the quality of the pineapple fruit produced. However, this also means high cost of land acquisition for the smallholder pineapple farmer. **As a financial service provider, one key consideration in designing a loan product for the pineapple farmer is the cost of land acquisition.**

B. **Spatial Organization and Infrastructure Planning:** Before clearing the selected site, a plan should be prepared to show the location of the various farm structures and operations. This will ensure free movement of farm machinery to undertake routine activities, and movement of harvested produce out of the various plots. The plan or layout should show location of:

Boundary lines	Farm Building and Structures
Nursery	Proposed Area to be planted with crops
Roads and Convenience	Paths Dams
Buffer Zone	Other infrastructure

C. **Land Preparation**: Land preparation refers to the series of activities carried out to get the land/field ready for planting. The success of pineapple production begins with a good land preparation. Poor land preparation will increase the risk of pests and diseases such as mealybugs, symphylids and phytophthora. Therefore, the purpose of land preparation is to

obtain a clean, weed free well loosened soil to facilitate the rapid development of the roots for efficient nutrients and water uptake.

1. What are some of the activities done by pineapple farmers during land preparation?
2. How can the rural bank support farmers to prepare their lands?

For virgin lands, trees and stumps are normally removed. Ploughing is then done to bury shrubs and bushes to improve soil structure and fertility. Depending on the softness of the soil, ploughing and harrowing may be done once. A second ploughing is done after two (2) weeks to enable organic matter to decompose. Harrowing is then carried out to obtain fine tilth for good root development, weed control and drainage enhancement. This is then followed by ridging. In the absence of farm machineries for ploughing, harrowing and ridging, farmers hire labour gangs to prepare the land. This labour cost constitutes the main cost incurred by the farmer at this stage.

D. **Basal Fertilizer**: After ridging, pre – planting fertilizer and nematicides are applied by broadcasting and working them lightly into the soil. Pineapple farmers purchase 8 bags (1 bag=25kgg) of Mono Ammonium Phosphate (MAP), 1 bag (1 bag = 50kg) of urea and 3 bags (1 bag = 25kg) of Sulphate of Potassium (SOP) for an acre. Nematicides are added to the fertilizer mixture to control nematodes if the site was previously planted with pineapples, papaya or vegetables. The cost incurred at this level thus is the cost of fertilizer.

E. **Plastic Mulching**: Plastic mulching reduces soil erosion, prevents weed growth and saves the cost of weedicide and labour cost for weeding. This is normally done when the soil is moist. Pineapple farmers buy plastic bags (thickness = 30-50μ (microns); width = 1.2-1.4m) long enough to cover the whole length of the beds completely. The mulch is laid such that there is no air space below the mulch and the edges of the mulch firmly sealed with soil. Soil crumbs should be broken down to ensure even ridge surface level. Figure 2 presents a farmer sealing mulch bed edges with soil.

Figure 2: Sealing of mulch bed edges with soil.

F. **Sucker selection and treatment:** Good suckers or planting materials are a mark of a good beginning in a pineapple production enterprise. It is therefore important that pineapple farmers carefully select suckers and treat suckers before planting. This encourages uniform growth and also reduce pest and disease incidence on the farm. There are four kinds of planting materials available to farmers. These are:

- Suckers
- Slips
- Crowns
- In-vitro material

The most popular kind of planting material is the suckers. Suckers are graded by weight and good suckers range between 200-400g. Suckers with thorns, old suckers and diseased suckers should be separated and planted separately. Suckers are harvested 2-3 months after fruit harvest and are cured 2-3 days with the sun. After removing basal leaves, dip the butt end into a solution of insecticide such as Dursban, or Dimethoate and fungicide such as Aliette, Ridomyl or Bayleton to control mealy bugs and *phytophthora*. Costs incurred by the farmer at this stage include **suckers and insecticide and fungicides for sucker treatment.**

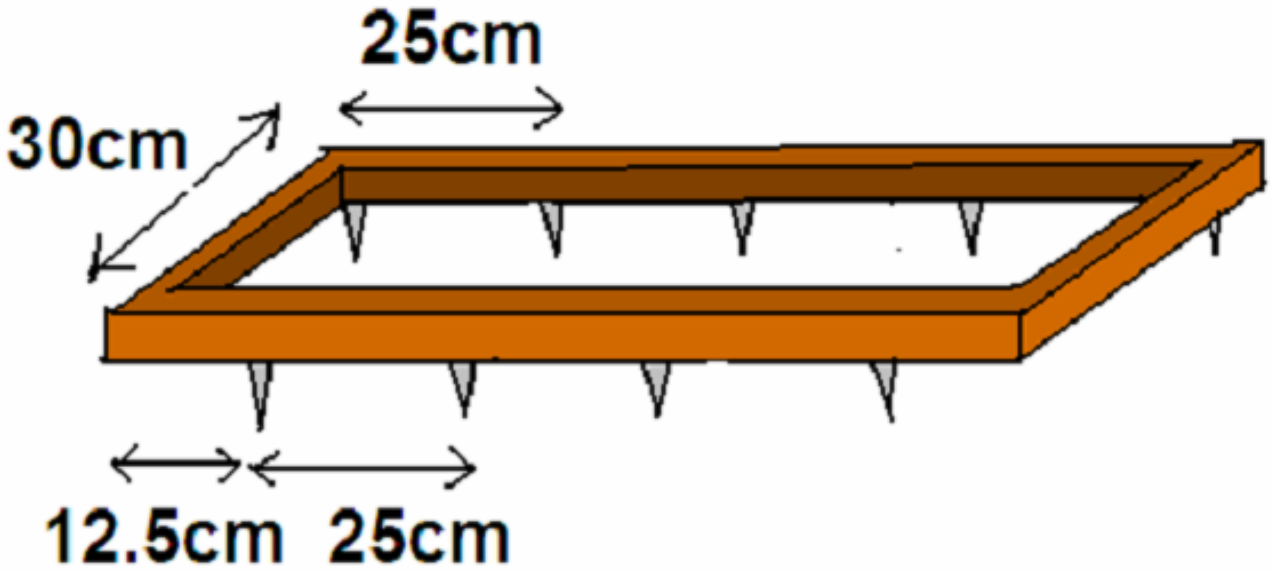
1.2 Planting Activities

Planting of pineapple takes place throughout the year. Recommended plant population is important to achieve good economical results.

1. On average, how many suckers can farmers plant on an acre?
2. How can the rural bank estimate potential revenue of farmers?

Suckers are planted two weeks after harvesting using double row and the recommended spacing for MD2 variety on a ridge is 30cm between rows and 25cm between plants. This translates into 24,000 plants per acre (60,000 plants per hectare). Figure 3 presents a double row planting distance for pineapple.

Figure 3: Double row planting distance for pineapple



Sharp pointed wood or metal is used to make planting holes on the bed and suckers are planted 8cm deep in the soil with firmed soil around it. Planted suckers not touching the soil will have undeveloped roots. Each grade of suckers is planted on a specific plot to ensure uniform growth. Figures 4 and 5 presents holes created for suckers and double row planting of pineapple suckers respectively.

Figure 4: Creating planting hole on a bed

Figure 5: Double row planting

1.3 Post Planting Activities

1. What are post-planting activities?
2. What are some of the post-planting activities undertaken by the pineapple farmer?
3. What factors should the rural bank consider to evaluate loan applications for post-planting activities?

After planting, a number of management or cultural practices are required before a good crop of pineapple can be harvested. These practices are also referred to as post-planting activities. Post-planting activities include weed management, fertilizer application, pests and diseases management, flower induction/forcing, de-greening.

A. Weed Control: Weeds cause considerable losses to pineapple farmers because they compete with the crop for water, nutrients, sunlight and space. Weeds may also serve as a hide out for insect pests and act as alternate host for other pests and diseases. It is therefore crucial to maintain a weed free field during the entire growing period of the plant. Weeds can be controlled either manually by using a hoe or chemically by using herbicides such as Bromacil (Hyvar-X) and Diuron. Spraying is done between the ridges immediately after planting when the soil is moist to kill weed seeds. Clean water is always used for mixing weedicides as muddy water interferes with active ingredient in weedicide. In undertaking weed control, the farmer purchases approved insecticides and uses the services of weeding gangs.

