

Review

Determining sustainability harvesting levels for most non-timber forest products (NTFPs)

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Determining sustainability harvesting levels for most non-timber forest products (NTFPs) is an evolving science. A monitoring programme that will continually assess the health and vitality of the natural resources base should be implemented. Though there is some information on individual species, ecosystem dynamics are still not well understood, commercialization of natural products makes it imperative to manage proactively through monitoring, harvesting and replanting and tree succession plans. Important steps in sustainable natural products management include the following: Identification and demarcation of the resource base by ecosystem type (forest, pasture, farmland, rock outcrop, and so on) and map of the locations of various ecosystems types; identification of resource supply areas of the preferred products; and estimating the volume based on current harvesting and trade or use. Further, identify potential threats to standing stock of natural resource base. In addition to conducting group meetings to investigate where and how products have been harvested, extracted or collected over the last 3 to 5 years; undertaking resource inventory of standing stock and also conducting user surveys and engaging resource collectors. Ultimately, for business development, the following logical issues are examined and critically analyzed; enterprise opportunity and location-specific overview of the community forestry subsector, sustainability of supply of forest products, regulatory environment and forest resource users/groups, technology, management and finance, and lastly marketing and sales.

Key words: Forest, enterprise, sustainability, technology, finance and marketing.

INTRODUCTION

Non-Timber Forest Products: refers to a vast array of goods and services of biological origin derived from the forest, other wooded land and trees outside forests, including small wood and fuel wood (FAO, 2002; Dlamini, 2007). Synonyms: Alternative Forest Products (AFP), Non-Timber Plant Products (NTPP), Minor Forest Products (MFP), Non-Wood Forest Benefits (NWFB), Non-Wood Forest Resources (NWFR), Non-Wood Goods and Benefits (NWGB), Non-Wood Goods and Services (NWGS), Special Forest Products (SFP), and Secondary Forest Products (SFP) (Wong, 2000; Dlamini, 2007).

Goods and services of the forest resource can be classified into three broad categories, namely direct use benefits, indirect use benefits and intermediate use

services (DANCED, 2000a; Hassan, 2001; Hassan et al., 2002; Shackleton, 2002, Shackleton and Shackleton, 2004; Dlamini, 2007). Direct use benefits include timber for construction and furniture, wood for crafts and household tools, fire wood, construction poles, wild fruits, wild vegetables, wild herbs, honey, bush meat, insects for food, bird eggs, medicinal products, thatch, grass hand-brushes, twig hand-brushes, weaving reeds, sand/clay, plant dyes, plant resins, seeds for rattles and decoration and other benefits. Indirect use benefits include pollination services, livestock grazing, recreation/aesthetic services (eco-tourism), religious functions and other benefits. Intermediate use services comprise carbon sequestration, water shed protection, protection against soil erosion, habitat for wild fauna and flora (breeding and nursery functions), biodiversity reserve, oxygen production, acid rain deposition, roles in the water cycle, runoff reduction (cultivated) and other services.

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Consequently, forest values can be classified into four broad categories: direct use values, indirect use values, option values and existence values (McKenney and Sarker, 1994; Clarke et al., 1996; Buttoud, 2000; Shackleton et al., 2000; Chipeta and Kowero, 2004; Clarke and Grundy, 2004; Dlamini, 2007). Dlamini and Geldenhuys (2009) developed a matrix of 19 use categories of NTFPs in Swaziland (Appendix 1).

ENTERPRISE OPPORTUNITY OVERVIEW; SUBSECTOR AND VALUE CHAIN ANALYSIS

According to Subedi et al. (2000), Lecup and Nicholson (2000) and Hellriegel et al. (2001) and Geldehuys (2004) feasibility studies to select natural products enterprises such NTFPs viable enterprises should use the following as a basis

