Key for a profitable and sustainable seed yam business enterprise: Business Plan and Market Development with Record Keeping for Seed Yam Farmers

Beatrice Aighewi, Norbert Maroya, and Djana Mignouna
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YIIFSWA Working Paper Series No. 8
## Contents

Preface by Project Leader .............................................................................................................................................. iv

1. Introduction ......................................................................................................................................................... 1
   Section 1: The business plan .............................................................................................................................. 2
   Section 2: The market development plan ......................................................................................................... 2

2. The seed yam value chain ................................................................................................................................. 2
   Section 3: Business record keeping ............................................................................................................... 4
   The Importance of Keeping Business Records for the Seed Yam Enterprise .............................................. 4
   Simple Business Records ................................................................................................................................ 5
   Estimated cost of seed yam business ............................................................................................................... 5
   Estimated revenue and gross margin of seed yam enterprise ..................................................................... 6
   Actual cost of business ................................................................................................................................... 7
   Labour use ......................................................................................................................................................... 8
   Expected risks .................................................................................................................................................. 8
   Realised revenue and gross margin from enterprise ....................................................................................... 9
   Record of market price data ............................................................................................................................. 9
   Technical information ..................................................................................................................................... 10
   List of major challenges encountered in production and marketing ........................................................... 10
   Simplified Sales Records Books .................................................................................................................... 11

### Annexes

1. Producing Quality Seed Yams Using Minisets ............................................................................................... 12
   Producing seed tubers by the adaptive minisett technique .......................................................................... 12

2. Calendar of Yam Activities ............................................................................................................................. 15

3. Collecting Required Information for the Business Plan Development ...................................................... 16

Additional reading materials ............................................................................................................................. 22
Preface by Project Leader

The Yam Improvement for Income and Food Security in West Africa (YIIFSWA) project is a grant of Bill & Melinda Gates Foundation to the International Institute of Tropical Agriculture (IITA). The project is being implemented in Nigeria and Ghana by IITA in partnership with a consortium of national and international R4D agencies and in collaboration with service provider organizations, the private sector, smallholder yam farmers and traders.

The “Business Plan & Market Development with Record Keeping for Seed Yam Farmers” is a manual developed specifically to assist seed yam farmers to operate with projections and decision making for each of theirs activities in term of production, marketing and selling. This manual will help seed yam entrepreneurs to achieve two goals. The first is to help generate financial projections regarding a specific period to support the creation of a business plan. The second aim is to support decision-making by enabling the user to change one or more parameters of his/her business setup.

The YIIFSWA Working Papers are published informally by the project to disseminate its intermediate outputs or technologies. Publications in the series include methodologies, survey questionnaires, as well as preliminary results of the various objective teams of the YIIFSWA project. The series is aimed at scientists and researchers working with national agricultural research systems in West Africa, the international research community, policy makers, donors, and members of international development agencies that are interested in yam.

As these working papers are not in their final form, comments are welcome. Such comments should be addressed to the respective authors or to the YIIFSWA Project Leader. Individuals and institutions may obtain copies by writing to:

The Project Leader
Dr Norbert Maroya
Yam Improvement for Income and Food Security in West Africa
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PMB 5320. Oyo Road
Ibadan, Nigeria
Introduction

Yam (*Dioscorea rotundata*) is a major tuber crop that affects the livelihoods of millions of people in West Africa. The crop is grown in areas from the Humid Forest to the Southern Guinea Savanna regions, with production concentrated in the derived and southern Guinea Savannas. Farmers normally plant whole tubers or tuber pieces of 200 - 1000 g to obtain a wide range of ware tuber sizes including some seed tubers. The traditional methods of producing planting material from a previous ware crop do not provide sufficient quantity and quality required by farmers for increased productivity. New methods such as the adaptive minisett technique, aeroponics vine cutting technique; micro and mini tuber propagation, etc. have been developed to rapidly multiply yams and provide good quality seed yam tubers to farmers. It is hoped that some farmers will use these improved methods to provide the vital missing link in the yam value chain - the seed yam enterprise.

This guideline is developed to assist existing seed yam farmers, as well as potential new entrants into the seed yam business, to develop a profitable and sustainable business enterprise. Seed yam production and marketing should be thought of as business operations just like any other business. Hence, there are many things to be considered in developing the seed business plan ranging from the need for labour, financial planning, advertising and promotion among potential buyers, meeting competition in the market, increasing production and the number of products to be made available for sale. A Business Plan is a detailed study of all factors which will affect your planned business. It looks at each factor which influences your operations, management, production, sales, expenses and profitability. It is a map, plan and direction of your operations. It shows what you intend to do, how you intend to do it, and what the results (and profitability) should be. It also gives you a “yardstick” against which you can measure your progress so that you can take corrective action if things are not going according to plan. This guideline is intended for use by any seed yam grower/producer, processor, stockist/dealer/merchant, sales agency, private sector or government agency that operates a seed yam business to generate income, or operates within a defined budget to provide planting materials for farmers. Other considerations are requirements of equipment and buildings, how products will be priced, displayed and marketed. It is necessary to set aside enough time to prepare a formal business plan which integrates the goals of the business, the production, marketing and financial targets, and labour requirements into a management strategy.