B. Fertilizer Application: Fertilizer application starts 1 month after planting and for each month until one month before forcing. Stopping fertilization a month before forcing allows the plant to go through some stress to respond better to forcing. Every month, pineapple farmers spend money on ½ bag of urea and 2 bags of SOP per acre. Protective clothing including gloves, masks, overall, boots, etc. are also needed to protect themselves during fertilization. All practices discussed so far are applicable to other varieties of pineapple except dosage of fertilizers which is MD2-specific. **Loan product for farmers should take into consideration both material cost and labour cost at thus stage.**

C. Pests and Disease Management: Pests and diseases reduce yield both in quantity and in quality. The major pests and diseases of MD2 pineapple in Ghana are mealy bug causing wilt disease, phytophthora, heart rot, nematodes and symphylids. Farmers buy pesticides to control pests and diseases on the field. **Loan products for pesticides could be considered by rural bank.**

D. Flower Induction or Forcing: Pineapple is one of the few crops that could be artificially induced to flower. Artificial flower induction or forcing is used to produce homogeneous fruits on a plot so that harvesting is concentrated within a short period of time. The MD2 variety like other pineapple varieties can be induced artificially to flower. To achieve maximum efficiency during forcing, fertilizer application is stopped 1 month before the intended date of forcing. Forcing can be undertaken seven (7) months after planting. Ethylene gas is needed by the farmers to undertake forcing. **Forcing loans which will take up cost of ethylene gas and labour cost can be looked at by service providers.**

E. De-greening: Fruits for the fresh fruits export market should be de-greened. De-greening is the application of ethephon or ethrel to the pineapple fruit to hasten the fruit's coloring process. However, the good practice is to measure the translucence and brix level 125-140 days after forcing. Harvest de-greened food after 7 days.

Session 2.0: Summary of Operational Costs for Pineapple Production

Session Objectives

At the end of this session, participants would be able to:

1. Identify the various activities, costs items and risk associated with pineapple production.

1. Identify the main activities, costs and risks associated with pineapple production.

STAGES AND KEY ACTIVITIES		COST ITEMS	PERIOD OF ACTIVITY	RISKS
I. PRE-PLANTING				
Site Selection	- Farmer searches for suitable land for pineapple production	- Land acquisition - Transportation	Anytime	**Farmer** i. Work health risk ii. Capital risk iii. Business and tax risk **Input Cost** i. Input price risks **Marketing** i. Production loss risk ii. Risk of quality loss iii. Price risk iv. Excess supply risk **Cash** i. Liquidity risk **Production factors** i. Machinery risk ii. Risk of building destruction
Land Preparation	- Farmer cuts trees and remove stumps. - 1st ploughing - 2nd ploughing - Harrowing - Ridging	- Labour costs for manual land preparation - Cost of farm tools such as hoes, cutlasses, mattock, etc. - Cost of tractor services for ploughing, harrowing and ridging.	1-4 weeks before planting	
Basal organic fertilizer application	- Basal organic fertilizer application	- Organic fertilizer cost (citrus waste, cocoa shells, cow dung, poultry manure or compost) - Labour cost for fertilizer application	1 week before planting	
Sucker selection and treatment	- Sucker harvesting - Sucker selection - Sucker treatment	- Labour cost for harvesting suckers - Cost of transporting suckers to the field (if suckers are bought from a different field) - Suckers cost	1 week before planting	

STAGES AND KEY ACTIVITIES		COST ITEMS	PERIOD OF ACTIVITY	RISKS
		- Labour cost for sorting and grading - Labour cost for treating suckers		iii. Pests and disease risk <u>Natural Resource factors</u>
Plastic mulching	- Plastic mulching	- Labour cost for covering ridges with plastic mulch - Cost of plastic mulch	1 week before planting	i. Climatic risks ii. Risks of natural disasters
II. PLANTING				
Planting of suckers	- Planting hole creation - Planting of suckers	- Labour cost for hole creation and planting	Planting week.	
III. POST-PLANTING				
Scouting, counting and D-leaves check	- Scouting - Counting - D-leaves check	- Labour cost for scouting, counting and D-leaves check	0-13 months after planting	
Irrigation/watering	- Fetching water	- Cost of water (if site not closed to water source) - Labour cost of fetching water	0-14 months after planting. As and when needed.	
Organic fertilizer application	- Compost preparation - Organic fertilizer application	- Labour cost for organic fertilizer application - Cost of organic fertilizer	4th and 7th months after planting; also every two months after harvesting	
Weed control	- Manual weeding	- Labour cost for manual weeding	1-13 months after planting at 2 weeks interval	

STAGES AND KEY ACTIVITIES		COST ITEMS	PERIOD OF ACTIVITY	RISKS
Pest and disease management	- Organic insecticides application - Organic fungicides application	- Labour cost for application of organic insecticides and fungicides. E.g. neem - Cost of organic fungicides and insecticides	0-13 months after planting. Depends on results after scouting.	
Forcing	- Forcing	- Labour cost of forcing - Cost of ethylene gas	8-9 months after planting depending on variety and market needs	
Harvesting and transportation	- Harvesting - Transportation of fruits	- Labour cost for harvesting - Labour cost for transporting fruits	135-145 days after forcing depending on brix and market needs	

MODULE 3.0 FINANCIAL PRODUCTS FOR PINEAPPLE PRODUCERS

ABOUT THE MODULE

This module is built from the first two modules. It is designed to support participants in designing financial products for the pineapple producer, using the knowledge gained in the first two modules.

MODULE OBJECTIVES	SESSIONS	MODULE OUTCOME
The objective of this module is to: 1. Describe the steps in financial product design; 2. Use the steps in financial product design to design products for the pineapple farmer.	Session 1.0: Financial Product Design and Development	At the end of this module, participants would be able to: 1. Describe the steps to take in designing financial products and services; 2. Design financial

Session 1.0: Financial Product Development

Session Objectives

At the end of this session, participants would be able to:

1. Describe the steps in financial product development;
2. Design financial products for the pineapple producer.

Developing financial products to suit the needs of specific targets such as pineapple producers needs to cover specific financial product development process. In designing financial products for pineapple producers the steps in Figure 6 can be considered.

Figure 6: Steps in Financial Product Development

1. Market research

Market research is the first step in the product development process and is essential to evaluate the market demand for a financial product or a service for pineapple producers and other value chain actors. The market research provides the rural bank with information to help in the product design. The research for pineapple producers should cover the areas and consider the following as presented in Table 2.

Table 2: Market Research Areas for Financing Pineapple Production

Area	Key factors to consider
Market size	This focuses on the number of pineapple producers or value chain actors that will demand the financial services. 1. How many pineapple producers/ farmers are available in your community?
Demand for different product types	1. What are the financial needs of pineapple producers?

Area	Key factors to consider
	2. How many people will be demanding savings or loans products in the value chain?
Competition	1. Which rural banks are serving the agricultural sectors? 2. Are there rural banks that provide financial services to the pineapple sector? 3. What type of products do the providers provide to this target market?
Market segmentation	This section focus on segmenting the target market and developing specific products for the various segments. The segments can focus on farm size, location of farmers, the target market for the pineapple produce for instance producers for the local market, etc., 1. Which segments of pineapple producers can the rural bank develop specific products for? 2. What specific needs do the segments require?

2. Product Design

After undertaking the market research, the product design is the next step in the financial product development process. Product design explores the processes used for the design of financial products. In designing products for pineapple producers, the rural bank needs to take into consideration the following:

- Incorporating agriculture and pineapple sector knowledge into the design;
- Developing the initial product concept;
- Considering the potential challenges and risks of products;
- Soliciting feedback from clients on the product;
- Finalising the prototype for pilot.

1.2.1 Product Design Framework

In designing financial products there are key product features that should be considered. The traditional 8Ps can be adopted to guide the designing of financial products for pineapple producers.

PRODUCT	INDICATORS
The features of the loan	• Target clients (example farmer with one acre land or farmer with 20 acres) • Loan amount • Loan term • Guarantees or collateral, if any • Borrower Eligibility Requirements • Loan Purpose
PRICING	
Pricing considers the market potential and profit/sustainability objective using various strategies that include cost based, cost-plus, demand based and break even. It looks at behavioural attitudes and perceived values. During the initial design phase, it is best to price conservatively.	• Interest rate • Loan fees • Penalties • Incentives
PLACE	
Is the financial product accessible where and when it is wanted? Important lessons can be drawn from the informal sector	• Place of loan disbursement/distribution • Place of repayment • Location of operations

PRODUCT	INDICATORS
where access to debt is readily available, but at a high price.	
PROMOTION	
Refers to sales communication, which is used to inform and persuade clients.	• Advertising • Marketing
PEOPLE	
Considers how the pineapple producers are treated during the process of obtaining financial products. To deliver the best customer service, the rural bank needs to recruit the right staff and train them on key areas such as costs in pineapple production as well the financial products and processes targeted at pineapple producers.	Staff of the rural bank
POSITIONING	Includes:
The rural bank's effort to occupy a distinct competitive position in the mind of the pineapple farmer; the pineapple farmer's perception.	• Transaction cost • Price • Quality • Turnaround time • Professional service
PHYSICAL EVIDENCE	Includes:
The presentation of the pineapple financial product.	• Physical appearance of offices, branches, points of service, • loan officers • The appearance of the brochures and posters • Transaction receipts • Loan cards and passbook

PRODUCT	INDICATORS
PROCESS	Includes:
How the financial product is delivered to a farmer.	• Loan origination • Loan appraisal and approval • Loan disbursal • Loan repayment • Processing and documenting of transactions

Source: Adapted from WASH Financial Product Development Toolkit

1.2.2 Product Risk Analysis

During the concept product design stage, it is helpful to conduct a product risk analysis on the financial product ideas, to highlight the potential risks associated with each product. The market research will help identify some of the risk areas and can inform the risk analysis. The risk areas with respect to institutional, external factors and viability may be adapted to the rural banks context. Some risk areas to assess are presented as Table 3.

