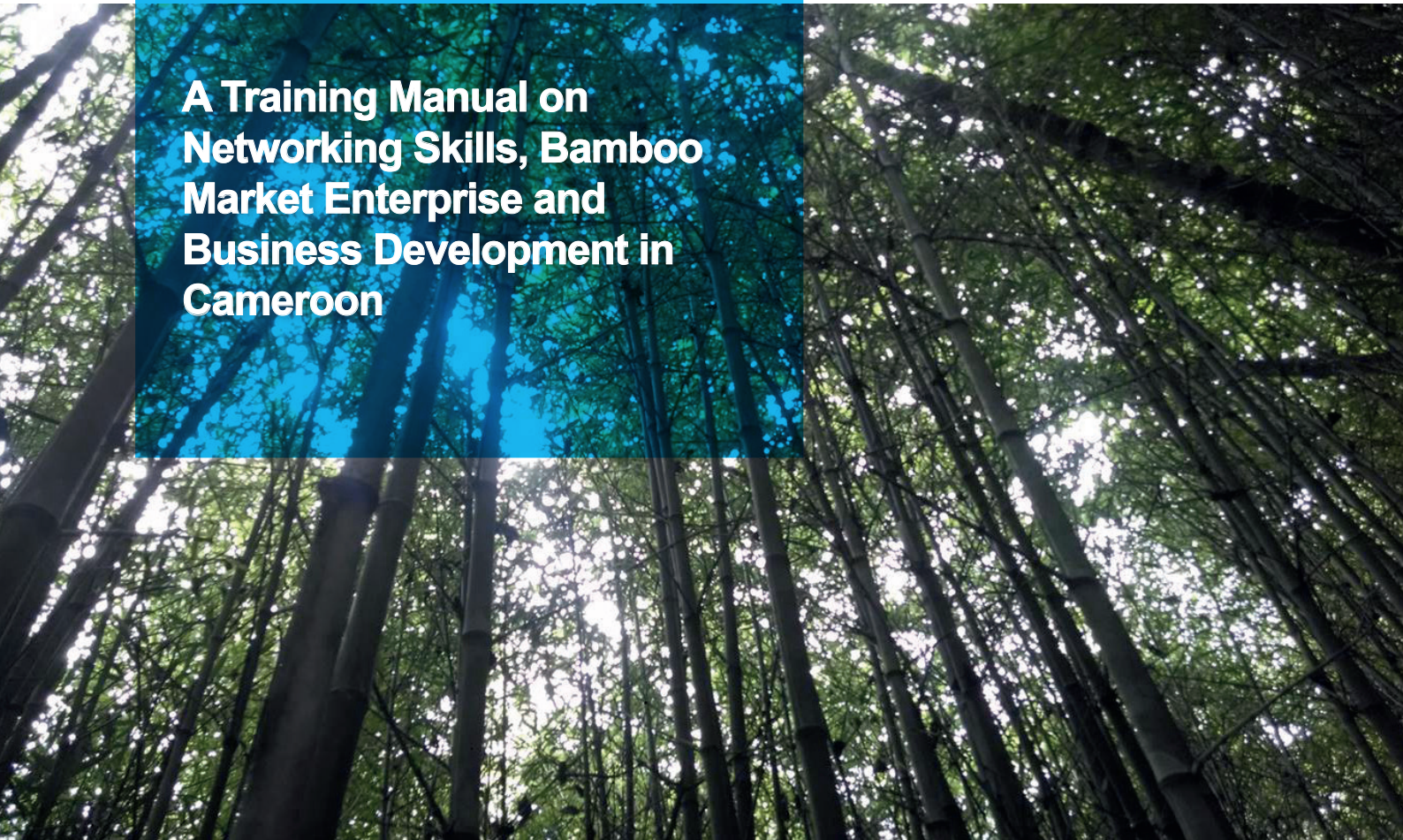




The Inter-Africa Bamboo Smallholder Farmer's Livelihood Development Programme (Cameroon, Ghana, Madagascar, and Ethiopia)

**A Training Manual on
Networking Skills, Bamboo
Market Enterprise and
Business Development in
Cameroon**



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PREFACE

Bamboo grows almost everywhere, even on soils with low fertility in tropical, subtropical and mid-temperate zones. Bamboo is a multipurpose plant which is currently used in our day to day life. It plays both direct and indirect roles in the livelihood of people around us. Bamboo influences livelihood directly via its socio-economic potential and indirectly through the role it plays in environmental protection. Bamboo has a great socio-economic impact on the sustainable development of many countries. Nowadays in Africa and particularly in Cameroon, experiences in bamboo products are still limited to bamboo furniture from handicraft even though the last 20 years has been a turning point in bamboo commercial industrialized products. Indeed bamboo is now seen as a timber substitute. Its rapid growth rate and capacity for sustainable harvesting increases the demand for its products. Recent developments have created new employment opportunities in the bamboo Handicraft sector (Bamboo farmers, bamboo collectors, bamboo culm sellers, bamboo culm transporters, bamboo

processors, bamboo product sellers). Bamboo has enormous potential for socio-economic development; this gives place to the development of an international bamboo trade and market. It is exported worldwide as raw material, semi-finished and finished product. The bamboo sector can bring extra revenue to African countries via the development of some industries for bamboo processing into a variety of industrialized products. Bamboo is also used in the pharmaceutical domain for the production of drugs and cosmetic products. Its shoots are equally used in Asia as a vegetable (food). Bamboo positively impacts the environment. It can replace wood and as such reduces pressure on the demand for timber, thereby encouraging forest protection. Moreover, bamboo contributes to soil protection and has a great capacity to sequester carbon through its canopy and litter, hence reducing soil evaporation and erosion, limiting landslides and contributing to the restoration of soil fertility. Bamboo also purifies water and provides a source of energy. It can be used to produce both wood fuel and charcoal for cooking and heating.