Since each farm business is unique in terms of its physical characteristics, income level and people involved, this guideline will provide farmers with the information needed and format for developing realistic business and marketing plans as well as record keeping skills to meet the specific needs of their seed yam business.
The seed yam value chain

Seed yam passes through several stages and actors as it moves from the producer to the user. At each step of the way, value is added to the seed tuber or planting material and each actor involved in the value chain must add a cost to increase the value. This could be a service, or expertise. The seed farmer cannot make money from producing seed yam without a buyer, and a buyer depends on the transporter to move the tubers from the farm gate to a storage barn and then to one market to another. Each person in the value chain should make a fair income based on the inputs or services that they contribute to move the seed yam to the users. The seed yam value chain include the pre-basic seed also known as breeder seed produced by the Research Institutes, the basic seed or the foundation seed yam produced by private seed companies and some public parastatal organization, the certified or commercial seed yam produced by commercial seed producers, seed growers, etc. In addition to the seed categories, the seed yam value chain includes seed storage, seed treatment, seed packaging and transportation.

Section 1: The business plan

A business plan is an essential tool for the farmer who intends to run his/her farm as an enterprise and make profit. It helps in planning, directing and running a business successfully. The business plan shows the potential of the business and helps in the execution of a strategy. When a business plan is written, it brings an idea to reality and indicate clearly the why, what, who, how, where, when, and how much of the venture. The business plan forces one to take a deep look at an idea, and how it could be transformed into a business while helping to recognize areas that need rethinking or support. There must be a business name, address and location of enterprise, as well as details of every aspect of the enterprise including production, marketing, financial and management strategies.

Section 2: The market development plan

Planning for seed yam production without an effective marketing plan is a plan to fail. Having a foresight of the marketing of the products of the enterprise, possible challenges and how they will be tackled is essential. For a simple plan, the following information will be necessary:

Overall Market Strategy: Describe your company’s general marketing philosophy and strategy, derived from market research and evaluation.

What kinds of customer groups will you target for intensive sales promotion?

What kinds of customer groups will you target for later sales efforts?

For a simple plan, the following information will be necessary:

1. Where to sell (list and select favorable locations and markets):

........................................................................................................................................................................
........................................................................................................................................................................
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2. List categories of buyers of the seed and select the most probable (e.g. traders, farmers, roadside retailers, etc.)

3. Marketing and sales expenses

Sales Tactics
Describe methods to be used to make sales/distribute your seed yam or provide the services.

Will you use your own sales force/stores, independent sales representatives, distributors?

Describe margins given to retailers, wholesalers, and salesmen.

Compare the above with those of your competitors.

Provide details of quantities and costs for:

- Distribution channels
- Transportation (means of transportation and routes used for transport)
- Storage
- Packaging (type of material used)
- Wages
- Records and record-keeping
- Advertising and promotion
- Describe approaches used to bring your seed yam or services to the attention of prospective purchasers.
- Describe approaches used by your competitors, and relative success of each.
- Describe advertising costs
- Miscellaneous

4. Storage type, cost and duration:

<table>
<thead>
<tr>
<th>Type of seed*</th>
<th>Storage type</th>
<th>Length of time in storage</th>
<th>Month/s to sell</th>
<th>Losses during storage (No./100)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

*milked tuber, small whole seed, large tuber to be cut into setts

5. Expected prices for each type of seed tuber:

Pricing strategy
Describe prices to be charged for your seed yam or products/services.

Compare your pricing policy with that of your major competitors within your operation areas.
How are you sure that your prices are right to penetrate the market, maintain a market position, and produce profits?

<table>
<thead>
<tr>
<th>Type of seed</th>
<th>Expected unit price</th>
<th>Actual unit price (e.g. 100 tubers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milked seed</td>
<td></td>
<td></td>
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<tr>
<td>Very small tubers (&lt; 100 g)</td>
<td></td>
<td></td>
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<tr>
<td>Small tubers (101 – 149 g)</td>
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<td></td>
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<tr>
<td>Normal seed (150 – 300 g)</td>
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<td></td>
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<tr>
<td>Large seed (301 – 500 g)</td>
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<tr>
<td>Extra-large seed (&gt; 500 g)</td>
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</tr>
</tbody>
</table>

6. Marketing plans (outline of plans to market seed yam tubers as a group, e.g. division of labour), if applicable.

7. Marketing costs (e.g. per lot of 50, 100, 400, or 1000 seed tubers) - This should include: bulking up of produce, sorting and grading, transport, handling, time spent on assembling and marketing seed yam, commission (e.g. 1 tuber/heap of 100), and other costs.

8. Expected benefits from marketing (e.g. through higher prices, more stable market access)

9. Expected net benefits from marketing (estimated benefits of marketing minus estimated costs of marketing):

**Section 3: Business record keeping**

A business record is a written evidence summarising a transaction carried out by a person in his/her business at a given time or over a given period. Business record keeping is done on daily basis and summarized weekly. Business records are normally kept in books in an organized table form. They can also be maintained in electronic format.