Requirements for enterprise success

- (1) Raw material availability: A long-term biologically sustainable supply of the targeted NTFPs in right quantities is a pre-requisite for enterprise development.
- (2) Legal access to and control over forest resource or NTFPs stock: Collectors should be able to manage NTFPs harvesting and incorporate enterprise activity into their overall forest management plans in compliance with a range of legal requirements.
- (3) Equitable benefit sharing or distribution of benefits: If there are no secure rights to access and benefits from NTFPs for local resource users and this result in intruders and non-resident collectors invading NTFPs and promoting unsustainable utilization of NTFPs.
- (4) Appropriate processing technology: Technology should be compatible with infrastructure and human resources, that is, transport and storage facilities.
- (5) Good management: People with skills, knowledge and experience should be available to run the enterprise.
- (6) Commercial sustainability (economic or financial viability): Be able to sell products at a price and volume that covers all costs associated with the NTFPs enterprise with enough money left over as profit.
- (7) Access to capital: Start-up capital and ongoing working capital is needed for the enterprise.
- (8) Available and accessible market for the products: Market for available quantity and quality of product, demand at expected selling price, and reliability buyers of the products.

SUSTAINABLE SUPPLY OF NATURAL PRODUCTS

Determining sustainability harvesting levels for most NTFPs is an evolving science. A Monitoring Programme that will continually assess the health and vitality of

natural resources base should be implemented (Hassan et al., 2002; Lawes et al., 2004; Dlamini, 2007). Though there is some information on individual species ecosystem dynamics are still not well understood.

Commercialization of natural products makes it imperative to manage proactively through monitoring, harvesting and replanting and tree succession plans. Important steps in sustainable natural product management include the following:

- (a) Identification and demarcation of the resource base by ecosystem type (forest, pasture, farmland, rock outcrop, etc.) and map the locations of various ecosystems types.
- (b) Identification of resource supply areas of the preferred products. Estimate the volume based on current harvesting and trade or use. Further identify potential threats to standing stock of natural resource base. In addition, conduct group meeting to investigate where and how products have been harvested, extracted or collected over the last 3 to 5 years.
- (c) Undertaking resource inventory of standing stock and also conducting user surveys.
- (d) Engaging individual resource collectors and/or users and local communities from step (a) to step. (c) and design and implement biological monitoring.

The monitoring plan should indicate the following:

- (1) Area being monitored
- (2) Target species
- (3) Ecosystem changes
- (4) Human activity impacting the species and ecosystem

Making a preliminary estimate of a sustainable harvesting regime. Monitor the harvesting rate and make necessary adjustments in the biological monitoring plan. It is important to note and recognize that sustainable harvesting involves not only quantities harvesting, but also determined by how and when the plant is harvested and all other impacts on the ecosystem.

Consequently, sustainable harvesting levels should be known before a forest enterprise starts, however scarce secondary data remains a major challenge. Dlamini (2007) and Geldenhuys (2002, 2003, 2004) stated that biological sustainability occur and is impacted at these levels:

- (1) Genes
- (2) Population
- (3) Community
- (4) Ecosystem

To determine biologically sustainable harvesting levels community level on particular species and the following factors are crucial (Crafter et al., 1997; Geldenhuys, 2002; Dlamini, 2007; Becker and Barnett, 2008). Current

Table 1. Processing and regulations.

General steps of a value chain	How the regulatory environment can affect the forest enterprise
Harvesting and Management of Natural Resources (Forest Resources)	Land and resources tenure; access to natural products; existing harvesting seasons and methods; resource management system.
Processing	Enterprise registration, processing licence, labour regulations/laws, technology access, taxes, financial support.
Trade and marketing	Release and export permits, export and import procedures and duties, market information.

Source: Modified from Subedin et al. (2000) and Geldenhuys (2004).

harvesting levels; where product is harvested; amount traded; various harvesting methods; and season, percentage and parts of plant harvested. A detailed commercialization model by Geldenhuys (2004) in South Africa, for a specific natural product from the forest (*Ocotea bullata* bark) that may used as a guideline for local NTFPS commercialization and enterprise development programmes is presented in Appendix 3.

REGULATORY ENVIRONMENT AND FOREST USER GROUPS

The regulatory environment

Crafter et al. (1997), Subedi et al. (2000), Becker and Barnett (2008), revealed that the regulatory environment in a natural enterprise like a forest enterprise operates in a hierarchy where the following levels are recognized:

- (a) Local, national, regional and international policies and legislation.
- (b) Socio-cultural norms and practices.
- (c) Organizations that support and regulate enterprise activities.