Table 3: Risks Areas in Product Analysis

Areas	Questions for Consideration
Institutional	• Does the rural bank have sufficient expertise in the production of pineapple? • Are there any staff concerns with launching a pineapple financial product (capacity, training, etc.)? • Does the rural bank have a standard protocol in place for launching new products? • Will the financial product require special processes? • What will the relationship be between the staff and farmer or clients? • What are the policies, procedures and internal controls like? • Will the rural bank be able to adapt to product needs?

External Factors	• Are the local economic, seasonal patterns, and programs conducive to the product? For example, is the rural bank considering the impact on financing pineapple if the government is planning to increase taxes on fertilizer? Is there competition from other rural bank's offering the same product?
Viability	• What is the potential for client default? • Will the clients be able to afford the cost? • Are the terms of the financial product manageable for the targeted clients? • Will the product be demanded by the targeted clients? • Will the cost of managing the financial product be more than revenue to be earned? • Is there sufficient cash flow to launch the product?

1.3 Pilot Testing a Financial Product

1. What is pilot testing in financial product design?

A pilot test is a limited offering of a product to a narrow geographic area and/or a limited number of clients. The test allows the rural bank to assess market demand and product effectiveness, which will inform product refinement prior to full scale roll-out. By pilot testing a new product, the rural bank can identify potential problems and make the necessary adjustments to product terms, marketing strategies, staffing and/or procedures. Pilot testing offers an opportunity to test out the prototype, allowing the bank to avoid problems during full scale product roll-out. The earlier problems are detected, the lower the cost of correction will be for the bank.

To effectively pilot test financial products for pineapple production the following steps can adopted:

Steps		Details
Step 1.	Compose the pilot test team	The team needs to be representative of the departments involved with the product to ensure effective coordination and product viability prior to launch. If possible, the product development team can continue as the pilot test team.
Step 2.	Define the product objectives	In order to determine the success or failure of the pilot test, it is essential that the objectives for the new product is clearly defined. The objectives can be to improve the quantity of pineapple produce available for export, increase the number of farmers that are into pineapple production, increase the income levels of pineapple farmers, expansion of financial products into new markets, increase earning of prospective rural bank, etc.
Step 3.	Develop the testing protocol	A testing protocol provides an outline for how the pilot test team will manage the test. It dictates the terms of reference (TOR) for the test and includes the specific tasks, requirements and precisely how and when the test will be monitored. It should also include guidelines under which the test would be paused or terminated. The terms of the pilot test protocol should include the following: • Anticipated location and number of clients to be included in the test;

Steps		Details
		• Duration of the test (start/end dates); • Reporting dates; • What data should be analysed, and when; • Specific factors that may pause or call off the test.
Step 4.	Prepare systems	Prior to launching a pilot test, the rural bank should prepare the management information system (MIS) as well as any systems necessary to manage collaborations with external parties. All of these processes and systems must be ready before pilot testing begins. Once the processes are finalized, all respective staff must be trained.
Step 5.	Develop financial projections	Financial projections for the pineapple product should be developed to provide a clear financial picture and serve as a basis for informed decision-making. As new products are unlikely to reach their full potential within the first year, the financial projections are usually prepared for a three- to five-year period. The financial projections should cover direct cost, indirect cost as well as the revenue streams. Some of the costs are easily determined, like the direct costs of staff, training and fixed assets. Indirect costs and variable direct costs, on the other hand, can be difficult to project and track. Indirect cost includes office rent, depreciation of furniture and fittings and other equipment. The revenue

Steps		Details
		streams mainly include interest income and fee income on loans. Though the financial projections can be a difficult process, it is critical to understand the full cost of the product.
Step 6.	Document product definitions and procedures	Clear documentation is necessary to ensure that everyone implementing the pilot test will fully understand both the policies surrounding the product and the procedures for its operation. Policy and procedure definitions must address all areas that affect, or are affected by, the product, including credit staff (with direct customer contact) and their supervisors, marketing staff and back-office operations (human resources, accounting and IT). Document in detail the procedures for each process relating to the product. As a new product, the bank should develop a document to cover all processes of the product marketing and delivery.
Step 7.	Train relevant staff	Effective training of all staff involved with the financial product is essential to ensure buy-in and commitment.
Step 8.	Develop customer marketing strategies and materials	Marketing financial products may require unique marketing strategies in cases where demand is dormant.
Step 9.	Start the product test	It is very rare for a pilot test to proceed without challenges. It is therefore important to build in

Steps		Details
		the contingency fund to deal with any challenges as they arise.
Step 10.	Evaluate the test results	The pilot test team should meet as needed to evaluate the data and the progress of the pilot against the previously defined objectives.

1.4 Product Launch

Product launching often requires a step-by-step approach to move the product from the successful conclusion of the pilot test, to the point where it is fully operational. The product launch process involves multiple steps and feedback loops that provide data for decision making.

Steps		Details
Step 1.	Team Formation	This focuses on forming a working team that will be involved in the launch of the new product. The team should include personnel from human resources department as well the leadership.
Step 2.	Examine internal capacities	The rural bank's capacity must be reassessed at every step of the product development process. This is especially important when considering the rollout of a new product. Lessons learned from the pilot phase are integrated into the launch and rollout of the product. Question to be considered include: 1. Does the financial product fit within the bank's strategic plan? 2. Based on the pilot test, does the product satisfy objectives relating to expected product returns? etc.

Steps		Details
Step 3.	Organize product rollout	The bank can adopt a ‘’soft or public method’ roll out to the launch of the new product. With the soft method, little or no marketing is done in the launching of the product. In this case, the bank can identify few pineapple producers and sell products to. The ‘’public’’ roll-out, launch involves extensive marketing with the expectation of receiving many clients.
Step 4.	Conduct a product cost analysis	One of the basic objectives of pilot testing is to determine product profitability. Profitability is a factor of the: • Costs related to the product • Revenues earned from the product It is recommended that bank conduct product costing analysis to understand product profitability.
Step 5.	Train staff	This step involves assessing the training on the product undertaken at the pilot stage to identify the strengths and weakness. This is to either accept the approach or revise the approach and also train staff on new areas added.
Step 6.	Update the marketing plan	To ensure that effective marketing is done, the bank needs to develop a detail marketing plan. The marketing plan should cover market assessment, product marking goal and objectives, strategies, etc.
Step 7.	Product launch and rollout	This step puts together all the various strategies undertaken from steps 1 to 6. Once

Steps		Details
		the marketing plan is ready, the product can be launched.

1. **Read the case below and provide responses to the questions**

Nnoboa pineapple co-operative is a group of ten outgrowers with fifteen acres of pineapple farm in Ankwaanda in the Central Region. The farmers mainly produce for an exporter, Fresh Fruits, which exports the pineapples to the Netherlands and Germany. They also sell some of their produce in the Ghanaian market. They have been an outgrower for the exporter for the past 10 years. As a cooperative, they support each other in cultivating their pineapple farms. They also hire labourers to help them in land preparation, planting, cultural activities and harvesting. They normally force their produce twice a year and harvest it five months after the pineapples are forced. They normally force the fruits in June and October. They harvest an average of 20,000 pineapples per acre. To obtain the average of 20,000 fruits, they undertake all the necessary pineapple farm maintenance activities. The activities they undertake and the cost involve per acre in terms of inputs and labour are presented below.