It is necessary to have basic knowledge and skills of keeping business records. This section will provide information on how to maintain basic business records, understand and monitor the trend of business in a simplified way.

**The Importance of Keeping Business Records for the Seed Yam Enterprise**

Keeping business records is a very important aspect of managing your seed yam business. The records help you manage your business better by:

- Planning and monitoring your business transactions and the corresponding incomes and expenditures.
- Identifying easily and correctly whether your business is making a profit or loss at any given time on basis of facts and records.
- Following up on your obligations (respect of signed agreements) with business partners (suppliers and customers).
- Providing a basis for mobilising additional financial capital for the business.
- Providing a basis for preparing good statements of accounts for the business and for carrying out audits.
- Helping to separate private transactions from that of the business.
Business records should provide enough details on all transactions undertaken at any given time. This should be based on documents containing primary information on each transaction carried out. There should be records with reference to fixed assets, expenditures, taxes, bank transactions, personal drawings, sales, purchases, etc. Specify all cash and credit transactions, and all referential documents should be properly kept.

**Simple Business Records**

Every transaction will involve exchange of goods or service for money. For each sale a receipt must be issued even if the buyer does not need it. Basic business records, especially for micro and small businesses will normally require consistent record of all cash and credit transactions.

**Estimated cost of seed yam business**

All items required for the enterprise and their cost:

<table>
<thead>
<tr>
<th>S/n</th>
<th>Item</th>
<th>Unit cost</th>
<th>Quantity</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Land rent</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>Materials</strong></td>
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<td></td>
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<tr>
<td>1</td>
<td>Planting material</td>
<td></td>
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<tr>
<td>2</td>
<td>Land preparation (include clearing, stump-</td>
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<tr>
<td></td>
<td>ing, ridging or heaping)</td>
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<tr>
<td>3</td>
<td>Chemicals for treating setts</td>
<td></td>
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<tr>
<td>4</td>
<td>Mulching material</td>
<td></td>
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<tr>
<td>5</td>
<td>Staking material</td>
<td></td>
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<tr>
<td>6</td>
<td>Herbicide</td>
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<td>7</td>
<td>Fertiliser</td>
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<td>8</td>
<td>Seed treatment chemical (for the produce)</td>
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<tr>
<td>9</td>
<td>Rent for storage facility</td>
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<td></td>
<td><strong>Labour</strong></td>
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<tr>
<td>10</td>
<td>Cutting and treating minisetts</td>
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<tr>
<td>11</td>
<td>Mulching of planted setts</td>
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<tr>
<td>12</td>
<td>Planting</td>
<td></td>
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<tr>
<td>13</td>
<td>Staking</td>
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<tr>
<td>14</td>
<td>Weeding 1</td>
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<tr>
<td>15</td>
<td>Weeding 2</td>
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<tr>
<td>16</td>
<td>Weeding 3</td>
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<tr>
<td>17</td>
<td>Fertiliser application</td>
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<td>18</td>
<td>Harvesting</td>
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<td>19</td>
<td>Packing and loading</td>
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<td>20</td>
<td>Seed treatment</td>
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<tr>
<td>21</td>
<td>Storage – packing into store</td>
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<td>22</td>
<td>Storage – sorting and de-sprouting</td>
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<tr>
<td>23</td>
<td>Marketing cost (including loading, offloading,</td>
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<td></td>
<td>transport, taxes, market fees, etc)</td>
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</tbody>
</table>

**Total estimated cost of enterprise (1)**

Note: labour includes family labour cost at market value; planting material to include own and purchased seed yam)
Estimated revenue and gross margin of seed yam enterprise

Estimated outputs from the enterprise (examples: number of seed yam tubers harvested – small, medium, and large; other yam product produced, e.g. quantity of ware yam, chips)

<table>
<thead>
<tr>
<th>S/n</th>
<th>Item</th>
<th>Unit price</th>
<th>Quantity</th>
<th>Total revenue</th>
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<tbody>
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<td>1</td>
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<td></td>
<td>Total estimated revenue from enterprise (2)</td>
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</table>

Expected gross margin from enterprise = Total 2 – Total 1
## Actual cost of business