Regulations (formal and informal) entail resource access, forestry codes, incorporation options, investment codes pricing legislation, labour laws/regulations, tariffs, interest, rate ceilings, import and export procedures, taxes codes and other. Organizations (regulating and supporting) encompasses trade organizations, ministerial departments, export agencies, NGOs, credit and financial organizations, local institutions and organizations, forest user groups, and other.

Socio-cultural factors (community norms and buyers) basically cover traditional management systems, cultural values, norms of society, and buyers' expectations on quality, timely delivery, and other.

Regulatory environment and forest enterprises

The regulatory environment affects every step of the

enterprise value chain (Subedi et al., 2000; Lecup and Nicholson, 2000; Kozak, 2007). When selecting a forest enterprise analyze the regulations and support opportunities and challenges relevant to the business activity. Monitoring the regulatory environment is vital for successful enterprises (Table 1).

TECHNOLOGY, MANAGEMENT AND FINANCE

Enterprise decisions on finance, technology and management should be based on the needs of the business as determined in the business plan (Subedi et al., 2000; Lecup and Nicholson, 2000; Helleriegel et al., 2001; Kozak, 2007). A Sample Outline/Guideline of a sound business plan as per recent research on the Swaziland commercial banking sector lending structures for Agriculture SMEs (Dlamini, 2009). Another business plan option is presented in Appendix 2.

The business

- (A) Description of business
- (B) Products/services
- (C) Market analysis
- (D) Marketing plan (product/pricing/promotional strategies)
- (E) Location
- (F) Competition
- (G) Management and operations
- (H) Personnel
- (I) Application and effect of loan or investment-(This section is important whether you are seeking a loan, outside investment (equity) or investing your own money).

FINANCIAL DATA

- (A) Projected financial statements: Income statements; cash flow statements; balance sheets; assumptions to projected financial statements.
- (B) Break even analysis

(C) Sources and uses of funds

The basic purposes of financial projections are:

- (1) Establish the profit potential of the business, given reasonable assumptions.
- (2) Determine how much capital the company needs and how it will be used.
- (3) Demonstrate the business can generate the cash to operate and re-pay loans.

Supporting documents

Supporting documents include historical financial statements, tax returns, resumes, reference letters, personal financial statements, facilities diagrams, letters of intent, purchase orders, contracts, etc.

Technology

According to Subedi et al. (2000); Lecup and Nicholson (2000), Helleriegel et al. (2001), and Kozak (2007) transformation and success of a potentially marketable product into a money making enterprise depends on appropriate technology, management and finance. Furthermore, technology in broad terms includes the following issues:

- (a) Machines
- (b) Storage facilities
- (c) Packing materials
- (d) Models of transportation
- (e) Specialized knowledge

Each of the above enterprise technology requirements (a to e) is supported by the appropriate amount of infrastructure, skilled labour and capital (money). Examples of NTFPs enterprise technology include:

- 1) Plant propagation
- 2) Harvesting tools
- 3) Grading standards
- 4) Post harvest dryers and storage containers
- 5) Chemical treatments
- 6) Product formulation
- 7) Protective packaging
- 8) Processing equipment
- 9) Climate controlled warehouses

Management

Subedi et al. (2000), Lecup and Nicholson (2000), and Helleriegel et al. (2001) stated that a successful enterprise requires good management. Often this aspect of enterprise development is overlooked or not systematically addressed. Raw material supply, financing can

overwhelm operations and keep enterprise in continual if not addressed properly. Management integrates all the functions of an enterprise. A good management team and structure will eliminate problems and enhance efficiency, Subedi et al. (2000) and Becker and Barnett (2008). Specific management issues include:

- (a) Understanding how natural product growth and yield studies impact.
- (b) Factoring harvesting areas, quantity, seasons, methods and rotations into procurement strategies.
- (c) Monitoring species inventories, regeneration and growth to determine future supply levels.
- (d) Complying with the operational plan as agreed upon between the Forest User Groups (FUGs) and Forest Department.
- (e) Supporting FUGs in adopting sustainable harvesting systems, competency in raw material sourcing and inventory management.