Activity	Input Cost (GHS)	Labour (GHS)
Land preparation	550	700
Planting	-	300
Farm maintenance	250	1860
Harvesting	-	460
Total for inputs/labour	**250**	**3320**
Total cost for all activities		**4,120**

From the table, Nnoboa spends **GHS 4,120** to produce an acre of pineapple. To maintain all 15 acres, they require GHS 61,800. They have to increase their farm size to be able to increase the number of fruits they produce from the current 300,000 fruits to 500,000. Fresh Fruit Export has

given them a target of 450,000 fruits whiles a small scale fruit juice processor also needs 50,000 fruits. With their current 15 acres, they are unable to meet the target and require financial support to expand production. In addition to their current financial need, they also have challenges maintaining their farm. They mostly buy farm inputs on credit from their suppliers and also pay the labourers after they harvest the pineapple. They make an average sale of GHS 10,000 (GHS 0.50p for 1 pineapple and 20,000 pineapples harvested per acre) of pineapples per acre.

Just like Nnoboa's case, there are other farmers in Ankwaanda and other surrounding communities who also cultivate pineapple and have financial difficulty. They need financing to enable them produce large quantities of pineapples which have ready market in both local and international markets. A financial service provider has identified the need to develop financial products to suit the needs of the pineapple farmers.

Questions

1. Which two loan products should the financial service provider develop for the pineapple farmers?
2. To develop the loan products, which steps should the bank take?
3. What do you think should be the features of the loan products?
4. Complete the table below and calculate the total repayment amount using the following assumption:
    a. The loan amount requested is GHS4,120.
    b. At interest rate of 35%.
    c. Loan duration 9 months.

PRODUCT FEATURES			
Principal Loan Amount (GHS)	Interest Rate (%)	Repayment Duration (months)	Monthly Repayment Amount (GHS)

Answers

Questions	Response
1. Which two loan products should the bank develop for the pineapple farmers?	Expansion Loan Product, Working Capital Loan
2. To develop the loan products, which steps should the bank take?	Market Research, Product Design, Prototype Testing and Product Launch.
3. What do you think should be the features of the loan products?	Loan Amount (Principal), Interest Rate, Repayment Duration, Repayment Amount

PRODUCT FEATURES			
Principal Loan Amount (GHS)	Interest Rate (%)	Repayment Duration (months)	Monthly Repayment Amount (GHS)
4,120	**35%**	**9**	**618**

With the above assumptions, the total repayment amount will be **GHS5,562.**

PART 2 - SMALL SCALE FRUIT PROCESSING AND MARKETING

MODULE 1.0: SMALL SCALE FRUIT PROCESSING AND MARKETING IN GHANA

ABOUT THE MODULE

Module 1 is designed to provide relevant knowledge on the processes involved in fruit processing and to give the participant an understanding of the various stages and challenges associated with them.

MODULE OBJECTIVES	SESSIONS	MODULE OUTCOME
The objectives of the module are to: 1. Present the concept of in fruit processing; 2. Understand the importance of small scale fruit processing and marketing to the economy; 3. Understand the challenges associated with small scale fruit	1. Small Scale Fruit Processing and Marketing and its importance .	**At the end of this module, participants would be able to:** • Identify the categories of small fruit processors and marketers in Ghana; • Describe the importance of small scale fruit processing. • Describe the challenges faced by small scale fruit processors and marketers.

processing and marketing.		

PRE AND POST EVALUATION TEST ON SMALL SCALE FRUIT PROCESSING AND MARKETING

Q1.	Fruit juices are the most consumed beverage next to water.	Yes	No	I don't know
Q2.	Fruit processing requires a higher demand in quantity of fruits.	Yes	No	I don't know
Q3.	Small scale fruits are seasonal.	Yes	No	I don't know
Q4.	Prices of small scale fruits fluctuate all year round.	Yes	No	I don't know
Q5.	The last step in the process is the bottling of the juice and corking of the bottles.	Yes	No	I don't know
Q6.	Post- processing involves the storage, transportation and distribution of processed fruits to the wholesalers or final consumer.	Yes	No	I don't know
Q7.	Pre-processing activities involve all activities carried out before fruits and other raw materials are available at the work station of the fruit processor.	Yes	No	I don't know
Q8.	Pineapple is the main base to which the other raw materials are mixed with in processing.	Yes	No	I don't know

Q9.	The more complex and lengthy the marketing chain, the higher the marketing costs.	Yes	No	I don't know
Q10.	The price paid to the farmer for an orange cannot be directly compared with the price paid by the consumer for a bottle of fruit orange juice.	Yes	No	I don't know
Q11.	For juicers, the fruits are smoothened into paste and the solid is separated from the liquid.	Yes	No	I don't know
Q12.	In designing financial products it is important to consider the marketing chain as well as the various categories of costs that are incurred in marketing processed fruits.	Yes	No	I don't know
Q13.	In designing a product for small scale processing, market research is necessary.	Yes	No	I don't know
Q14.	In pricing a product for small scale processing, market potential is considered.	Yes	No	I don't know
Q15.	In designing a product for small scale processing, product risk analysis must be conducted.	Yes	No	I don't know
Q16.	Pilot testing of products designed for small scale fruit processing informs product refinement.	Yes	No	I don't know
Q17.	Product cost analysis conduction is necessary after organizing the roll out of the product.	Yes	No	I don't know

Q18.	In designing products, potential challenges and risks of products should be considered.	Yes	No	I don't know
Q19.	Feedback from clients on products developed must be solicited.	Yes	No	I don't know
Q20.	In designing a product for small scale processing, market research is necessary.	Yes	No	I don't know

Session 1.0: Small Scale Fruit Processing and Its Importance

Session Objectives

At the end of this session, participants would be able to:

1. Identify the categories of small scale fruit processors and marketers in Ghana;
2. Understand the importance of small scale fruit processing and marketing to the economy;
3. Understand the challenges associated with small fruit processing and marketing.

1.1 Small Fruit Processing and Marketing in Ghana

Consumption of fruit juice in Ghana has become popular and is increasing daily. The domestic market for fruit juices has become strong in part because Ghanaian consumers increasingly appreciate the natural taste and health benefits. It is believed that fruit juices are the most consumed beverage next to water, however approximately 70% of these juice products produced are imported[10]. According to estimates, 10.4 million litres of fruit juice is consumed yearly in the country.

Ghana's location offers conditions that are close to optimum for growing tropical fruits. Ghana is endowed with an assortment of fruit, including mangoes, banana, papaya, pineapples, **citrus** and coconut amongst others. The opportunity to transform agricultural produce into juice and other value added consumer products for domestic and foreign markets, and ultimately dominate the processed fruits industry exists, but very few local companies have taken advantage of this opportunity.[11]

1. What are the categories of small fruit processors and marketers in Ghana?
2. How important is the processing and marketing of small scale fruit to the Ghanaian economy?

[10] http://fpmag.org/8/The-Fruit-Juice-Industry-in-Ghana

[11] http://fpmag.org/8/The-Fruit-Juice-Industry-in-Ghana

1.1 Categories of Small Fruit Processors in Ghana

There are various kinds of fruit processors in Ghana. These include fresh cut fruit processors and fruit juice producers. Some categories and examples of small fruit processors and marketers in Ghana are presented in Table 4.

Table 4: Categories of Small Fruit Processors and Marketers

Categories of Fruit Processors	Examples of processors	
Small Scale fruit processors		
Fresh cut fruit Processors	• Bomarts Farms • Peelco Limited	
Large scale Processors/ Fruit juice producers	• Akpanga Organic Citrus Farms • Coastal Groove Limited • Fruittiland • Oprimquans • Profound Integration • Beilaa Enterprise • Flag Fruits Cottage Industry • Blue Skies HPW • Peelco • Pinorora	