<table>
<thead>
<tr>
<th>S/n</th>
<th>Item</th>
<th>Unit cost</th>
<th>Quantity</th>
<th>Total cost</th>
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<tbody>
<tr>
<td>1</td>
<td>Land rent</td>
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<td>2</td>
<td>Land preparation (include clearing, stumping, ridging or heap-</td>
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<td>ing)</td>
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<td>3</td>
<td>Planting material</td>
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<tr>
<td>4</td>
<td>Labour for cutting and treating</td>
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<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Chemical for treating setts</td>
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<tr>
<td>6</td>
<td>Planting cost - labour</td>
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<td>7</td>
<td>Mulching - labour</td>
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<td>8</td>
<td>Mulching material</td>
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<td>9</td>
<td>Staking - labour</td>
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<tr>
<td>10</td>
<td>Staking material</td>
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<td></td>
<td>Herbicide</td>
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<td>11</td>
<td>Weeding 1 –labour</td>
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<td>12</td>
<td>Weeding 2 – labour</td>
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<td>13</td>
<td>Weeding 3 – labour</td>
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<td>Fertiliser</td>
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<td>15</td>
<td>Fertiliser application - labour</td>
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<td>16</td>
<td>Harvesting – labour</td>
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<td>17</td>
<td>Packing and loading – labour</td>
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<td>18</td>
<td>Seed treatment chemical</td>
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<tr>
<td>19</td>
<td>Seed treatment - labour</td>
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<td>20</td>
<td>Rent for storage facility</td>
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<tr>
<td>21</td>
<td>Storage – labour packing into store</td>
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<tr>
<td>22</td>
<td>Storage - labour for sorting and desprouting</td>
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<tr>
<td>23</td>
<td>Marketing cost (include loading, offloading, transport, taxes,</td>
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<tr>
<td></td>
<td>market fees, etc.)</td>
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</tbody>
</table>

**Total actual cost of enterprise (3)**

Note: Labour includes family labour cost at market value; planting material to include own and purchased seed yam); Compare actual costs of items to estimated costs.
Labour use

Labour cost could be included in the actual costs (as above) or recorded in the labour use form below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Family labour use</th>
<th>Hired labour</th>
<th>Person hours</th>
<th>Cost/ hour</th>
<th>Total labour cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Expected risks

List 5 main possible risks, e.g. drought, cattle grazing crop, flooding, pilfering, accident during transportation, etc.

<table>
<thead>
<tr>
<th>S/n</th>
<th>Expected possible risk</th>
<th>Possible solutions</th>
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</table>
Realised revenue and gross margin from enterprise

<table>
<thead>
<tr>
<th>S/n</th>
<th>Date sold</th>
<th>Where sold (market)</th>
<th>Item sold</th>
<th>Unit price</th>
<th>Quantity</th>
<th>Revenue</th>
</tr>
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</table>

Total actual revenue from enterprise (include both seed, ware and processed yam, also what is consumed or used at home)

Realized gross margin from enterprise = Realized revenue(4) – Actual costs(3)

If there is a difference between the estimated and actual gross margin from the enterprise, attempt to explain why and note what lessons could be learned.

Record of market price data

Record prices from market research and actual prices received

<table>
<thead>
<tr>
<th>Date</th>
<th>Location/ market</th>
<th>Source of information</th>
<th>Research price</th>
<th>Actual price</th>
</tr>
</thead>
<tbody>
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</table>
### Technical information

#### Number of setts planted versus actual production

<table>
<thead>
<tr>
<th>Date</th>
<th>Plot number</th>
<th>Number of setts planted</th>
<th>Number of tubers harvested</th>
<th>Weight of 50 tubers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

#### List of major challenges encountered in production and marketing

List five main challenges encountered

<table>
<thead>
<tr>
<th>S/n</th>
<th>Challenge encountered</th>
<th>How managed</th>
</tr>
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<tbody>
<tr>
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</table>
**Simplified Cash Transaction Records Book**

It is important to keep track of all cash transactions. A transaction involving receipt of cash will increase the cash balance while the one which involves payment of cash will decrease the cash balance. Below is the illustration of a simplified cashbook in which cash transactions can be maintained:

<table>
<thead>
<tr>
<th>Date</th>
<th>Particulars of Receipts and Payments</th>
<th>Amount received</th>
<th>Amount Paid</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/08/15</td>
<td>Balance brought forward</td>
<td></td>
<td></td>
<td>300,000</td>
</tr>
<tr>
<td>01/08/15</td>
<td>Cash sales</td>
<td>50,000</td>
<td>0</td>
<td>350,000</td>
</tr>
<tr>
<td>02/08/15</td>
<td>Cash purchases</td>
<td>0</td>
<td>300,000</td>
<td>50,000</td>
</tr>
<tr>
<td>02/08/15</td>
<td>Telephone charges</td>
<td>0</td>
<td>10,000</td>
<td>40,000</td>
</tr>
<tr>
<td>05/08/15</td>
<td>Cash sales</td>
<td>100,000</td>
<td>0</td>
<td>140,000</td>
</tr>
<tr>
<td>05/08/15</td>
<td>Payment by credit customer</td>
<td>150,000</td>
<td>0</td>
<td>290,000</td>
</tr>
<tr>
<td>05/08/15</td>
<td>Payment to credit supplier</td>
<td>0</td>
<td>40,000</td>
<td>250,000</td>
</tr>
<tr>
<td>06/08/15</td>
<td>Private drawings</td>
<td>0</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>31/08/15</td>
<td>Cash balance carried forward</td>
<td></td>
<td></td>
<td>500,000</td>
</tr>
</tbody>
</table>