I. INTRODUCTION

The demand for natural resources in Cameroon grows daily but the supply endangers the resource sustainability, especially when the livelihoods of millions of the local population depend on these resources for medicine, energy, and other socio-economic and cultural aspects. Non-Timber Forest Products (NTFPs) have long been an important component of the livelihood of the forest-dwelling people by providing shelter, food, and income. At the household level, forests directly provide about 8 million of rural and poor Cameroonians with traditional medicines, food, domestic energy and construction materials¹. Bamboo has long been regarded as one of the neglected Non-Timber Forest Products (NTFPs) in Central Africa², despite its taxonomy, its rapid growth rate, and its vital economic and ecological importance to humans. Bamboo is renewable and can be harvested³, as some species grow a meter per day and attain maturity within five years⁴.

In order to promote bamboo market enterprise and business development in Cameroon, the first step is to raise awareness on bamboo economic potential for Cameroonians especially women and

youth. This awareness needs to be done via the empowerment of women and youth on networking skills (Module I: Networking skill), building capacity on rural enterprise development (**Module II**: Rural enterprise development) and on business plan development (Module III: Business plan development). By so doing, we will improve the knowledge of participants on bamboo value chain (**Module IV**: Bamboo market enterprise in and out of Cameroon) and encourage bamboo business development (**Module V and VI**: Bamboo business development in Cameroon).

Module I, II and III are designed to enhance the networking skills of women and youth, rural enterprises and businesses so as to improve on entrepreneurship. Module IV will illustrate bamboo market enterprise (bamboo value chain) in and out of the country. **Module V** is all about bamboo business development in Cameroon. In other words, what is done in Cameroon and what can still be accomplished in Cameroon using bamboo. **Module VI** deals with bamboo potential markets. This manual can be used as reference material for trainers, trainees, and bamboo smallholder farmers while learning or working with bamboo.

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 2. Tabot Tabot, Ebenezer 2006. *Strengthening forward and backward linkages in the Rattan and Bamboo sectors in Africa: the case of South West Region of Cameroon*. Paper presented at ITTO/ICBR/INBAR International Workshop on Sustainable Development of Global Rattan Sector, 1st Bamboo and Rattan Standardization Training Workshop, 23—27 July, Beijing, China.
 3. Wu, F. Z., Yang, W. Q., K. Y. Wang, N. Wu and Y. J. Lu. 2009. "Effect of stem density on leaf nutrient dynamics and nutrient use efficiency of dwarf bamboo." *Pedosphere* 19: 496–504.
 4. Benton, L. T., O. Cronin, J. Frith, Jonkhart and W. Junqi. 2011. *Market Potential of Bamboo and Rattan Products*. International Network for Bamboo and Rattan Working Paper 63. International Network for Bamboo and Rattan, Beijing, China

1. Main objective of the training manual

The aim of this training manual is to contribute to the networking skills, bamboo market enterprise and business development capacities of women and youths in the bamboo rich regions of Cameroon.

2. Specific objectives of the training

1. To build the capacity of women and youths from bamboo rich regions of Cameroon on networking skills.
2. To build the capacity of women and youths on rural enterprise development.
3. To build the capacity of women and youths on business plan development.
4. To inform women and youths from bamboo rich regions of Cameroon on bamboo market enterprise development in and out of the country.
5. To engage women and youths from bamboo rich regions of Cameroon in bamboo business development.
6. To inform women and youths from bamboo rich regions of Cameroon on bamboo market opportunities.

3. Expected Outcome

Networking skills of women and youths from bamboo rich regions of Cameroon are improved.

1. Rural enterprise development capacities of women and youths from bamboo rich regions of Cameroon are improved.
2. Business plan development capacities of women and youths from bamboo rich regions of Cameroon are

improved.

3. Women and youths from bamboo rich regions of Cameroon are informed on bamboo market enterprise in and out of the country.
4. Women and youths from bamboo rich regions of Cameroon are engaged into bamboo business development.
5. Women and youths from bamboo rich regions of Cameroon are informed on bamboo markets opportunities.

4. Target groups

This training manual targets women and youths from bamboo rich regions of Cameroon who will serve as a source of inspiration in their communities during and after the project implementation. This is in the bid to contribute to the valorization of bamboo in Cameroon.



II. METHODOLOGY

The methodology used will be participatory and will involve the participants taking full responsibility. Depending on the module, interactive presentations will be delivered. Participants will work individually or in groups by answering oral or written questions in workshops designed from their real-life experiences, specially oriented to their knowledge on bamboo and their contributions to valorize it. Many activities will be based on participants' experiences using questionnaires and discussions. In some cases, there will be collective reflections (brainstorming sessions) and comments on possible case studies.

1. Tools needed

Didactic support: printed documents (ToR, training manual, PowerPoint presentation).

Tools: Flip chart, post it, markers, conference paper, digital camera, video projector, laptop, Dictaphone and saw.