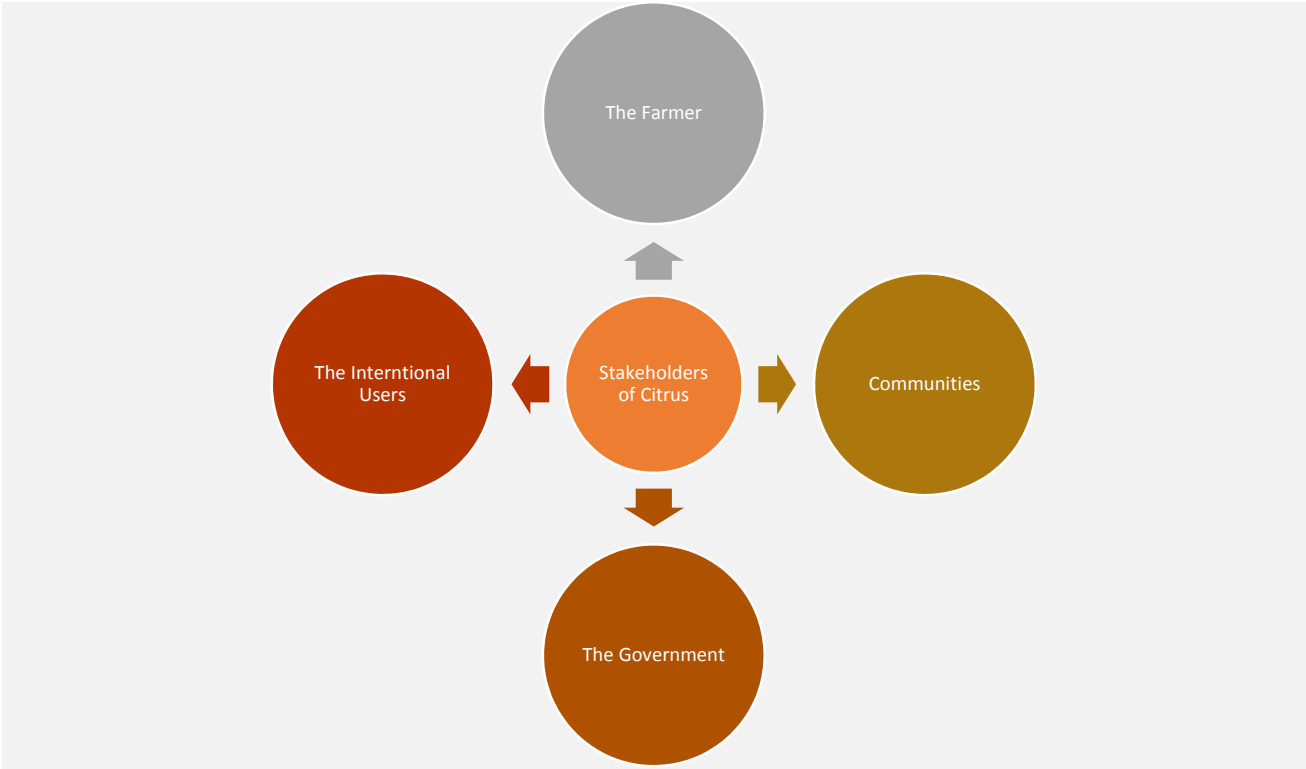
1. What are some of the challenges of processing and marketing small fruits you can identify?

1.2 Importance of Small Fruit processing and marketing to the Ghanaian Economy

There are several stakeholders who benefit from the processing and marketing of fruits in Ghana. They are presented in Figure 7.

These various stakeholders benefit in one way or the other from the processing of small fruit in the country. The Farmer for example would have increase in production and gain more income. This is because fruit processing requires a higher demand in quantity of fruits. The higher the demand, the higher the income the farmer gets on his yield.

Figure 7: Stakeholders of Processing and Marketing



The community and its youth through fruit processing gain access to employment, as fruit processing and marketing require more hands, which creates employment opportunity for the community. Areas in the fruit processing chain that involve labour and thereby

employment creation are along the stages of peeling, washing, packaging, branding/labeling and drying of fruits. The government and the economy also benefit from the processing and marketing of fruit through the increase in foreign exchange earnings from exports. Processed fruit is exported to other countries which increases the foreign exchange derived.

International users of the processed fruit also benefit by importing fresh and neatly packed fruits and juices of different variety for sale on their market which would generate income for the various businesses.

1.3 Challenges in Small Fruit Processing and Marketing in Ghana

Although there are many benefits to be derived from small fruit processing and marketing, there are a number of challenges that are faced in the sector. Presented are some key challenges of small fruit processing and marketing in Ghana.

Constant price changes of raw materials due to seasonality of fruits: Small fruit processors and marketers face challenges with the pricing of raw materials which leads to re-negotiation of payment terms. This is due to the fact that the fruits or raw materials are seasonal and therefore prices fluctuate all year round.

Lack of modern technology: Technology used in processing has not improved over the years and processors tend to use more manual methods of processing, relying heavily on human labour. The technology used in processing are mostly obtained from the Ghanaian local market and are usually manufactured without particular attention paid to technical dimensions or efficiency which cause frequent problems and reduce productivity.

High cost of production and lack of financial resources: Lack of finances also contributes to low productivity. The cost of processing is high, and as such the end product is also priced to make up for the cost implications of processing. Another factor that is closely linked to this is the demand for the end products as the price of the end product affects

its demand. The lack of adequate finances also affects the advertisement and increase of the local market for the products.[12]

[12] Report on Follow-up Survey Conducted on the Fruit Processing Industry in the Greater Accra Region

MODULE 2.0 STAGES AND ACTIVITIES IN SMALL SCALE FRUIT PROCESSING

ABOUT THE MODULE

This module is designed to enhance participants understanding on the various stages in small scale fruit processing and marketing. It highlights the costs incurred under the various activities as well as risks faced.

MODULE OBJECTIVES	SESSIONS	MODULE OUTCOME
The objectives of the module are to: 1. Present the processes involved in fruit processing; 2. Identify the cost incurred in small scale fruit processing and marketing.	Session 1.0: Fruit Processing Session 2.0: Fruit Marketing Session 3.0: Summary of Operational Costs for Processing and Marketing	**At the end of this module, participants would be able to:** • Recognize the various stages in processing and the resources required; • Identify the costs incurred by marketers.

Session 1.0: Fruit Processing

Session Objectives

At the end of this session, participants would be able to:

1. Understand the process involved in fruit processing;
2. Recognize the various stages in processing and the resources required.

Processing in relation to food, involves the transformation of raw ingredients, by physical or chemical means into liquid or solid substance for consumption. There are a number of activities that take place before, during and after the processing of fruits by small scale processors. The activities have been categorized under three main activities as presented in Figure 8.

Figure 8: Stages in Fruit Processing

For each of major activity, it is important for the financial service provider to understand the various inputs, cost and risks to be able to provide the appropriate financial products and services to the small scale fruit processors.

a. Pre-Processing

1. What are pre-processing activities?
2. What are the various pre-processing activities undertaken by small scale processors?

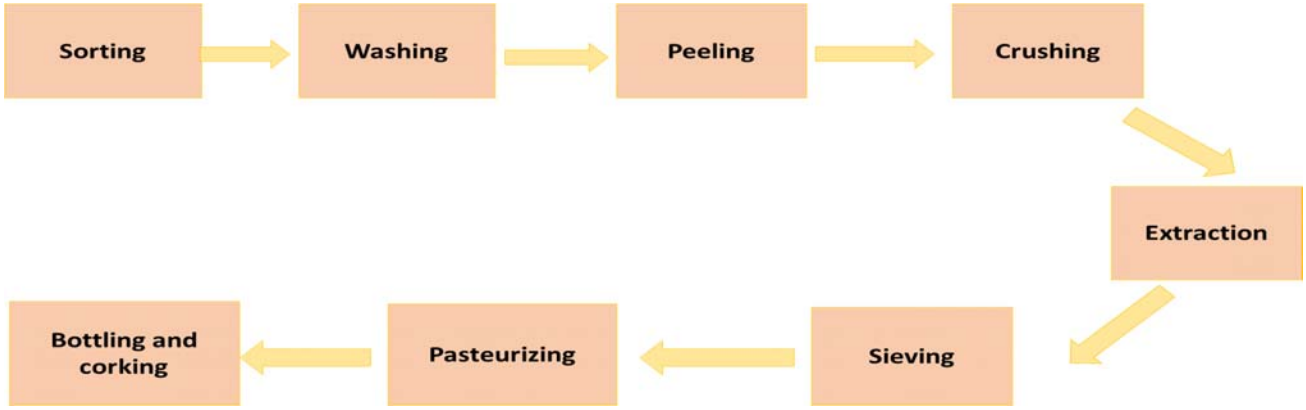
Pre-processing activities involve all activities carried out before fruits and other raw materials are available at the work station of the fruit processor. This stage involves the selection of production site, facilities, the buildings, the material handling and the equipment for the processing. For already established processors, their main concern will be choosing the right fruits. Small scale processors buy their raw materials from small

scale farmers, plantations as well as middlemen/traders in the Eastern and Central Regions of Ghana whiles others have their own farms which provide the needed fruits. In addition to the raw fruits, water, sugar, and artificial additives are added to the processed fruits. Processors also source bottling and packaging materials. It is important for the financial service provider to consider all materials used in the processing of fruits during the design of products. The final products of processed fruit include fruit juice, chopped fruits, smoothies, fruit cake etc. Each of the final products has similar or distinct ingredients used in the production.

b. Processing Activities

Fruit processing basically involves an eight step process as presented in Figure 9. The steps may vary slightly for some processors.

Figure 9: Fruit Juice Production Process



Source: Improvement of product quality and market access of small scale juice producing companies in Greater Accra Region, Ghana.

1. Describe brifely what each of the steps mention above involve?
2. For each of the eight steps mentioned in the fruit processing, identify resources a processor will require?