**Simplified Sales Records Books**

The other very important element of trade is the sales. The simplest way of tracking sales is to maintain both cash sales and credit sales in Sales Day Book as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Invoice No.</th>
<th>Name of Customer</th>
<th>Particulars of Goods/Services</th>
<th>Amount N</th>
<th>Cumulative Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/04/15</td>
<td>001</td>
<td>Dana Farms</td>
<td>Seed tubers</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>05/04/15</td>
<td>002</td>
<td>Alh. Bawa</td>
<td>Seed tubers and fungicide</td>
<td>20,000</td>
<td>70,000</td>
</tr>
<tr>
<td>10/04/15</td>
<td>003</td>
<td>Mrs. Joseph</td>
<td>Fungicide and insecticide</td>
<td>10,000</td>
<td>80,000</td>
</tr>
<tr>
<td>15/04/15</td>
<td>004</td>
<td>Mr. Daniel</td>
<td>Seed tubers</td>
<td>150,000</td>
<td>230,000</td>
</tr>
<tr>
<td>16/04/15</td>
<td>005</td>
<td>Ms Safiatu</td>
<td>Yam flour (Alubo)</td>
<td>5,000</td>
<td>235,000</td>
</tr>
<tr>
<td>31/04/15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>235,000</td>
</tr>
</tbody>
</table>

The appendices in this guidelines will provide more information on the technical aspect of seed yam production (Appendix 1), calendars for yam production activities to help in planning seed production to meet demands (Appendix 2), and a series of questions to guide the preparation of comprehensive business plan, market development and record keeping (Appendix 3).
Appendix: 1 Producing Quality Seed Yams Using Minisetts

Several methods may be used to produce seed yams for commercial purposes and these include the minisett technique, vine cuttings, tissue culture, and the aeroponics and temporary immersion bioreactor systems. Traditional methods of production by milking and cutting of large setts are not recommended because they are slow and wasteful. There are different types of planting materials, and the type of seed to be produced will guide the decision on what method to use. Yam planting material could be minitubers or cut setts of approximately 250 g (seed yam), vine cuttings or plantlets. To produce minitubers to be used whole as seed, the adaptive minisett technique will be most appropriate for many seed yam producers and is described in this document.

If the seed yam to be produced is earmarked for the formal seed system such as the production of certified seed where quality is assured, then the appropriate seed regulatory agency must be duly informed and totally involved in the entire production process starting from the land selection up to harvesting. This will facilitate the issuance of certification for the seed yam produced.

Producing seed tubers by the adaptive minisett technique

The minisett technique is a very important means of producing large quantities of good quality seed yam. The process involved is given below.

Selection of Mother Seed Yams: There are many yam varieties available and the choice of which variety to produce will depend on market demand. Select only healthy mother tubers of less than 1000 g, which have broken dormancy and are free from internal or external symptoms of pests and diseases.

Cutting and size of Minisetts: The size of minisett determines the size of seed tubers to be produced. Choose a minisett size to avoid cutting of the seed tubers produced as much as possible. Note that there are varietal differences in the performance of minisetts, so different sizes of different varieties may perform differently. Generally the recommended size of minisetts ranges between 20 and 100 g.

Treatments of Minisetts – Cut minisetts should be treated with a mixture of suitable broad spectrum fungicide and insecticide to prevent rots after planting [e.g. Chlorpyrifos (48EC) and Mancozeb (80WP)]. There are many chemical products available that could be used, and an Agricultural Extension Officer will provide useful advice on this.

Pre-sprouting of Minisetts – The prepared minisetts can be pre-sprouted in containers (boxes, trays or baskets) or on beds using good loamy topsoil, saw dust, shredded coir or carbonized rice husk before transplanting to the field.

Selection of Field – One of the reasons for developing the minisett technique is to produce clean disease and pest-free seed tubers, hence the importance of selecting a field that is free from soil-borne diseases and pests especially nematodes, mealy bugs and scale insects. Avoid land that has been under continuous cultivation of yams. The soil should be loamy, well drained and free of stones.

Land Preparation – Land to plant minisetts is prepared as is customary for growing yam, although the mounds or ridges are smaller than those made for ware yam production. For large scale production, land preparation can be mechanized by ploughing, harrowing and ridging.
**Direct Planting** – This should be done only when the rainy season is fully established or where irrigation facilities are available. Plant minisetts at a spacing of 25 x 100 cm to give 40,000 plants/ha. The plant spacing could be increased or reduced depending on the size of minisetts and seed tubers desired.

**Transplanting Minisetts** – When transplanting, handle pre-sprouted minisetts with care to avoid damage to young roots and sprouts. This should also be done when rains are well established or at any time where irrigation is available. Minisetts should not be allowed to grow excessively in the nursery before transplanting.

**Field Maintenance** – The field should be kept free of weeds as much as possible, especially during the first 8 to 12 weeks when the crop cover is poor. Weeding can be done manually using the hand held hoe as is practiced by most farmers, or chemically with pre-emergence herbicides. Earthing-up of exposed minisetts, roots and tubers is essential especially from the second or third weeding when some soil would have been washed off by rain.

Where there is a need for fertilizer application, follow the recommendation for your location. However, the following rate could serve as a guide: NPK 20:10:10 or 15:15:15 at 400 – 500 kg/ha applied at 8 – 12 WAP in bands on both sides of the ridge for single row planting, and double rows on each side of the ridge for double row planting. If pre-sprouted minisetts are used, fertilizer is applied earlier at 4 – 8 weeks after transplanting.