2. Training manual content

This training is focused on six (6) modules which are organized as follow:

1. Module I: Networking skills.

- What is a skill?
- Different Types of skills,
- What is networking?
- Types of networking,

- How can we improve our networking skills?

2. Module II: Rural enterprise development

- Definition of a Business,
- Definition of a micro-enterprise,
- Characteristics of micro-enterprises,
- Role of micro-enterprises in rural development,
- Factors affecting the success or failures of a micro-enterprise (External and Internal),
- Business cycle for rural enterprise development.

3. Module III: Business plan development

- What is a Business Plan?
- Reason why to write a Business Plan?
- Parts of a Business Plan.

4. Module IV: Bamboo market enterprise in Cameroon

- Bamboo Handicraft market,
- Unprocessed Bamboo culm market,
- Bamboo Nursery market.

5. Module V: Bamboo business development opportunities in Cameroon.

- Bamboo cultivation and nursery

development,

- Bamboo handicraft development,
- Bamboo semi-industrialization development.

6. Module VI: Bamboo market opportunities

3. Evaluation of the training

At the end of the training, evaluation forms will be distributed to participants. This is aimed at evaluating the training organization (strengths and weaknesses), the logistics, the working conditions, the relevance of the modules, the interests of participants, the animation style and the suggestions of participants. These evaluation forms will be analyzed and used to improve each module in order to better meet the expectations expressed.

III. MODULE I: NETWORKING SKILLS

1. What is a skill?

A skill is an ability or capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas, things, and/or people⁶. Also, a skill is the ability to carry out a task with determined results often within a given period of time, energy, or both. It can be divided into general and specific skill domains. For example, in the domain of work, some general skills would include time management, teamwork, leadership, self-motivation etc., whereas specific skill domains would be used only for a particular job⁶ like a medical Doctor. Again, skills are

the expertise or talent needed in order to do a job or task, they are what makes you confident and independent in life and are essential for success⁷. Any skill, be it general or specific could be learned or improved.

2. Types of skills

There are many different types of skills that can be categorized based on the kind of work. For this training manual, we will lay emphasis on 5 main skills (communication, leadership, management, professionalism and organizational) necessary for business development and networking. These skills are described as follows;

5. <http://www.businessdictionary.com/definition/skill.html>

6. <https://en.wikipedia.org/wiki/Skill>

7. <https://examples.yourdictionary.com/examples-of-skills.html>

Communication skills: This is a dynamic process and the most important used skill which enables us to communicate. This involves an effective and efficient information transfer. Communication is an essential skill nowadays, it helps us to advice, coach, motivate, interview (interact with people) via message transfer. For these messages to be effectively transferred, we need to manage our emotions (avoid stress), to be coherent and clear (communicating messages clearly and concisely), to use a friendly tone (this will encourage others to communicate with you), to be confident (confident will give faith in your abilities to deliver what they need, confident actions can be maintaining eye contact during a conversation, or using a friendly tone when speaking over the phone). Furthermore, to have empathy (because everyone will have his/her own ideas about how things should be done), to be respectful (If you respect the ideas and opinions of others, they will be more likely to communicate with you), to be able to listen (take the time to listen to what the other person is saying), to have an open mind (a good communicator requires an open mind to understand other people's points of view) and to be able to ask appropriate questions (ask open questions to ease conversation and improve the outcome) are attributes of a good communicator.

Leadership and Management skills: These are skills we use when organizing and encouraging other people to reach a set goal. This can be by motivating them to accomplish a series of tasks according to a given timeframe. A good manager and leader should be able to delegate, be diplomatic, be a good decision maker, be able to motivate and manage people, be

able to resolve problems and/or conflicts, be a strategic thinker, be self-aware (to know his/her strengths and weaknesses) and be able to learn from others (constantly be in a learning mode).

Professionalism Skills: This is an important skill to have when developing a business or working for someone. To say one has these Skills, implies he/she is mature and patient enough, has integrity, honesty and ethics as life values. In addition to these, he/she needs to be self-confident, competent and reliable by producing high quality work that meets deadlines.

Organizational Skills: This is when one is able to keep work organized on different projects without getting disoriented or lost. Workers with strong organization skills are able to structure their schedule, boost productivity, and prioritize tasks that must be completed immediately versus those that can be postponed, delegated to another person, or eliminated altogether⁸.

3. What is networking?

Networking is the exchange of information and ideas among people with a common profession or special interest, usually in an informal social setting⁹. It is creating a group of acquaintances and associates, and keeping it active through regular communication for mutual benefit. Networking is based on the question «How can I help?» and not «What can I get?»¹⁰. Networking is the most important aptitude for entrepreneurs because it involves building and maintaining contacts and relationships with people. That is why the personal network accumulated over time,

8. <https://www.thebalancecareers.com/organizational-skills-list-2063762>

9. Julia KAGAN/updated April 25,2019, <https://www.investopedia.com/terms/n/networking.asp>

10. <http://www.businessdictionary.com/definition/networking.html>

be it professional or social can be very significant for entrepreneurs because these contacts might help them with a key idea or ingredient for the start of their business.

4. Types of networking

Networking helps a professional to be currently in contact with those in his/her domain, this enables him/her to keep up with current events in the said field. There are three main types of networking namely; professional/business, social and online/artificial networking.