Finance

Enterprise finance refers to obtaining the NTFPs capital, taking care of revenues and expenses. Finance is the money needed to start or expand the enterprise; it may also be known as fixed or working capital (Subedi et al., 2000; Lecup and Nicholson, 2000 and Kozak, 2007). Fixed capital is used once, usually for pre-opening expenses and larger expenses for assets like equipment, land and buildings. On the other hand, Working capital is used to pay for ongoing expenses of the business, for example raw materials, salaries, fuel and other costs. Finances can come from internal resources (that is, savings, labour, materials), loans, equity investments or donations. An enterprise runs smoothly because of proper money management, accurate accounting, and a healthy supply of working capital.

Key concepts of forest enterprise comprises

- (1) Break-even-point
- (2) Payback period
- (3) Sustainability analysis
- (4) Working capital management

Biological and financial sustainability

Subedi et al. (2000) reported that NTFPs should not start operations without firm evidence that the resource base will be able to supply the enterprise on an ongoing basis. Sustainability and biodiversity conservation are more than environmental goals and they are essential to the long-term commercial viability of a NTFPs enterprise. Environment as a factor of production is an important financial consideration and essential to the security of an

enterprises' raw material supply. Enterprise designs should incorporate environmental considerations to ensure the ecological and economic/financial sustainability of the enterprise.

MARKETING AND SALES

A market study and strategy are crucial and essential, however even the best strategy will not result in customers buying the products if the NTFPs enterprise does not go out to sell (Subedi et al., 2000; Kozak, 2007). Selling means actively offering the products to buyer and asking them to purchase, and you may try many times. Sales can mean being told no more than yes. Research has shown that 9 out of 10 customers will not buy the product, as a result the entrepreneurs focus on finding the 10th customer (Subedi et al., 2000).

It is of utmost importance to adhere to the following:

- (1) Learn to be responsive to customers.
- (2) Be accessible.
- (3) Answer their queries quickly, do not wait for them to call, contact them; and
- (4) Deliver products on time, in right quantities and in good condition.

A market concept for natural products such as NTFPs should follow the sequence and 6 steps (Table 2).

In order to use the marketing concept presented above the NTFPs enterprise should consider:

- (a) Determining the needs of its customers (Step 1 to 3: Market research).
- (b) Analyzing competitive advantages (Step 4: Market strategy).
- (c) Selecting specific market to serve (Step 5: Target market).
- (d) Determining how to satisfy those needs (Step 6: Market mix and product sales).

A CASE STUDY OF BARK HARVESTING FOR TRADITIONAL MEDICINE: FROM ILLEGAL RESOURCE DEGRADATION TO PARTICIPATORY MANAGEMENT

Development of the research action plan

The key and critical focus of sustainable bark harvesting for small scale enterprise development required a unique approach in the study design than that needed for isolated studies within any one of the disciplines of ecology, sociology and economics. A procedure made of several pertinent steps and activities were followed (Geldenhuys, 2002):

Step 1: Visit resource areas and key parts of the perceived value chain, to identify challenges and options

associated with bark harvesting for the traditional medicine trade.

Step 2: Identify critical issues for development of sustainable utilisation, commercialisation and domestication for each of the target species (Appendix 2).

Activity 1: Review available knowledge on the ecology of the target species, ecology of the vegetation in which the target species occurs, and the socio-economic issues related to the target species, to determine the potentials and constraints in development of the target species. Key information extracted from the literature and unpublished study reports were used in development of the commercialisation model, identification of critical studies and development of improved management practices. For example, some key knowledge for *O. bullata* included:

1. Silvicultural considerations for management (Geldenhuys, 2004b).

- (a) Damaged trees easily produce coppice shoots that may be harvested later (Lübbe 1990).
- (b) The species occurs over a wide and disjunct geographical range (Von Breitenbach 1995), with potential variation in gene pool and active chemical compounds useful for cultivation of the species.
- (c) The tree regenerates naturally in pioneer stands (pines, eucalypts, wattle, Australian blackwood, and the indigenous *Virgilia* spp.) on the margin of forests that contain the species (Geldenhuys, 2003, 2004).
- (d) Substitute species can be cultivated (Mander 1998).

2. Socio-economic considerations for its use

- (a) In the Southern Cape forests, its timber is highly sought for, the furniture industry and fetches prices of US\$1000 to 2000 per m³, and small wood carving items, but the bark is not used.
- (b) In the Eastern Mistbelt forests the bark is harvested and sold for US\$0.8/kg to US\$3.6/kg at the Durban Herbal Market (Diederichs in press), but the trees die or are felled without the timber being used.