In regions where yams are normally staked, plants from minisetts should also be staked using small stakes of 1 – 2 m or trellising could be done. In trellising, two poles are placed at the end of the ridges and another pole or rope is tied horizontally on top of the two. The young vines are directed to the overhead rope using twines.

Inspect the crop regularly to eliminate diseased (virus) and off-type plants, and ensure that adequate precaution is taken to keep pests out of the field.

**Harvesting and Sorting** – Seed yams mature in 5 to 6 months after planting or transplanting. To avoid cuts and bruises which serve as entry points for the pathogen-causing rots in storage, harvest carefully. Immediately after harvest, remove seed tubers from the sun to a shade to prevent sun scorch. Seriously damaged tubers and those with symptoms of nematode infestation should be sorted for use as food. Store seed tubers of each variety separately, and grade them according to size.

**Curing of Harvested Seed Tubers** - Immediately after harvest, pile tubers in a heap and cover with materials such as grass, mats, sacks and/or tarpaulin for two to three days. This will hasten the curing of tubers and they will store longer.

**Storage of Seed Tubers** – Cured tubers store better. Treat seed in a solution similar to the one used to treat cut minisetts before storage. A good storage facility for seed yam tubers must have good ventilation, adequate shade and good security against pilfering, rodents and other pests. Regular inspection should be carried out to dispose of rotting tubers and also remove sprouts that come up much earlier than planting time.

It should be noted that very small tubers that originate from vine cuttings and tissue culture derived plantlets can be planted at close spacing to produce regular seed size tubers (100 – 250 g).
Appendix 1: Seed production using minisetts technology

Quality Seed Yams for Improved Productivity

1. Select healthy tubers
2. Cut into minisetts (25-80g)
3. Harvest seed yams, treat and store for sale
4. Treat minisetts with chemicals
5. Maintain crop
6. Air dry under shade

Plant on mounds or ridges
(100 X 25-30cm)

www.iita.org/web/yilirwa/home
### Appendix 2: Calendar of Yam Activities

#### Seed yam production in Forest zone
- **Seed Selection**
- **Preparation of Nursery**
- **Cutting of minisetts and laying in nursery**
- **Land preparation (mounding or ridging)**
- **Transplanting minisetts/direct planting**
- **Weed management**
- **Staking**
- **Field inspection for rouging/positive selection**
- **Harvesting, sorting and curing**
- **Storage**

#### Ware yam production in Forest zone
- **Seed selection**
- **Land preparation (Land clearing, mounding)**
- **Cutting of setts and planting**
- **Weed management**
- **Staking**
- **Field inspection for rouging/positive selection**
- **Harvesting, sorting and curing**
- **Storage**

#### Seed yam production in Savannah zone
- **Seed Selection**
- **Preparation of Nursery**
- **Cutting of minisetts and laying in nursery**
- **Land preparation (mounding or ridging)**
- **Transplanting minisetts/direct planting**
- **Weed management**
- **Staking**
- **Field inspection for rouging/positive selection**
- **Harvesting, sorting and curing**
- **Storage**

#### Ware yam production in Savannah zone
- **Seed Selection**
- **Land preparation (Clearing, ploughing)**
- **Preparation of setts and planting**
- **Mulching**
- **Weed management**
- **Staking**
- **Field inspection for rouging/positive selection**
- **Harvesting, sorting and curing**
- **Storage**
Appendix 3: Collecting Required Information for the Business Plan Development

Most of the essential information items are presented in the form of questions. DO NOT answer them by yes or no. They are intended as guides to help you learn the details of all factors which will affect the success or failure of your business. Answer each with a complete discussion, tables, figures, costs, etc., which cover each item and all aspects in which it will affect your operations, sales, management, expenses and profit.

1. **Identifying the proposed seed yam business**
   - Do you have a distinct name for the business to project its characteristics and nature?
   - Have you prepared a statement of objectives, operations, etc., for your business?
   - Have you identified and briefly described your planned business operations?
   - Will the business be a “new start-up” or re-organization of an existing business?
   - Will it be a separate enterprise, a franchise operation, or a branch operation?
   - Where will your business be located and established?
   - Where will your business operate?
   - Have you detailed the type of seed yam or seed yam services (SY/SYS) of the business?
   - Will the business produce its own seed yam?
   - Will the business sell at wholesale, distributor or retail level?
   - Will the business provide services such as treating, packaging, storage, distribution? Which?
     - At what level?
   - What is the planned or projected start-up date? How much preparation time is available? How does the start-up date relate to market trends, if market is seasonally affected (as seed yam sales are)?