1. Professional/business networking

This type of networking is established for business individuals to remain in contact. Through the use of this networking, entrepreneurs are able to keep all of their networks updated which is the best promotion for their businesses. Professional/ business networks are contacts made through business or professional activities in a specific domain, for example colleagues in the domain of accounting, law or agriculture (bamboo smallholder farmers, bamboo craftsmen, etc.) for mutual benefits.

2. Social networking

Social networking is a type of networking where personal contacts are made informally via social networks. Contacts here could be non-business friends, former work colleagues, contacts made throughout educative periods, contacts made through associations and organizations, etc.

3. Online/artificial/ virtual networking

These are contacts made through virtual means by setting up networks for both business and non-business people. Online networking can bring together

entrepreneur/ business communities for business relationships and to recognize and create upon business opportunities. These Online/artificial networking are often open access to new member. Some examples of Online/artificial networking are Facebook, Whatsapp and LinkedIn.

4. How could we improve our networking skills?

1. Reach out to those in a similar domain of activity

Many people have the impression that networking means meeting as many people as possible which is wrong. Making a few meaningful connections is often better than having a lot of non-useful connections. We need to use networks with purposes/goals, for example setting a goal to get five business contacts in your sector of activity. For instance in case you are a bamboo farmer, you need to contact bamboo culm collectors, bamboo culm sellers and bamboo culm processors/craftsmen. Meanwhile bamboo culm processors/craftsmen need to create contacts with bamboo farmers, bamboo culm collectors, bamboo culm sellers and bamboo shop keepers to sell bamboo finished products. It's important to continue networking even if you are not actively seeking anything new. Focus on building meaningful relationships and watch people turn to you when a new position comes up. Stay proactive, and avoid a disservice to yourself.

2. Join groups/associations in your domain of activity

Joining groups related to your activity domain like associations give an added value of opportunity to network. You can join Former classmates who are in the same domain of activity and can provide potential partnership.

3. Be an active listener when having a real conversation

Listening is actually an essential skill to be developed, allow others to speak first. By listening, you can provide ideas and advice that could potentially help your business. The person with whom you are speaking will realize if you are not paying close attention to what he/she are says. The interlocutor can even go forward by asking thoughtful questions in response to what you hear. If you are capable to answer to his/her questions, this means you paid attention. During these conversations, you need to express body language like smile, body posture, good manners, etc.

4. Be you/nature and open minded

It is very important that you remain natural and open minded to all the concerns of the person in front of you, this create a truthful relationship with people and companies with whom you may do business with in future.

5. Join and/ or create social media groups

Checking Facebook, whatsapp, LinkedIn and other social media sites is a good way to connect or reconnect to people. Some probably have friends on Facebook, are in one or more whatsapp groups and have LinkedIn contacts to tell them more about their activities.

Keyfacts

- A skill is the ability to carry out a task with determined results often within a given period of time, energy, or both. It can be divided into general and specific skill domains.
- General skills include time management, teamwork, leadership, and self-motivation while specific skills are used only for a particular job like a medical Doctor, an electrician, carpenter, etc.
- Skills can be categorized based on the domain of work. We have 5 main skills (communication, leadership, management, professionalism and organizational skills) necessary for business development and networking.
- Networking is the exchange of information and ideas among people with a common profession or similar interests, usually in an informal social setting.
- Networking is the most important aptitude for entrepreneurs because it involves building and maintaining contacts and relationships with people.
- There are three main types of networking, these are; professional/business, social and online/artificial networking.
- To improve our networking skills, you have to; reach those who are in a similar sector or domain of activity like yours, join groups/associations in your domain of activity, be an active listener when having a real conversation, be natural and open minded, and join or create social media groups.

IV. MODULE II: RURAL ENTERPRISE DEVELOPMENT

1. Definition of a Business

A business is defined as an organization or enterprising entity engaged in commercial, industrial, or professional activities. Businesses can be for-profit entities or non-profit organizations that operate to fulfill a charitable mission or further a social cause¹¹. Again, a business can be seen as an effort made by an organization or individual to produce, buy and sell goods or services in order to earn money and/or make profits.

2. Definition of micro-enterprise

A micro-business is a firm with five or fewer employees started with \$50,000 or less as initial capital and may not have access to traditional commercial loans. They start in a small scale, but can grow quickly into large job-generating businesses. Furthermore, a microenterprise is a small business that employs a small number of people (less than 10 people) and is geographically restricted. Microenterprises start with a small amount of capital. They usually specialize in providing goods and services for their local areas.

1. Characteristic of micro-enterprises

Characteristics of a micro-enterprise include:

- Less initial capital,
- self-employment,
- Initiated and managed by a household

or few individuals,

- Use of simple technology and equipment,
- local resource and raw material utilization,
- informal transactions (no written agreement, based on personal contact trust),
- Easy to have a job in such organization.

2. Roles of micro-enterprises in rural development

Micro-enterprises in rural development could reduce poverty and enhance women and youths to play a significant role in the economic development of their communities. The main role of micro-enterprise development is to improve household's socio-economic status via income generating and social development activities. Moreover, micro-enterprises specifically:

- create jobs for community members,
- gives access to training,
- aim at improving natural resource utilization in communities,
- increase family income,
- are opportunities for minorities and low-income individuals to start a business,

11. <https://www.investopedia.com/terms/b/business.asp>

- promote local ownership (communities and/or individual wealth),
- promote communities and/or individual leadership (communities and/or individuals could be able to watch the growth of their enterprise),
- help in the development of the overall economy of communities,
- Improve the living standards of communities.