Activity 2: Formulate and develop a commercialisation model of the target species to determine focus points for development of products, to remove constraints and to capitalize on potentials. For each identified, important link in the value chain (forest as natural resource, harvesting practices, cultivation of resources, processing and packaging of bark products, and product marketing), various priority issues for development of technology and skills, management practices, and potential partners were identified and selected for study in the short term. The commercialisation model for *O. bullata* (Geldenhuys and Van Wyk, 2002) was used as the basic model for the target species because most relevant information was available for this species and it was the critical bark-

Table 2. Market concept for natural products.

Step 1	Market research-Is the natural product established or not established?
Step 2	Market research-Understand the market
Step 3	Market research: Collect Information from Customers
Step 4	Market strategy: Market segmentation and target marketing
Step 5	Target market: Position product
Step 6	Market mix: Market mix and product sales

Source: Subedi et al. (2000).

harvested species at the market (Mander, 1998). The priority issues are shown in Appendix 4.

Activity 3: Develop action plan for the short-term (2 to 3 years), using identified critical constraints and potentials related to the ecology, sociology and economy of sustainable bark harvesting from the target species in the Umzimkulu District. Implementation of the action plan had to remove the constraints on sustainable resource use in the short term, and build on the cultivation and product development potentials in the medium to long-term.

Step 3: Identify other important issues. The following issues, generated by observations during the rapid reconnaissance and discussions with resource managers, were identified as of potential importance in design of the Bark Study.

(1) Traditional bark harvesting is a discrete/secretive practice; bark is used but not the leaves. However, if the active compounds are produced in leaves and stored in the bark, then it is possible that leaf harvesting for the medicine could be easier and less destructive than bark harvesting.

(2) Alternative practices of harvesting bark or leaves, or processing and packaging, may not be acceptable to traditional users. However, most urbanised rural people may have broken ties with some traditional practices and may help to break constraining traditions by accepting alternative practices and products.

(3) Natural products/resources may be sufficient to satisfy market needs, but harvesting practices could be wasteful of both timber and bark.

(4) The lack of a tree planting (that is, afforestation and reforestation) culture in rural areas may constrain the cultivation of alternative resources. Cultivation may also be relatively easy, but nursery and forestry techniques and practices may affect affordability and plant quality.

(5) Value chains seemed to be long with many poorly organized links.

Step 4: Develop research framework. The Commercial Products from the Wild (CPWild) Bark Study Plan included four main components (Appendix 3): (1) natural resource management, (2) laboratory studies, (3) development of alternative resources, and (4) institutional

structures, value chains and business development. The sub-components were dealt with according to priorities, practicality and in sequence for dependent activities. In addition, integration of activities between components was also important. For example, it was important to understand the state and condition of the resource or standing stock before effective interaction with the harvesters at the market could be started.

The integrated approach to the study was developed in early 2000. On 30 May 2002 Department of Water Affairs Forestry (DWAF) issued the General License under sections 7, 15 and 23 of the National Forests Act (1998) to the Sizamimpilo Association, for harvesting of bark under guidance of the management plan for natural forests in the Umzimkulu Area. The local DWAF office, with assistance and guidance from the CPWild Bark Study, compiled the plan for sustainable resource use management. It provides guidelines for resource harvesting, planting for alternative resources, and monitoring of resource use impacts, and stipulates the arrangements between the Department of Water Affairs and Forestry and the Association.

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APPENDIX

Appendix 1. Use categories of NTFPs (goods and services) in Swaziland.