2. **Feasibility of the planned seed yam business**
   - Does your SY/SYS satisfy an unfilled need?
   - Will your SY/SYS serve an existing market where demand exceeds supply?
   - What is unique about your business and your seed yam? Why will customers/farmers buy it?
   - What is the “market niche” of your seed yam business?
   - What competitors are already in this business?
   - What volume of business are the competitors doing? Is there still an unsatisfied market demand, or will your business have to take from the market already supplied by existing competitors?
   - How are your competitors faring economically? Are they successful and profitable? What problems do they face?
   - Will your SY/SYS be competitive in quality, selection, price, location?
   - Why will your proposed business succeed?
   - How will your proposed business succeed?

3. **Your capability to run the seed yam business**
   - What is your experience in business in general?
   - What is your experience in, and knowledge of, this aspect of the seed business?
   - Have you ever worked in a seed business/position like this?
Do you know the skills needed to be successful in this area of the seed yam business?
Do you have the required technical and managerial skills?
Have you ever worked as a supervisor/manager, especially in a technical seed business?
Have you had any formal business schooling or seed technology training?
If you are lacking specific experience/training, how will you get it?
If you don’t have the skills, can you delay starting the business until you get skills?
What is the experience/knowledge of your planned partners, managers, and personnel?
Show how it will help the business succeed?
Can you hire people with the managerial and seed technology skills needed?

4. **Seed yam/ seed yam service**
What SY/SYS will you provide?
Have you made a SY/SYS production, operating and sales plan, based on estimated sales, to determine how much you must produce, stock, inventory?
Do you have reliable/adequate producers/suppliers? Or will you produce on your own farm lands, or buy from other producers?
Have you compared prices, quality, credit, etc., of other suppliers?

5. **Market analysis**
Is there an adequate market for your planned SY/SYS, site, etc.?
Who will your customers/farmers be? What are their primary crops and production operations?
How large (units, money value, etc.) is the market for your SY/SYS?
Should you try to appeal to the entire market, or only to segments?
What percent (volume, value) of the market can you get?
Do you understand your potential farmer customers’ needs/desires?
Where do your farmers/customers live/work?
Will you offer the SY/SYS they are willing to buy?
Will your prices be competitive in quality and value?
Will your promotional plan effectively draw in farmers/customers?
Do you understand how your business compares with competitors?
Is your business conveniently located for your farmers/customers?
Will your business have adequate delivery facilities?

6. **Competition analysis**
Do you have a unique “market niche”? Describe it, and why it is unique and why your farmers/customers will buy it. What competitive advantage will your SY/SYS have?
What SY/SYS will compete with yours?
List and describe (in detail) your direct competitors.
What indirect competitors do you have? (SY/SYS which can be used instead of yours)
Who are your nearest competitors?
How are your competitors’ businesses similar, different and/or competitive to yours?
How will your SY/SYS be better or more salable than your competitors’?
What can you learn from studying your competitors, or talking with their customers? Which of your competitors’ good practices can you adopt, and which of their bad practices can you avoid? How do you compare with direct and indirect competitors in terms of price and quality?

7. **Operations plan**
   Have you prepared an operations plan, including every aspect of your planned business? Does your operations plan match with your financial/business plan?

8. **Financial plan**
   Have you prepared a complete, detailed financial plan, showing funds available, funds needed, income expected, and sources and amounts of required funding? Does your financial plan show timings of expenses and income? Will your plan allow you to earn the necessary margin? Will farmers/customers pay the prices shown in your financial plan? What kind of accounting system will you use? What kinds of records will you use? Does it permit accurate reporting for taxes? Do you need a computer and special software? Is your financial plan and accounting system complex enough to require hiring an accountant? Can you handle it yourself? Can your tax accountant keep it for you? Does your financial plan reflect your operational plan, and include a profit and loss projection? Does your financial plan include a schedule of sources and amounts of funds? Does your financial plan include a pro forma (planned) balance sheet? Does your financial plan include a cash flow projection?

9. **Expense records**
   Do your expense records give you the key information you need to make sound decisions? Do you know which expense items over which you have the greatest control? Are records sufficiently detailed to identify where the money goes, and which items are expensive? Can you detect those expenses which are not necessary to successful operation of your business?

10. **Financing your business**
    How much money do you have to invest in the business (financial statement)? What is your percentage of equity? How much money will you need to start the business (start-up cost estimates)? How much money will you need to operate the business, keep it running for 1, 2, 3, 4, 5 years (operating expense estimates)? How much money must you borrow? What percentage of the equity in your business will be under mortgage or covered by loans?
11. **Business records**
Have you prepared to maintain complete records of sales, income, expenses, accounts payable, accounts receivable?
Have you prepared to handle payroll records, tax reports, and payments to employees and for taxes, etc.?
Have you arranged for the necessary financial reports, and how to prepare them?

12. **Protecting your business**
Have you considered/taken insurance coverage for liability/accident insurance? Fire and all hazard insurance on facilities and equipment? Fire and all-hazard insurance on inventory-seed, supplies, other inputs, etc.? Medical/life insurance for employees/staff?
Do you have adequate insurance coverage for each?
Are you familiar with your obligations to employees under both common law and workers’ compensation?
Do you have some fringe benefit insurance for your employees (group life, group health, or retirement insurance)?