When these micro-enterprises get matured, they could provide high-quality jobs.

3. Factors affecting the success or failure of a micro-enterprise (External and Internal)

Success is achieved if an organization uses its performance to meet or to exceed the financial, social and personal growth expectations of the persons who have an interest in the organization¹². Failure is the absence of success; it could be understood in relation to the expectations and goals drowned by the entrepreneur. Internal factors are those that are within the control of the entrepreneur. These include the knowledge, skills, attitude and resources. External factors are those that are outside the control of the entrepreneur. These include the market situation, economic situation of the community, the weather, etc.

3. Business cycle for rural enterprise development

A business cycle could be defined as the rise and fall in the production output of goods and services in an economy. We have four main stages of rural enterprise

development:

- Startup/Existence Stage:** At this stage, the enterprise needs an effective business plan. The main challenge at this level is to answer these questions; what type of bamboo products will I produce? Who are my key customers? Do I have enough money to start-up this business? This is when you first start the business and trying your best to make it viable.
- Take-off/ Survival stage:** At this stage, the enterprise has demonstrated that it is a workable business. Here the capital and human resource development are crucial for the enterprise. At this level, the main challenge is to become a sustainable and profit-making enterprise.
- Success/Prosperity stage:** At this level, the enterprise has generated enough profits, this profit could be reinvested in the business for its expansion. The main challenge here is a good financial management.
- Maturity stage:** At this stage the enterprise has less opportunity growth. The main challenge here is the ability of the enterprise to adapt to new



12. Wickham, P.A. (1998). *Strategic Entrepreneurship: A Decision Making Approach to New Venture Creation and Management*. Great Britain.

Keyfacts

technologies, new marketing channels, and new customers.

- A business is an effort made by an organization or individual to produce, buy and sell goods or services in order to earn a profit.
- A microenterprise is a small business that employs a small number of people (less than 10 people) in a given geographical zone.
- A microenterprise starts with a small amount of capital and is usually specialized in providing goods and services to their local areas.
- A micro-enterprise is characterized by less initial capital, self-employment, Initiated and managed by a household or few individuals, use of simple technology and equipment, use of local resources, informal transactions and job facilities.
- A micro-enterprise is an opportunity for minorities and low-income individuals to start a business
- Micro-enterprises in rural development could reduce poverty by creating jobs, increasing family income, promoting individual leadership and improving living standards of communities.
- External and Internal factors affect the success or failure of a micro-enterprise.
- A business cycle is a rise and fall in the production output of goods and services in an economy.
- The business cycle has four main stages (Startup/Existence, Take-off/ Survival, Success/Prosperity, and Maturity).
- Once an enterprise has completed a business cycle there are three choices; open a new business, continue with the existing business or cease operating the existing business.

V. MODULE III: BUSINESS PLAN DEVELOPMENT

1. What is a Business Plan?

A business plan is a document that summarizes the operational and financial objectives of a business and contains the detailed plans and budgets showing how the

objectives are to be realized¹³. Therefore, a business plan will demonstrate how your business is going to work and how you are going to make it succeed.

13. Susan WARD, Updated December 30, 2018/ <https://www.thebalancesmb.com/business-plan-2947267>

2. Why write a Business Plan?

- **To attract investors and partners:** The business plan is necessary to show all the interested parties that you are serious.
- **To reduce risk and save time:** The business plan gives you the chance to make mistakes on paper and keep you from making the same mistakes over and over again.
- **To determine the capital needed:** The business plan creation process helps you to determine exactly how much capital you need and how you will use it.
- **To know your market:** The business plan helps you to establish a marketing strategy.
- **To better understand your customer:** It enables a detail customer analysis which is essential for the success of a business.
- **To better identify competition:** when creating the business plan, you are forced to analyze the competition. It is advantageous to understand the competitive enterprise.

- **To attract your future employees and a management team:** to attract and retain top-quality talent, a business plan is necessary.
- **The business plan helps you to take better decisions.**
- **The business plan is a guide and measurement tool.**

3. Parts of a Business Plan.

A Business Plan has 7 parts which are; Cover Sheet, Table of Contents, Executive Summary, Organizational Plan (Form Of Business, Owners/Principals, Name Of Business, Start of Business, Hours Of Business Operation, Location, Contact Information). In addition to these, it contains a Marketing Plan (Industry Overview, Social /Technological Changes, Demographic Changes, Economic Changes, Environmental Changes, Product/Service, What You are Doing Differently, Direct and Indirect Competition), Financial Documents (a detail Budget on how much money do you need and how will you spend, and **Supporting Documents.**

Keyfacts

- A business plan demonstrates how our business is going to work and how we are going to make it succeed.
- We need a business plan for numerous reasons these are; to reduce risk and save time, to determine the capital needed, to attract investors and partners, to know our market, to better understand our customers and identify competition, Etc.
- A business Plan has 7 parts which are; Cover Sheet, Table of Contents, Executive Summary, Organizational Plan, Marketing Plan, Financial Documents and Supporting Documents.