Use category	Comments
Direct use	
Forest foods and drinks	Edible fruits, leaves, roots, buds, herbs, other edible portions that contribute to improving food security and nutritional status.
Forest medicines	Leaves, bark, fruits, roots, etc.
Thatching material	Different grasses used as roofing material.
Plant tannin and dyes	Plant dyes from bark and other parts, including vegetable tannin materials. Items made from indigenous forests found in households; include kitchen utensils, mats, sweepers, etc.
Household items and fibre products	
Handicrafts and fibre products	Everyday utensils, some also used in traditional ceremonies; weapons such as knob sticks; traded items made for tourists
Animals and animal products	Ivory, trophies, bones, feathers, butterflies, live animals and bush meat, etc
Fuel wood and charcoal	A major source of energy to both rural and urban households traded in large amounts throughout the country
Other NTFPs	Spices, insect products, natural plant pigments, essential oils, incense wood, latex, plant gums, waxes etc
Direct/indirect use	
Cultural ceremonies and rituals	Plants used in local and national ceremonies. Use of bird feathers in traditional gear
Landscaping and ornamentals	Shade, windbreaks, garden plants, and hedges; aesthetics and scenery
Fodder and grazing	Trees, shrubs, grasses, and others that provide for livestock fodder
Floral greenery	Ferns, wild flowers, herbs, etc.
Other	Plants and animals used as indicators, e.g. red chested cuckoo calling in the ploughing season.
Intermediate use services	
Tourism and recreation	Forests and trees provide habitats for animals and plants that attract foreign visitors and generate income. Useful in Biodiversity conservation. Including aesthetics and scenery.
Soil fertility and soil conservation	Plant parts such as roots, leaves, fruits, bark, etc, that contribute to soil stabilization and maintaining soil fertility.
Pollination services	Various insects such as bees, beetles, etc. birds and bats that contribute to crop production.
Hydrological cycle and water conservation	Natural forests and woodlands play a crucial role in the water cycle, particularly in water holding and circulation.
Other environmental services	Services such as oxygen production, acid rain deposition and carbon sequestration.

Source: Adapted from Dlamini and Geldenhuys (2009)

Appendix 2. A detailed specimen of a forest enterprise development plan.

The business plan

Part 1: Executive Summary: This section provides a summary of all main elements of the business plan in about one to two pages

Part 2: Background and Overall Goals of the Forest Enterprise: Background on rationale for the enterprise, present situation and how the enterprise will change the situation

Part 3: Product and Product Description (Raw material, Procurement and Processing): Product Description (specifications and quality control); Raw material collection and supply; Enterprise site description (access to transportation, communication facilities, raw materials, infrastructure); Product process (technology, skills level, equipment, infrastructure, fuel, supplies); Production capacity (raw materials needed and capacity of processing equipment)

Part 4: Sustainable Resource Management: Sustainable Harvesting Guidelines; Mitigation of pollution from processing (if any); Plan for biological monitoring and conservation enforcement; Compliance with local, national, regional and international forest regulations

Part 5: Marketing and Sales Targets: Summary of market research; Marketing strategy and target market; Sales targets and sales plan

Part 6: Enterprise Organizational Arrangement and Management: Legal status, organizational and ownership structure Interface with regulatory bodies; Management team (board of directors, managers, skilled personnel); Number of employees and duties and responsibilities, qualifications and experience for each position in the enterprise, and compensation structure); Employee training and technical assistance planned; Relationship with stakeholders (collectors, suppliers, tenure holders, traders, regulatory institutions); Interface with community and distribution of enterprise benefits