The process begins with the sorting of fruits through to bottling and corking. After the first three steps are concluded the juice is extracted and sieved to separate the pure juice from fruit flesh.

After the pure juice is fully separated it goes into pasteurization stage. Once pasteurized the last step in the process is the bottling of the juice and corking of the bottles. For each of the steps there are key equipment and labour required for the processing. For each of the steps in Figure 9, the rural bank needs to identify the resources required, how the resources are obtained and the cost involved in acquiring the resource for production. Prior knowledge of the aforementioned, can help the rural bank to design financial products that meet the demand of processors.

1.2.1 Steps, Description and Resources Required in Fruit Processing

Steps		Description	Resources Required
Step 1	Sorting	Prior to fruit washing, spoiled fruits are eliminated from the good fruits. This is to avoid contamination of good fruits during washing.	Labour.
Step 2.	Washing Fruit	Fruits are washed to remove soil, microorganisms and pesticide residues. Some usual practices in fruit washing are: • addition of detergents or 1.5% Hydrochloride (HCl) solution in washing water to remove traces of insect-fungicides; • use of warm water (about 50°C) in the pre-washing phase.	Labour, Water, Wash tanks, buckets.
Step 3.	Peeling	This involves the removal of the back or skin of the fruits to get to the edible part.	Labour, Knives, Peeling Machine.
Step 4.	Crushing/ Slicing	For juices, the fruits are smoothened into paste and the solid is separated from the liquid. For solid processed fruits, the fruits are cut, dried or fried.	Slicers, Knives.
Step 5.	Extraction	Juice can be extracted from fruits in a number of ways, depending on the	Labour, Fruit Press.

Steps		Description	Resources Required
		hardness of the raw fruits. Citrus fruits are usually reamed to extract the juice without the bitter pith or skin. Harder fruits, such as pineapple, are peeled and pulped using a liquidizer and pressed to extract the juice.	
Step 6.	Sieving	This involve the separation of solid substance from the liquid in the case of juice.	Large bowls
Step 7.	Pasteurizing	This step focuses on preservation of the fruit juice. It involves heating, which vastly reduces the bacteria, molds and yeasts in juices. One of the following methods is used in pasteurization: • heating the juice and hot-filling into clean, sterilised bottles; • cold-filling, sealing and heating the bottles in large pans of simmering water.	Labour, Large pans, Gas Stoves and cylinders, Electricity,
Step 8.	Bottling and Corking / Canning	This involves filling of processed fruits into bottles or containers ready for consumption.	Labour, Bottle coolers, Containers for Packaging, Labels, Preservatives.

Post-processing

This stage involves the storage, transportation and distribution of processed fruits to the wholesalers or final consumer. Processors require large storage facilities to store their finished as well as partly finished products from spoilage.

Session 2.0: Fruit Marketing

Session Objectives

At the end of this session, participants would be able to:

1. Understand the cost incurred in marketing.

2.1 Marketing of Small Scale Fruits

1. What is a marketing chain?
2. What are the various costs incurred by marketers in marketing small scale fruit?
3. What are the implications of these costs on the design of financial products for small scale fruit processors and marketers?

2.2 The Marketing Chain

The sequence of stages involved in transferring produce from the farm to the consumer is generally referred to as a marketing chain. The consumer may be as close to the farmer or may be one in another country. All transfers to ensure that the fruits get to the final consumer involve marketing activities of some form and these activities involve costs. At the simplest level, the cost involved in the transfer of citrus fruits from the farmer to the consumer may simply be the time taken by the farmer to walk to a nearby market and stay there till his/her fruit are sold. At the most complex level, a processed fruit product may have to be stored for several days, transported long distances and processed several times before reaching the form in which it is finally sold. In simple terms, the more complex and lengthy the marketing chain, the higher the marketing costs.

In designing financial products therefore, it is important for the financial service provider to consider the marketing chain as well as the various categories of costs that are incurred in marketing processed fruits.

2.3 Categories of Costs Incurred by the Small Scale Fruit Processor and Marketer

Costs incurred by the small scale fruit processor and marketer can be put under eight (8) main categories. These are packaging, handling, transportation, product losses, storage, processing, capital costs and other costs.

Processing costs: Processing is often an important marketing cost. Fruit juices have to be sorted, washed, pealed, crushed, extracted, sieved, pasteurized and bottled. In working out the total marketing costs, there is the need to consider the conversion of the fresh raw fruit to the bottled fruit, as well as the value of any by-products. Consequently, the price paid to the farmer for an orange cannot be directly compared with the price paid by the consumer for a bottle of fruit orange juice. Processing costs will also vary according to the company's costs which can depend on factors such as fuel costs, depreciation costs, import duties, taxes and wages.

Packaging Costs: Types of packaging used for fruits may range from a simple jute or polythene bag, which may account for less than one percent of the marketing cost, to sophisticated plastic packaging for direct transport of fruits to consumers in supermarkets within and outside the country, which would account for much more.

Handling costs: At all stages in the marketing chain, fruits will have to be packed and unpacked, loaded and unloaded, put into store and taken out again. Each individual handling cost will not amount to much but the sum total of all such handling costs can be significant.

Transportation Costs: Once packed, produce is then transported. The initial transportation may be done by agents who work in or with processors. Transportation costs will vary according to the distance between the processing unit/factory and the market. The quality of the roads, whether good or bad, will also determine the transportation speed and eventually cost. In cases where the processor hires a truck to facilitate transportation of processed fruits, the costs of transportation will vary as well depending on the distance, quality of roads amongst other factors.

Product losses: Losses are common with agricultural produce marketing. Even if nothing is actually thrown away products may lose weight in storage and transit. Thus one kilogram of a product sold at retail level cannot be compared with one kilogram sold by the farmer. Sometimes very high losses can be recorded, particularly for a perishable fruits. Losses will probably be highest in the main season when “gluts” of produce mean that much has to be thrown away unsold. In general, the longer the distance between processor and consumer the higher the likely loss. The treatment of losses in marketing cost calculations can be fairly complex. In particular, produce which is bought but not sold can still incur costs such as packaging, transport and storage. If there are no quantity losses there can still be quality losses and this is reflected in the price at which produce is sold.

Storage costs: Storage is an important cost for many products. The main purpose of storage is to extend the availability of produce over a longer period than if it were sold immediately after harvest. The assumption behind most storage is that the price will rise sufficiently while the product is in store to cover the costs of storage. Such costs will vary, depending on the costs of building and operating the store but also on the cost of capital used to purchase the produce which is stored. If a store is used to its maximum capacity throughout the year, costs will obviously be much less than if it is only used for a few months and is, even then, kept half empty.

Capital costs: Capital costs may not be very visible but are extremely important. To operate, small scale fruit processors and marketers may have to borrow money from the bank. The interest they pay on that money is a cost. If these processors and marketers use their own money we cannot say that they have no costs since they could have left the money in the bank to earn interest instead of using it for processing the fruits. The opportunity cost of using their own funds is thus the interest they are not receiving.

Other costs: The costs considered above are the major costs that are faced in small scale fruit marketing. These include market fees charged for agents or traders who use markets, license fees, toll fees, taxes etc. All these costs have to be built into the calculations.

Prices and margins: Finally, costs have to be related to prices received. In a retail market in the morning fresh sliced processed fruits may be selling at a high price which appears to give the marketing agent or trader an excellent profit. By the evening, however, the agent may be selling them at a far lower price, knowing that the next day a supply of fresh sliced fruits will be arriving. This must be kept in mind when comparing the selling price with the amount paid to the farmer. The price paid by the eventual consumer is thus made up of the amount of money paid to the farmer for his produce plus all of the costs involved in getting it to the consumer in the form in which he or she purchases it and a reasonable return to processors and marketers. The percentage share of the final price which is taken up by the marketing function is known as the marketing margin.

Session 3.0: Summary of Operational Costs for Processing and Marketing

Session Objectives

At the end of this session, participants would be able to:

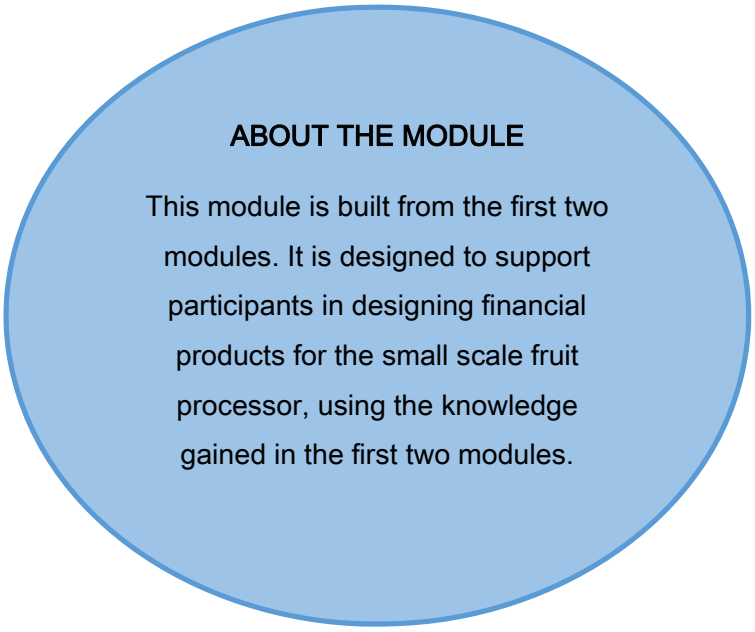
1. Identify the various costs items associated with fruit processing.

