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Ministry of Forests and Soil Conservation
Department of Forests

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Kurilo

Introduction

Kurilo, Satavari (Scientific Name: *Asparagus racemosus* Wild; English Name-Asparagus) belonging to Liliaceae family is a perennial under shrub of sub-tropical regions of Nepal. Its roots, tubers and tender shoots are widely used for food, medicinal and commercial purposes. GoN/MoFSC/DPR listed Kurilo as one amongst the 30 prioritised species for cultivation and economic development.

Habit (Characteristics)

Kurilo is a climber that reaches up to 1-3 m high. It is an extensively scanty spinous, much branched under shrub. Roots are numerous, tapering at both ends, succulent and tuberous with a diameter of 0.5 to 1.5 cm and arises as a cluster from the basal end of the stem. Its stem is woody, sparsely covered with recurved spines; and leaves are reduced to small scales called as cladode which is in tufts of 2-6 in a node, finely acuminate and curved. Inflorescence is a branched raceme. The flowers are white, fragrant, solitary or fascicles have a width of 0.3-0.4 cm. Its berries are globose or obscurely 3 lobed while the seeds are black in colour and hard with brittle protective cover. Flowering of Kurilo occurs from Baisakh to Bhadra and fruiting occurs from Jestha and Ashoj and matures from Magh to Falgun (Manandhar 2002; Ghimire et al. 2008b, Pyakurel 2012).

Pictures: Habit of Kurilo in wild (left) and Kurilo tuber (in right)- photographs by Dipesh Pyakurel
Habitat and Distribution

**National Perspective:** Kurilo is generally found in open slopes, forests and shruberies within the altitude of 600m-2200m throughout Nepal. Naturally, it can be found mostly in community forests, leasehold forests, national parks and conservation areas. Asparagus has been successfully cultivated in districts like Makawanpur, Chitawan, Bara, Parsa, Sindulpalchowk, Kavre, Myagdi, Gulmi, Nawalparasi, etc. Amongst all the districts, Makawanpur has the highest potential for Kurilo cultivation.

**Distribution of Kurilo in Panchase Area:** It is associated with *Castanopsis indica*, *Castanopsis tribuloides*, *Lyonia ovalifolia*, *Berberis aristata*, *Maesa chisia*, *Mahonia napaulensis* etc in Panchase area. Kurilo is naturally distributed in Arther, Ramja Deurali and Bansing VDCs. It is most abundant in the southern slopes of Arther (ward no 5, 8 and 9), Bansing Deourall (4, 6, 7, 8 and 9) and Ramja Deurali VDCs.

**Uses of Kurilo**

Tender shoots of Kurilo are eaten vegetable while its roots have various other significance. For instance, in central Nepal, vegetable soup prepared from its crushed roots is used to cure diarrhoea. Similarly, roots are considered effective to cure impotency, preventing flatulence and is also appropriate cure bile. Likewise, root powder is beneficial for both breast feeding mother and child. It further helps in reducing the acidity. Powdered form of root is taken as a tonic and is also helpful in expelling the placenta of animals after delivery (Manandhar 2002).

Kurilo exhibits anti cancer, astringent, tonic, laxative, aphrodisiac, diuretic, demulcent, antiseptic, alterative, appetite inducing, antispasmodic and cardiac stimulant characteristics. It is used against leprosy, dyspepsia, gonorrhoea, epilepsy and throat complaints in modern medication. Extracts from its fruits lowers the blood sugar level (Ghimire et al. 2008b).

Roots and seeds have commercial value and is traded throughout Nepal. Asparagus rhizome is one of the major NTFPs export of Nepal.

**Objectives**

The major objective of this study is to prepare comprehensive value chain analysis report of Kurilo. Specific objectives are:

- Suggest present value chain constraints of Kurilo as per the experiences of other areas
- Suggest business service provision gaps and how it can be fulfilled
- Suggest key business enabling environment constraints and opportunities
- Suggest sustainable business system of NTFPs from successful lessons learnt from different parts of Nepal

**Supply Chain of Kurilo**

The dried roots are transported to nearby cities or market centres and are exported mostly to India. More than 95% of the product is exported to India in its raw form. About 60-200 tons of Kurilo is collected/cultivated and exported every year from Nepal while the global market demand of Kurilo is about 700 tons (Kunwar, 2006). There are prospects of manufacturing powder of Kurilo but it has not been institutionalised yet. The market chain of Kurilo involves: collectors or farmers, village level traders, district level traders and exporters.

Like other NTFPs, Kurilo is not traded from the Panchase area. The figure given below depicts the general supply chain of Kurilo.

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**Figure:** Supply Chain of Kurilo (Size of box does not represent the volume).
3.4 Value Chain Map of Kurilo

Figure below presents the value chain map of Kurilo of Nepal. As the product from Panchase region is not in trade, a case is given which represents the trade from Nepal.