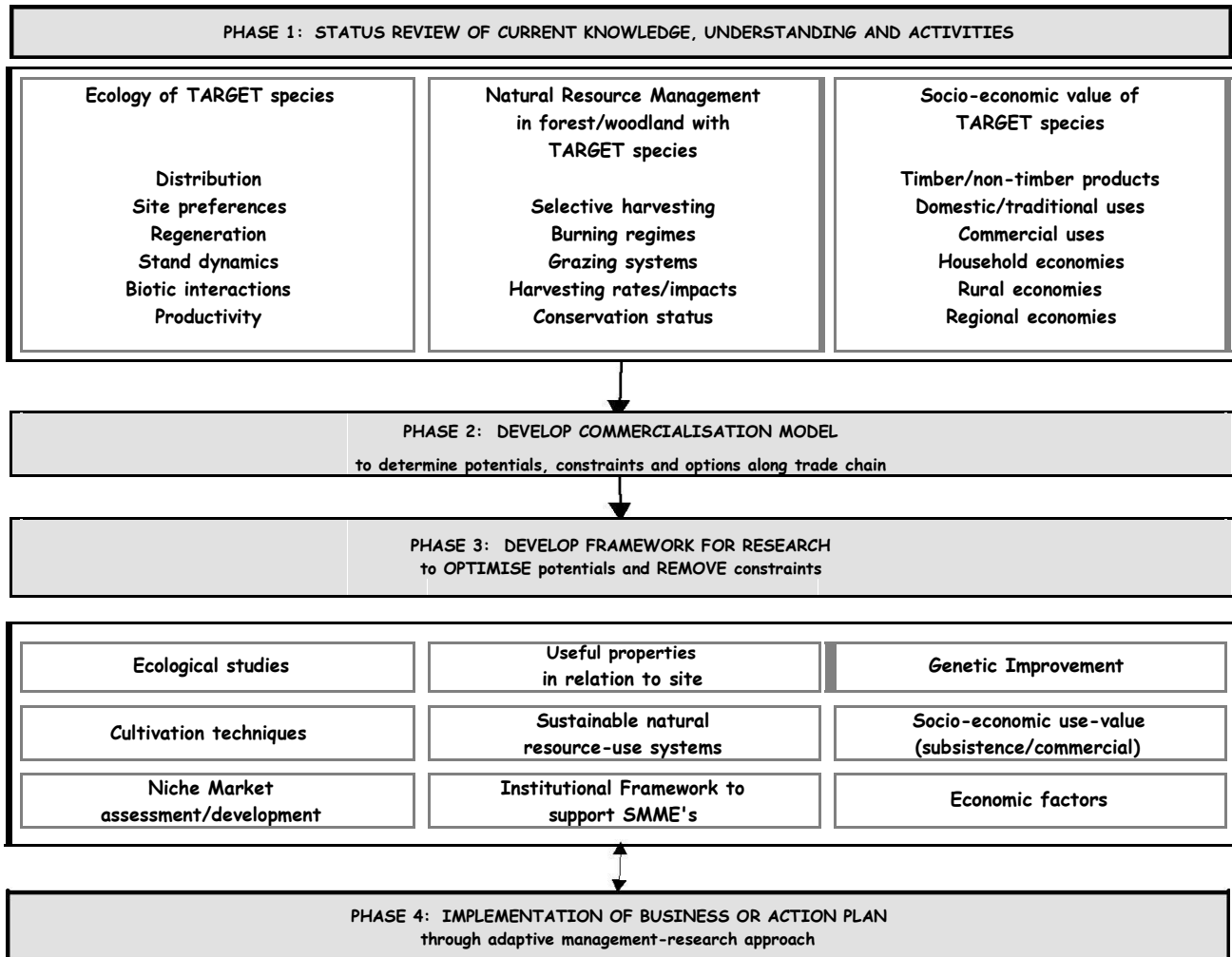
Part 7: Financial Assumptions, Projects and Management: Investment capital requirements (pre-operating, working and fixed capital); Projected cash flow, income, and balance sheets (for at least the initial five years) with ratio and sensitivity analysis; Proposed financing plan with loan repayment schedule and payback period, break-even point and return on investment noted

Part 8: Risk Analysis: Mention of major risks to the enterprise that are specific to the industry and geographic location.