1. Identify the main activities and costs items in fruit processing and marketing.

STAGES AND ACTIVITIES	COST ITEMS
Processing Site Selection and preparation	- Building acquisition; - Equipment; - Labour; - Transportation.
Raw materials acquisition	- Fruits; - Bottling and packaging materials acquisition; - Natural and artificial additives; - Transportation.
Sorting	- Labour; - Equipment.
Washing fruit	- Labour; - Water; - Wash tanks; - Buckets.
Peeling	- Labour; - Knives; - Peeling machine.

STAGES AND ACTIVITIES	COST ITEMS
Crushing/ Slicing	- Slicers; - Knives.
Extraction	- Labour; - Fruit press.
Sieving	- Large bowls.
Pasteurizing	- Labour; - Large pans; - Gas stoves and cylinders; - Electricity.
Bottling and Corking/ Canning	- Labour; - Bottle coolers; - Containers for packaging; - Labels; - Preservatives.
Processing	- Labour; - Water; - Wash tanks; - Buckets; - Peeling machine; - Slicers; - Knives; - Fruit press.
Packaging and handling	- Labour; - Containers for Packaging; - Labels; - Product losses.
Storage	- Rent; - Labour; - Product Losses.
Transportation and Distribution	- Fuel; - Product losses; - Labour.

MODULE 3.0: FINANCIAL PRODUCTS FOR SMALL SCALE FRUIT PROCESSORS



MODULE OBJECTIVES	SESSIONS	MODULE OUTCOME
The objective of this module is to: 1. Describe the steps in financial product design; 2. Use the steps in financial product design to design products for the small scale fruit processor.	Session 1.0: Financial Product Development	At the end of this module, participants would be able to: 1. Describe the steps to take in designing financial products and services; 2. Design financial products for small scale fruit processors

Session 1.0: Financial Product Development

Session Objectives

At the end of this session, participants would be able to:

1. Describe the steps in financial product development;
2. Design financial products for the small scale fruit processor.

Developing financial products to suit the needs of specific targets like small scale fruit processors needs to cover specific financial product development process. In designing financial products for small scale fruit processors the steps in Figure 10 can be considered.

Figure 10: Steps in Financial Product Development

1. Market research

Market research is the first step in the product development process and is essential to evaluate the market demand for a financial product or a service for small scale fruit processors and other value chain actors. The market research provides the rural bank with information to help in the product design. The research for small scale fruit processors should cover the areas and consider the following as presented in Table 5.

Table 5: Market Research Areas

Area	Key factors to consider
Market size	This focuses on the number of small scale fruit processors or value chain actors that will demand the financial services. 1. How many small scale fruit processors are available in your community?

Area	Key factors to consider
Demand for different product types	1. What are the financial needs of small scale fruit processors? 2. How many people will be demanding savings or loans products in the value chain?
Competition	1. Which rural banks are serving the agricultural sectors? 2. Are there rural banks that provide financial services to the fruit processing sector? 3. What type of products do the providers provide to this target market?
Market segmentation	This section focus on segmenting the target market and developing specific products for the various segments. The segments can focus on farm size, location of farmers, the target market for the processors etc., 1. Which segments of small scale fruit processors can the rural bank develop specific products for? 2. What specific needs do the segments require?

2. Product Design

After undertaking the market research, the product design is the next step in the financial product development process. Product design explores the processes used for the design of financial products. In designing products for small scale fruit processors, the rural bank needs to take into consideration the following:

- Incorporating agriculture and fruit processing and marketing sector knowledge into the design;
- Developing the initial product concept;
- Considering the potential challenges and risks of products;
- Soliciting feedback from clients on the product;

- Finalising the prototype for pilot.

1.2.1 Product Design Framework

In designing financial products there are key product features that should be considered. The traditional 8Ps can be adopted to guide the designing of financial products for small scale fruit processors.

PRODUCT	INDICATORS
The features of the loan	• Target clients (example a processor into fruit juice bottling and one into fresh fruit slicing/cutting); • Loan amount; • Loan term; • Guarantees or collateral, if any; • Borrower Eligibility Requirements; • Loan Purpose.
PRICING	**Includes:**
Pricing considers the market potential and profit/sustainability objective using various strategies that include cost based, cost-plus, demand based and break even. It looks at behavioural attitudes and perceived values. During the initial design phase, it is best to price conservatively.	• Interest rate; • Loan fees; • Penalties; • Incentives.
PLACE	**Includes:**
Is the financial product accessible where and when it is wanted? Important lessons	• Place of loan disbursement/distribution;

PRODUCT	INDICATORS
can be drawn from the informal sector where access to debt is readily available, but at a high price.	• Place of repayment; • Location of operations.
PROMOTION	Includes:
Refers to sales communication, which is used to inform and persuade clients.	• Advertising; • Marketing.
PEOPLE	Includes:
Considers how the small scale fruit processors are treated during the process of obtaining agric financial product. To deliver the best customer service, the rural bank needs to recruit the right staff and train staff on key areas such as costs in processing and marketing as well the financial products and processes targeted at small scale fruit processors.	Staff of the rural bank.
POSITIONING	Includes:
The rural bank's effort to occupy a distinct competitive position in the mind of the processor farmer; the processor's perception.	• Transaction cost; • Price; • Quality; • Turnaround time; • Professional service.
PHYSICAL EVIDENCE	Includes:
The presentation of the financial product.	• Physical appearance of offices, branches, points of service; • Loan officers; • The appearance of the brochures and posters;

PRODUCT	INDICATORS
	• Transaction receipts; • Loan cards and passbook.
PROCESS	Includes:
How the financial product is delivered to a farmer.	• Loan origination; • Loan appraisal and approval; • Loan disbursal; • Loan repayment; • Processing and documenting of transactions.

Source: Adapted from WASH Financial Product Development Toolkit

1.2.2 Product Risk Analysis

During the concept product design stage, it is helpful to conduct a product risk analysis on the financial product ideas, to highlight the potential risks associated with each product. The market research will help identify some of the risk areas and can inform the risk analysis. The risk areas with respect to institutional, external factors and viability may be adapted to the rural banks context. Some risk areas to assess are:

Areas	Questions for Consideration
Institutional	• Does the rural bank have sufficient expertise in fruit processing and marketing? • Are there any staff concerns with launching the financial product (capacity, training, etc.)? • Does the rural bank have a standard protocol in place for launching new products? • Will the financial product require special processes? • What will the relationship be between the staff and farmer or clients? • What are the policies, procedures and internal controls like? • Will the rural bank be able to adapt to product needs?

Areas	Questions for Consideration
External Factors	• Are the local economic, seasonal patterns, and programs conducive to the product? For example, is the rural bank considering the impact on financing fruit processing and marketing if the government is planning to increase taxes on plastics? Is there competition from other rural bank's offering the same product?
Viability	• What is the potential for client default? • Will the clients be able to afford the cost? • Are the terms of the financial product manageable for the targeted clients? • Will the product be demanded by the targeted clients? • Will the cost of managing the financial product be more than revenue to be earned? • Is there sufficient cash flow to launch the product?

1.3 Pilot Testing a Financial Product

A pilot test is a limited offering of a product to a narrow geographic area and/or a limited number of clients. The test allows the rural bank to assess market demand and product effectiveness, which will inform product refinement prior to full scale roll-out. By pilot testing a new product, the rural bank can identify potential problems and make the necessary adjustments to product terms, marketing strategies, staffing and/or procedures. Pilot testing offers an opportunity to test out the prototype, allowing the bank to avoid problems during full scale product roll-out. The earlier problems are detected, the lower the cost of correction will be for the bank.