VI. MODULE IV: BAMBOO MARKET ENTERPRISE IN CAMEROON

The bamboo market enterprise in Cameroon is not yet well developed. Bamboo market enterprises found in Cameroon can be divided into three sectors:

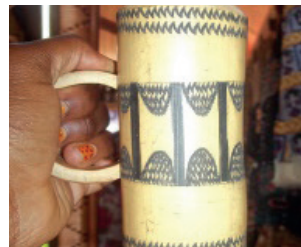
1. Bamboo Handicrafts market

Handicraft is the most important source of employment creation for the Cameroon bamboo sector. Even though these bamboo craftsmen are few, they are able to realize craft products such as Bamboo cups, Bamboo flower stands, Bamboo chairs, Bamboo Bars, Bamboo musical instruments, Bamboo beds, bamboo picture frames, Bamboo handle tool, Etc. Bamboo culms are also used for construction (house and bridge) and decorative purposes. Some of these craft works are represented on the pictures below;

Bamboo craft products done in Cameroon



Bamboo house



Bamboo cup



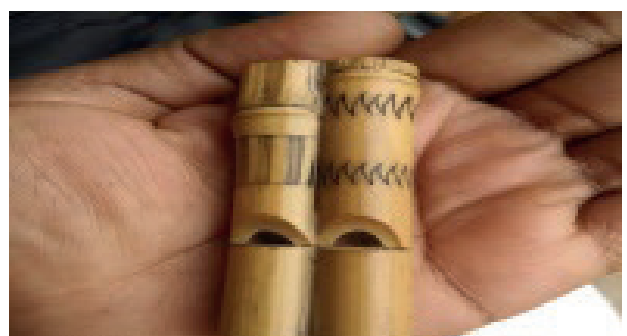
Bamboo chairs



Bamboo flower stand



Bamboo Bar



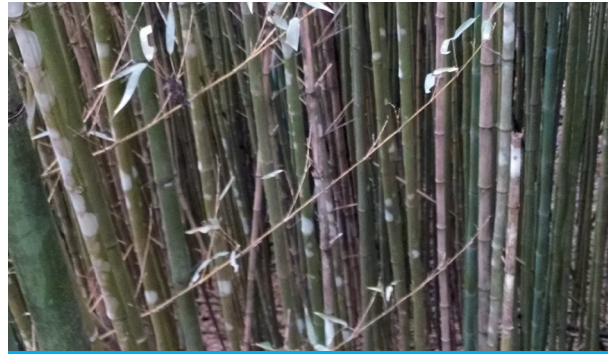
Bamboo musical instruments



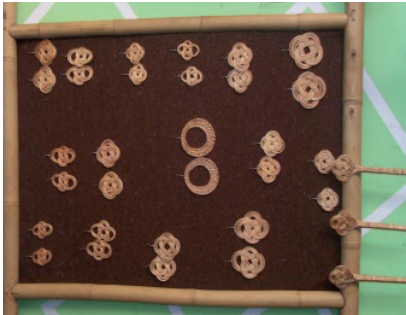
Bamboo bed



Bamboo handle tool



bamboo use for house decoration



bamboo picture frame



2. Bamboo Unprocessed culm market

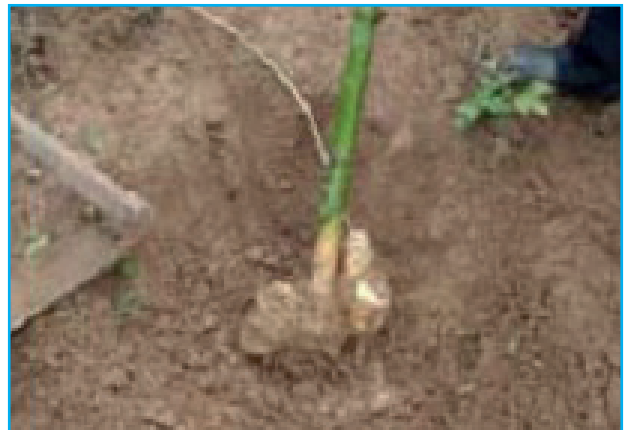
The bamboo unprocessed culm (raw material) market is at a primitive stage in Cameroon. There is no available market where one can be supplied with bamboo culms. We have very few bamboo stores. These are mostly found in Douala and Yaoundé where culms are stocked and sold mostly for construction support. Bamboo craftsmen usually get their raw materials directly from the farms of bamboo farmers while some are supplied by bamboo culm collectors.



Bamboo Unprocessed culm market

3. Bamboo Nursery market

Bamboo nurseries are established by very few people (bamboo collectors, bamboo farmers, and bamboo processors) in Cameroon. The main national institution that practice bamboo nursery in Cameroon is ANAFOR (National Forestry Development Agency). This agency also sells bamboo planting materials to some bamboo farmers to be replanted.



ANAFOR Bamboo nursery Dschang

1. Bamboo cultivation and nursery development

Bamboo Nursery development starts with the establishment and management of a nursery. A nursery project has 2 main components, namely: nursery infrastructure and propagation material.

1. Nursery infrastructure

To establish a nursery, a site must be properly selected according to the following factors:

- The soil at the nursery site must be porous, well drained with a pH value ranging between 5 and 6.5. Saline (salty) soils are not appropriate,
- The nursery must be shaded, either by local material (palm tree leaves) construction and/or by modern material. This is to protect bamboo seedlings from severe weather,
- The nursery site should be accessible by road,



Photo 11: Bamboo nursery shaded (source: INBAR Ethiopia)

- The nursery site should be close to a water source,
- The nursery site should be close to the planting area.