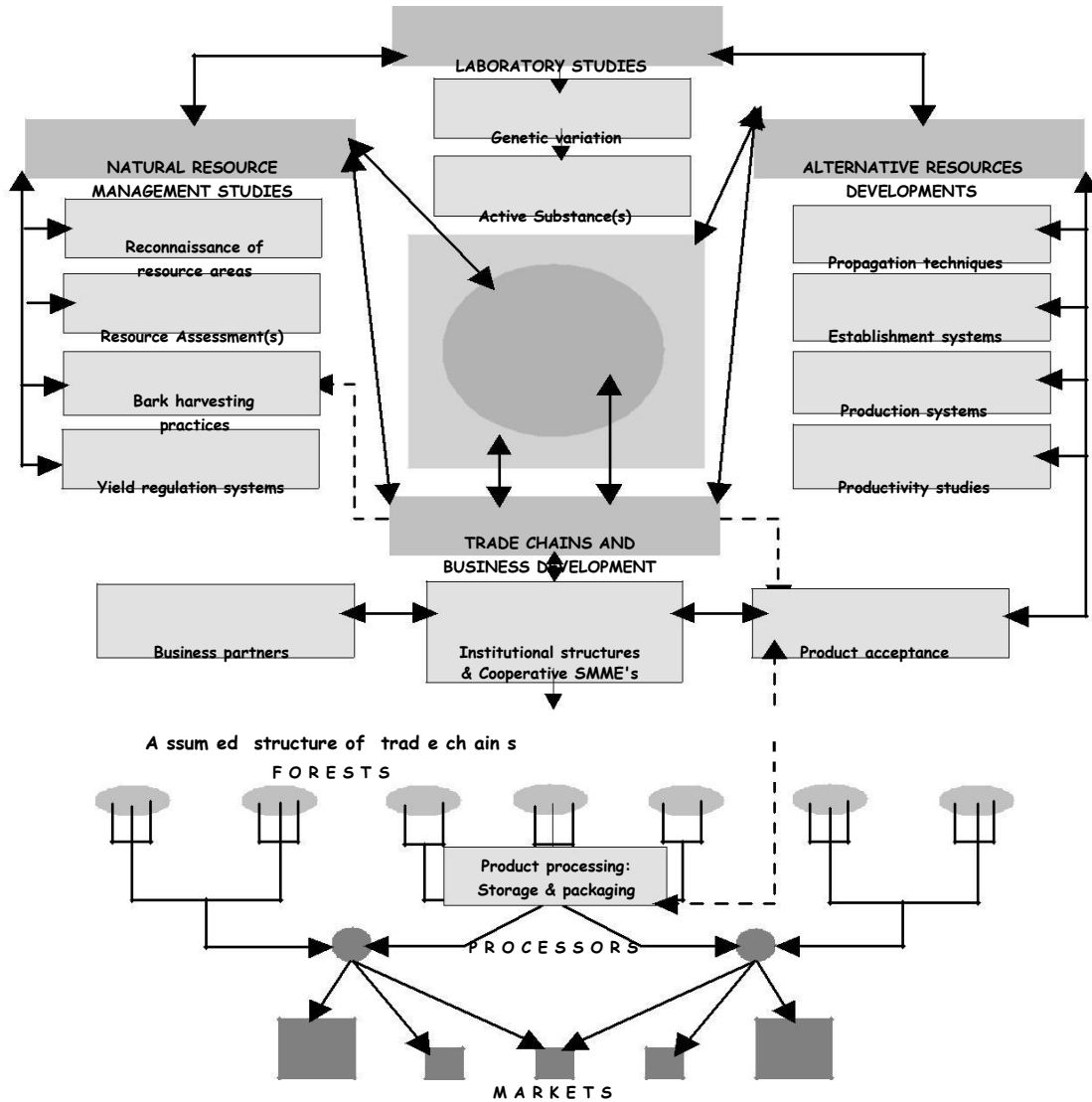
Part 9: Enterprise Activities and Timeline: List of major activities (with timeline) needed to launch enterprise and operate in year one and year two.

Source: Adapted from Subedi et al. (2000).

Appendix 3. A detailed overview of a Commercialization Model for Medicinal Bark in South Africa (Adapted from Geldenhuys, 2004).



Appendix 3A. Outline of the process to develop a study plan for development of sustainable utilization, commercialization and domestication of a target species.



Appendix 3B. Components of the study of bark for medicinal use in the Umzimkulu district, Eastern Cape.

Appendix 4. A simple commercialisation model for *O. bullata* for bark for medicinal use.

Value chain	Technology/skills development	Management requirements	Partners to be involved
Natural resources	Resource assessment; rates of growth, recruitment and mortality	Yield regulation; integrated resource use; institutional arrangements	Resource owner (state, timber companies, communities); nature conservators; resource users; scientists
Harvesting	Bark stripping vs. tree cutting; bark/timber use; crown die-back; minimising impacts	Tree selection; optimal tree use; coppice regrowth; impacts; services	Resource owners; harvesters; traditional healers; scientists
Cultivation	Propagation; conservation; bark and use	genetic leaf Cultivation systems; site selection	Resource owner; scientists; traditional healers/industry
Processing	Processing machines.	At source or market; Quality control.	Resource owner; industry/traditional healers.

Appendix 4 Contd.

Packaging	Product mix: with <i>Curtisia</i> , <i>Prunus</i> , <i>Rapanea</i> , <i>Rhus</i> , etc.	Raw vs. packaged products; acceptability; quality	Industry/traditional healers
Marketing	Product mix.	Chain links; Cooperative structures.	Industry; Traditional healers.

Source: Geldenhuys and Van Wyk (2002).