To effectively pilot test financial products for processors, the following steps can adopted:

Steps		Details
Step 1.	Compose the pilot test team	The team needs to be representative of the departments involved with the product to ensure effective coordination and product viability prior to launch. If possible, the product development team can continue as the pilot test team.
Step 2.	Define the product objectives	In order to determine the success or failure of the pilot test, it is essential that the objectives for the new product is clearly defined. The objectives can be to improve the quantity of fruit processed for export, increase the number of individuals that are into fruit processing, increase the income levels of fruit processors, expansion of financial products into new markets, increase earning of prospective rural bank, etc.
Step 3.	Develop the testing protocol	A testing protocol provides an outline for how the pilot test team will manage the test. It dictates the terms of reference (TOR) for the test and includes the specific tasks, requirements and precisely how and when the test will be monitored. It should also include guidelines under which the test would be paused or terminated. The terms of the pilot test protocol should include the following: • Anticipated location and number of clients to be included in the test • Duration of the test (start/end dates) • Reporting dates

Steps		Details
		• What data should be analysed, and when • Specific factors that may pause or call off the test.
Step 4.	Prepare systems	Prior to launching a pilot test, the rural bank should prepare the management information system (MIS) as well as any systems necessary to manage collaborations with external parties. All of these processes and systems must be ready before pilot testing begins. Once the processes are finalized, all respective staff must be trained.
Step 5.	Develop financial projections	Financial projections for the financial product should be developed to provide a clear financial picture and serve as a basis for informed decision-making. As new products are unlikely to reach their full potential within the first year, the financial projections are usually prepared for a three- to five-year period. The financial projections should cover direct cost, indirect cost as well as the revenue streams. Some of the costs are easily determined, like the direct costs of staff, training and fixed assets. Indirect costs and variable direct costs, on the other hand, can be difficult to project and track. Indirect cost includes office rent, depreciation of furniture and fittings and other equipment. The revenue streams mainly include interest income and fee income on loans. Though the financial

Steps		Details
		projections can be a difficult process, it is critical to understand the full cost of the product.
Step 6.	Document product definitions and procedures	Clear documentation is necessary to ensure that everyone implementing the pilot test will fully understand both the policies surrounding the product and the procedures for its operation. Policy and procedure definitions must address all areas that affect, or are affected by, the product, including credit staff (with direct customer contact) and their supervisors, marketing staff and back-office operations (human resources, accounting and IT). Document in detail the procedures for each process relating to the product. As a new product, the bank should develop a document to cover all processes of the product marketing and delivery.
Step 7.	Train relevant staff	Effective training of all staff involved with the financial product is essential to ensure by-in and commitment.
Step 8.	Develop customer marketing strategies and materials	Marketing financial products may require unique marketing strategies in cases where demand is dormant.
Step 9.	Start the product test	This involves the Contingency funds should be built into the budget to deal with any issues as they arise.

Steps		Details
Step 10.	Evaluate the test results	The pilot test team should meet as needed to evaluate the data and the progress of the pilot against the previously defined objectives.

1.4 Product Launch

Product launching often requires a step-by-step approach to move the product from the successful conclusion of the pilot test, to the point where it is fully operational. The product launch process involves multiple steps and feedback loops that provide data for decision making.

Steps		Details
Step 1.	Team Formation	This focuses forming a working team that will be involved in the launch of the new product. The team should include personnel from human resources department as well the leadership.
Step 2.	Examine internal capacities	The rural bank's capacity must be reassessed at every step of the product development process. This is especially important when considering the rollout of a new product. Lessons learned from the pilot phase are integrated into the launch and rollout of the product. Question to be considered include: 1. Does the financial product fit within the bank's strategic plan? 2. Based on the pilot test, does the product satisfy objectives relating to expected product returns? etc.
Step 3.	Organize product rollout	The bank can adopt a ''soft or public method' roll out to the launch of the new product. With the soft method, little or no marketing is done

Steps		Details
		in the launching of the product. In this case, the bank can identify few small scale fruit processors and sell products to. The ‘’public’’ roll-out, launch involves extensive marketing with the expectation of receiving many clients.
Step 4.	Conduct a product cost analysis	One of the basic objectives of pilot testing is to determine product profitability. Profitability is a factor of the: 1. Costs related to the product 2. Revenues earned from the product It is recommended that bank conduct product costing analysis to understand product profitability.
Step 5.	Train staff	This step involves assessing the training on the product undertaken at the pilot stage to identify the strengths and weakness. This is to either accept the approach or revise the approach and also train staff on new areas added.
Step 6.	Update the marketing plan	To ensure that effective marketing is done, the bank needs to develop a detail marketing plan. The marketing plan should cover market assessment, product marking goal and objectives, strategies, etc.
Step 7.	Product launch and rollout	This step puts together all the various strategies undertake from steps 1 to 6. Once the marketing plan is ready, the product can be launched.

2. Read the case below and provide responses to the questions

CASE STUDY

NKZ Fruit Juice Limited, located at Kasoa in the Awutu Senya- East in the Central Region of Ghana was established in 2008. It is planning for expansion in 2017. Activities in 2016 will focus on acquiring and installing machines at the processing site. The plant capacity is expected to be 20 metric tonnes per day and processing will be six days a week (3 days for processing and 3 days for non-processing activities), excluding public holidays resulting in a total of 300 working days in a year. Operation rate of the project is at 70% of plant capacity in year 1 and 2 and increases to 90% in year 3 and 4; and to 100% in the fifth year. The conversion rate for pineapple is 0.6 tonne of juice per tonne of fresh fruit purchased. A tonne of pineapple fruit cost GHS 500 and a crate of pineapple fruit juice is sold at GHS 20. Total investment cost for year 0 is estimated at GHS 108, 800 which includes land, processing plant and other equipment such as juice extractor, corking machine, pasteurizer, etc. The operating cost is mainly made up of variable cost of production such as fresh pineapples, labour cost including administrative staff and labourers at processing site and utilities (water and electricity). Other cost incurred by the firm in its daily activities include bottles, fuel, boxes, corks and labels. This is based on the assumption that costs of items are constant over the project life and additional total cost is commensurate with the increase in the use of plant capacity. A projected cash flow of the firm is shown in Table 8.

Table 6: Projected Cash flow of NKZ Fruit Juice Ltd.

Year	Cash Outflow (GHS)	Cash inflow (GHS)
0	100,800	-
1	103,134	120,960
2	103,134	120,960
3	125,539	155,520
4	125,539	155,520
5	139,983	173,180

Year	Cash Outflow (GHS)	Cash inflow (GHS)
6	136,183	172,800
7	136,183	172,800
8	136,183	172,800
9	136,183	172,800
10	136,183	221,976

Question

i. At the cost of capital of 20%, is this project viable?

ii. At the cost of capital of 30%, is this project viable?

iii. At what cost of capital will this project break even?

Solution

i. The Net Present Value (NPV) is estimated to be GHS 23,535. Since the NPV is positive, it means the project is viable. Alternatively, the Benefit-Cost Ratio is found to be 1.03. This is greater than 1 meaning the project is profitable.

ii. The Net Present Value (NPV) is estimated to be GHS (15,869). Since the NPV is negative, it means the project is not viable. Alternatively, the Benefit-Cost Ratio is found to be 0.97. This is less than 1 meaning the project is not profitable.

iii. The project will break even when the Net Present Value is zero. i.e. NPV=0. The interest rate at which the net present value is zero is the internal rate of return (IRR). The IRR is found to be 25%. Therefore, the project will break even at 25%.

PROCESSOR LOAN PRODUCT FEATURES

LOAN PRODUCT	USE OF LOAN	PRODUCT FEATURES							
		Loan Amount (GHS)		Interest Rate (%)		Repayment Duration (months)		Repayment Amount (GHS)	
		Min	Max	Min	Max	Min	Max	Min	Max
Fixed Asset Loan	Purchase of distribution van	23,000	45,000	30	35	36	60	1,000	2,000
	Purchase of juice extractor	7,000	8,000	30	35	24	36	300	500
	Purchase of bottle coolers	3,000	4,000	30	35	12	24	150	200
	Purchase of refrigerators	5,000	8,000	30	35	12	24	200	400
	Purchase of labelling machine	5,000	6,000	30	35	12	24	200	400
	Purchase of pasteurizer	10,000	12,000	30	35	36	60	300	500
	Purchase of corking machine	4,000	6,000	30	35	12	24	200	500
Working Capital Loan	Supplier credit facilities *(packaging materials, water, electricity supply, detergents, etc.)*	600	1,000	30	35	1	6	100	1,000
	Credit facilities for fresh fruits	3,500	5,500	30	35	1	6	1,000	5,000
	Overdraft for labour	8,000	12,000	30	35	1	3	2,800	12,000
	Transportation cost	2,100	3,000	30	35	1	3	1,000	3,000
Expansion Loan Product	• Expansion of processing facility	40,000	50,000	30	35	36	60	1,200	2,000

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