2. Propagation material

Bamboo can be propagated using two reproductive methods, through seeds and by vegetative propagation. Seed propagation methods are rarely used because of the irregular flowering of most bamboo species (can take about 100 years). For many tropical bamboo species, flowering intervals range from 40 to 80 years¹⁴. Furthermore, the non-availability of these seeds during the year and their poor viability (between one and six months) promotes bamboo vegetative propagation methods. The bamboo vegetative propagation method is that which uses vegetative parts of bamboo plants such as rhizomes, culms and branches. Vegetative propagation is the most popular used method for bamboo propagating, therefore it is could be the most effective method.

i. Bamboo propagation by Seeds

In case bamboo seeds are available, it is important to buy them from sellers who are able to guarantee the seed's origin and viability. The seeds of some bamboo species loose viability rapidly within a year. The main advantage with this method is that there is massive propagation of bamboo. The following steps are needed for bamboo propagation by seeds:

1. Bernard N. Kigomo, Kenya Forestry Research Institute, KEFRI Guideline Series: No. 4 - April 2007

- **Germination bed preparation**

- Dig the soil to a depth of at least 60 centimeters and remove large stones and other obstacles to rooting,
- Measure 1.2 meters on 2,

- Raise beds of 15 to 20 centimeters above the ground,
- Establish boundaries between the raised beds,
- Level and smooth the surface of the raised beds

Sand can also be used for bamboo seed germination.



Bamboo seed



Germination bed preparation



Dig the soil



Raised beds



Level and smooth



Germination bed

Photo 12: Germination bed preparation (source: INBAR)

ii. *Bamboo vegetative propagation*

Bamboo can be propagated vegetatively through Rhizome off-sets, Culm Cuttings, Branch Cuttings, Marcotting or air-layering on the culm and Culm soil layering.

● **Rhizome off-sets:**

- Selection of culms
- Rhizome off-sets extraction
- Rhizome off-set transplanting (during the rainy season)

The main advantage of rhizome offsets is that the new culms emerging from the offset will almost be of the same size. Rhizome off-set extraction and transportation has special challenges. This vegetative method

is an extremely labourious and tedious process, not more than 2 to 3 rhizomes can be extracted per day. Therefore, this method cannot be used for bamboo plantation establishment. Bamboo off-sets extracted during the dry season should be transplanted in a mist bay (a bay containing soil or sand and well drained) in a nursery, to be later transplanted during the rainy season.

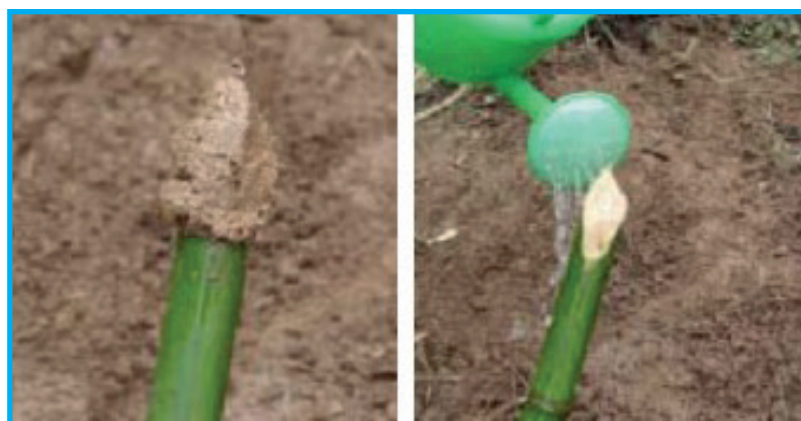


Photo 13: Bamboo Rhizome off-sets vegetative propagation (photo source: INBAR)

● **Culm Cuttings**

- Selection of the culm to be cut
- Cutting of the selected culm near the base
- Trimming of the branches
- Cutting of the culm (with a saw or sharp knife) into segments having 1, 2 or 3 internodes with the cut positioned 3 to 5 cm below the basal node
- Planting of the cuttings in black polyethylene bags (planted vertically) or on propagation plots (planted horizontally) at a depth of 4-5 cm with at least one node below the soil

- Watering of the cuttings daily at least 3 times per day
- Root development is 2 to 3 months
- Transfer the rooted cuttings to the plantation site during the rainy season.

● **Branch Cuttings**

- Selection of the culm (1 to 2 years old)
- Cutting of the selected branch with a sharp knife
- Trimming of the branches to 4 or 6 internode lengths from the base
- Planting of the cuttings in black polyethylene bags or on propagation plots (planted vertically) at a depth of 2-3 cm with at least one node below the soil

- Watering of the cuttings daily at least 3 times per day
- Root development is 1 to 2 months
- Transfer the rooted cuttings to the plantation site during the rainy season.