13. **Seedstock inventory records**
Do your inventory records give you the key information you need to make sound decisions?
Do your inventory records show how much you have invested in each kind of seed, without having to make a physical inventory?
Have you achieved optimum balance between inventory and cash?
If you hold too much seed stock inventory, do you know the additional costs this imposes? Do you have adequate safe carryover storage?
Do you know the difference between inventory valuation at cost and valuation at market?
Are you aware of inventory-related costs such as pilferage, spoilage, quality/pest losses, variety obsolescence, etc.?
Have you taken steps to minimize shoplifting and internal theft?
Are your crop/variety seed lots adequately identified in storage?
Does your lot numbering code give you some data on the seed lot?

14. **Pricing your seed yam and seed yam services**
What is the value your SY/SYS represent to your potential customers /farmers? Is it essential?
Is it a good value, as compared to alternatives, to them?
Is your seed yam truly better? Does it attract farmers, over your competition? Can you charge premium prices-which they will pay?
Is your seed yam “just another name in the market”, so your prices have to reflect prices of other seed sources/competition?
Will you have to sell at low prices, until you command a reasonable share of the market, and then you can slowly raise your prices? (This is quite risky; the market-what farmers will pay-ultimately sets the price).
Will market prices allow you to receive the margin you must have to operate?
Do competitors do much discounting? Do they hold special sales, give price leaders, use consignment sales, etc.?
Have you established a set of pricing policies and goals?
Have you determined whether to price below, at, or above the market and your competitors?
Do you use a one-price policy rather than bargain with farmers/customers?
Do you offer discounts for quantity purchases, or to special groups?
Do you set prices to cover full costs on every sale?
Do the prices you have established earn the gross margin you planned?
Do you clearly understand the market forces affecting your pricing methods?
Do you know which crops/varieties are slow movers and which are fast movers?
Do you know which crops/varieties are price-sensitive to farmers/customers; i.e., when a slight increase in price will lead to a big drop in demand?
Do you know which of your crops/varieties draw farmers when the seed is offered for sale at your specified prices?
Do you know the maximum price farmers/customers will pay for certain crop/variety seed?
Is there a specific time of year when your competitors have sales?
Do your farmers/customers expect sales at certain times?
Are you influenced by competitors’ price changes?
Are there restrictions regarding prices you can charge?
If you buy some seed from other suppliers, do any of them set a minimum price below which you cannot sell?
Do you know all the regulations affecting your business and sales and pricing?

15. Advertising
Have you developed an advertising plan and goals, including:
Is your advertising message continuous, frequent?
What advertising do your competitors use, and how effectively?
What advertising does your trade association suggest?
Does your advertising plan give a separate strategy for each variety/seed category?
Have you planned advertising (1) to identify yourself to the market and potential customers, and then (2) to promote your seed?
What experience do you have with various advertising media?
What is your plan, cost ratio, use, type, etc., of advertising by:
Who prepares your ads? Is he/she adequately skilled? What is the emphasis/focus of your ads?
Do they appeal to what farmers/customers need and market?
Do you know the strengths and weaknesses of various promotional methods?
Are the unique appeals/values of your business reflected in your business/store image? (e.g., low prices, quality seed, special services, etc.)
Have you considered how various media and promotional methods might be used for your business, to the best advantage?
Do you know which of your seed can be successfully advertised?
Do you know when it is profitable to use institutional advertising?
Do you know when crop/variety advertising is better?
Do you record sales of seed yam advertised on each ad?
Do you check customer traffic in your store?
Do you know which of the media (radio, television, newspapers, telephone yellow pages, billboards, etc.) can most effectively reach your target group of farmers/customers?
Do you know what can and what cannot be said in your ads? (Truth in Advertising requirements)

16. Sales
Have you established a sales policy to cover selling methods, sales, prices, discounts, commissions, etc.?
What sales terms are you planning (cash, credit, discount, etc.)?
Will you sell for cash only? On credit? What terms?
Detail your sales plan.
How will you sell? Describe in detail:
Retail stores/outlets, owned by your business
Wholesale
Direct sales
Traveling salesmen
Retail stores/outlets, owned by others
Delivery routes and traveling sales trucks
Distributors
From your primary business site only

17. Sales records
Do you have an adequate record system to show sales and essential management information on all sales/species/varieties, separately?
Can you separate cash sales from charge sales?
Can sales be broken down by area, customer, and dealer/distributor?
Can sales be broken down and performance identified by species/variety/season?
Do sales records provide a way to assess each salesperson’s performance?
Do your sales records give you management information on what is selling, what is not selling, what the potential for adjusting prices is, how much more/less to produce next time, etc.?
Additional reading materials


large scale production of miniset
YIIFSWA Working Paper Series

1. Yam Improvement for Income and Food Security in West Africa
   YIIFSWA Project Description
2. Seed Yam Production in an Aeroponics System: A Novel Technology
3. Yam: A Cash Crop in West Africa
5. Working with farmers to produce clean seed yams
6. Novelty, rapidity and quality in seed yam production: the case of Temporary Immersion Bioreactors
   The Case of Yam Improvement for Income and Food Security in West Africa