Culm and branch cuttings have the same advantages. These methods are easier to manipulate with great variability in the rooting ability, thereby reducing labour and transport cost. Propagation materials are available, and these methods are appropriate for the establishment of bamboo plantation given those large quantities of young bamboo plants can be produced using this method. Even though these methods are advantageous, they are not adapted to all bamboo species, especially those with smaller/tiny culms and branches

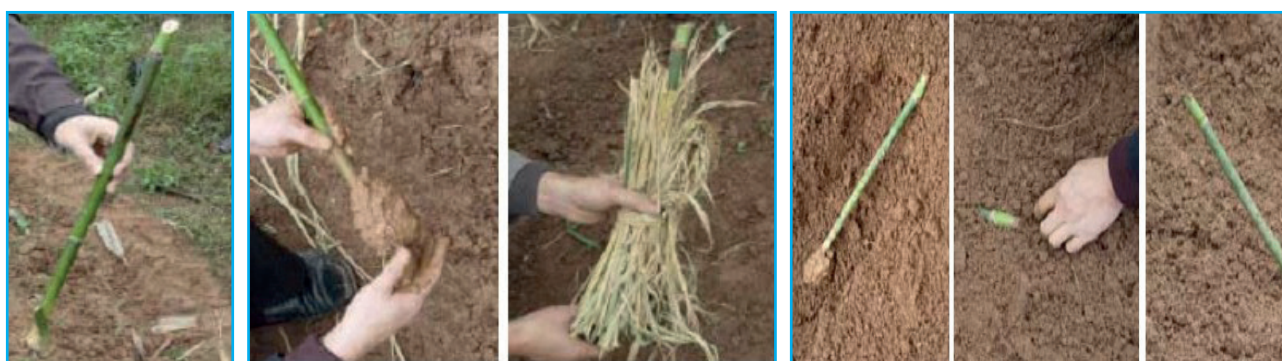


Photo 14: Bamboo branch Cuttings vegetative propagation (photo source: INBAR)

● **Marcotting or air-layering on the culm**

This is bamboo propagation where branch bases are covered with a propagating medium (wood sawdust or coconut coir). This method has as advantages a high rate of rooting and the rooting branches are easily manipulated. Unfortunately, this method is not appropriate for bamboo species

having large branches and it is also a labourious method. It can be used to produce large quantities of young bamboo plants. The following steps are used in marcotting:

- Selection of the culm's branch,
- Apply the propagating medium on the branch and cover with a plastic material,
- Roots develop between the 3rd and

4th month,

- Separate the rooting branch from the culm,
- Transfer the rooted cuttings to the plantation site during the rainy season.



Photo 15: Bamboo marcotting or air-layering on the culm vegetative propagation (photo source: INBAR)

● Culm soil layering

This method involves introducing a bamboo culm into the soil. It is not frequently used due to its less rooting rate. The following steps are used in bamboo culm layering:

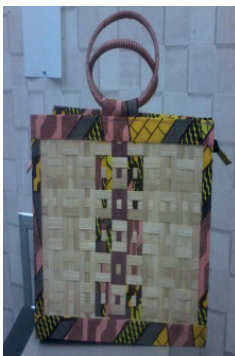
- Selection of culms,
- Cutting of the selected culm and measuring,
- Cutting the top of the culm and remaining with 15 to 20 internode lengths from the base,
- Trimming of the branches and creating small cavities on each internode,
- Digging between 5 to 10 centimeter depth to place the culm horizontally,
- Filling cavities with water and cover with soil,
- Watering of the cuttings daily at least 3 times per day.



Photo 16: Bamboo culm soil layering vegetative propagation (photo source: INBAR)

2. Bamboo handicraft development

In Cameroon we use bamboo to manufacture products like Bamboo cups, Bamboo flower stands, Bamboo chairs, Bamboo Bars, Bamboo musical instruments, Bamboo beds, bamboo picture frames, and Bamboo tool handles. We could increase the manufacturing of the bamboo products cited above and we could pay attention to other bamboo craft products like bamboo bays and bamboo school and bamboo executive desks, made in Ghana, bamboo sculpture, etc., in order to conquer the local market.



Bamboo bay



Bamboo executive desk



Bamboo school desk



Bamboo sculpture

Photo 17: Bamboo handicraft (photo source: INBAR)

3. Bamboo semi-industrialization development

Bamboo semi-industrialization is totally absent in Cameroon compared to other African countries like Ghana and Ethiopia where bamboo charcoal, bamboo doors, bamboo wheel chairs and bamboo toothpicks are popular. Asian countries like China have a well-developed bamboo semi-industrialization sector with the manufacturing of goods like; bamboo bathing products, bamboo vinegar, bamboo plywood, bamboo scrimber, bamboo structural lumber, bamboo textiles, bamboo laminated furniture, building panels, bamboo beer, bamboo food, bamboo paper, etc.



Bamboo fibers



Bamboo shoot



Bamboo beer



Bamboo charcoal

Photo 18: Bamboo manufacturing products (photo source: INBAR)

Keyfacts

- To establish a nursery project, 2 main components are needed; a nursery infrastructure and propagation materials.
- A nursery infrastructure is all about selecting a good site according to the soil type and drainage system, putting in place a good shading system, ensuring the site is accessible, close to a water source and the planting area.
- Bamboo propagation materials are bamboo seeds (propagation by Seed using a germination bed) and bamboo vegetative parts (used for the vegetative propagation method).
- The vegetative propagation of bamboo can be done through Rhizome off-sets, Culm Cuttings, Branch Cuttings, Marcotting or air-layering on the culm and Culm soil layering.

VIII.

MODULE VI: BAMBOO MARKET OPPORTUNITIES

Bamboo (culms) and bamboo products could be sold at the local, national, regional and world markets using potential selling technics like network selling, online selling

and the traditional selling technic (physical marketing place). Advertisement is equally important at this stage.



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