- **Exporting**
  - Exporters
  - Regional Traders
    - **Negatives:**
      - Quarantine
      - Hassles during trade; multiple taxation; chuti-he-mundre; multiple check posts; permit; royalty rate;
  - District-Level Traders
    - Negatives:
      - Inadequate financial resource
      - BFIs are there to invest short term loans
    - Positives:
      - Enhanced communication
  - Village-Level Traders / Middlemen
    - Negatives:
      - Inadequate knowledge, processing
    - Positives:
      - Enhanced communication
  - Collectors / Farmers
    - Negatives:
      - Diminishing resource; ban on collection; harvesting time

- **Function**
  - Indian (95%)
  - Local Consumption (<5%)

- **Enablers**
  - BFIs, FNCCI, FNCSI, NCC, NEHHPA, JABAN, DPR, DoF, Customs, NPQP, Projects
  - DFOs, BFIs, GOs, NGOs, CBOs, Projects
  - BFIs, Projects
  - DFO, NGOs, CBOs, BFIs, Cooperatives, farmer group

Figure : Value chain map of Kurilo traded from Nepal
Role and Function of Actors and their relationship

As the cultivation of Kurilo has not commenced in Panchase area and its wild collection from core area is prohibited, the trade of Kurilo is yet to begin. The function of potential actors (collectors, village level traders, lemiddlemen, district vel traders, regional traders and exporters) are mentioned further in functional upgrading.

Kurilo is mostly collected by smaller farmers or poor villagers for whom the collection and trade of wild NTFPs is a major source of income. They collect Kurilo from the wild and sell it to village-level traders. In most cases, collectors do not even know the exact market price and are hence compelled to sell at the rates offered by the village trader. In this regard, the establishment of agricultural cooperatives and collective marketing from these cooperatives will ensure optimum benefit for these collectors.

Enablers

Enablers of “Kurilo value chain” in the present context are those who are likely to work for the value chain actors and provide facilitatory and regulatory supports in Panchase area. Activities of enablers ranges from collection to end use, advocacy for simplifying trade policy and procedures, organizing groups and networks for reinforcement, and market information and linkages for better access. Regulating agencies are also working as a facilitator in many cases.

Economic Analysis of Kurilo Cultivation

Price

The price of Kurilo root is determined by its demand and quality, both of which are ever fluctuating. One kg of Kurilo costs Rs. 350 to Rs. 400 depending on the quality (Kathmandu and Nepalgunj, September 2013). The price trend of the last five years showed that the price almost remained stable for a period of last six years (till 2012) except in 2013 when the price decreased a little.

Table: Price trend of Kurilo for last seven years

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dried Kurilo Tuber (Rs/kg)</td>
<td>300</td>
<td>300</td>
<td>350</td>
<td>350-400</td>
<td>350-400</td>
<td>400-450</td>
<td>375-400</td>
</tr>
</tbody>
</table>

Cultivation Cost

One hectare (one hectare equals to about 20 ropani) of plantation needs about 10,000 to 11,000 seedlings (i.e. around 800 grams of seed, when planted at the distance of 1m X 1m. One kg of seeds have around 20,000 seedlings and each seedling has the germination percentage of 85-90%.

The cost per hectare is Rs 74,500 for first year, Rs 23,000 for second year and Rs 43,000 for third year. The expert consultation cost is kept Rs 30,000 collectively for three years. Thus the total cost of production when raised
from seedling is 1,70,500 for three years (Rs 1,87,500 when raised from seedlings). About 1,650 kg can be produced in a hectare and if sold at Rs 375 per hectare (September 2013), the total sales is Rs 6,18,750. Hence, profit per year per hectare is estimated to be Rs 150,000 (from seeds) and Rs 1,44,000 (from seedlings).

**Kurilo, cost per hectare for First Year**

<table>
<thead>
<tr>
<th>SN</th>
<th>Particulars</th>
<th>Quantity</th>
<th>Rate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nursery preparation</td>
<td>10 persons</td>
<td>400</td>
<td>4,000</td>
</tr>
<tr>
<td>2</td>
<td>Pipe and other</td>
<td>L/s</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Land preparation</td>
<td>30 persons</td>
<td>400</td>
<td>12,000</td>
</tr>
<tr>
<td>3</td>
<td>Seed seedlings cost</td>
<td>1 kg</td>
<td>3.50</td>
<td>3,500</td>
</tr>
<tr>
<td></td>
<td>seedlings cost 10000 pcs</td>
<td>2</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Compost fertilizer</td>
<td>10 tonnes</td>
<td>700/tonne</td>
<td>7,000</td>
</tr>
<tr>
<td>5</td>
<td>Plantation in the field</td>
<td>30 persons</td>
<td>400</td>
<td>12,000</td>
</tr>
<tr>
<td>6</td>
<td>Weeding and composting</td>
<td>20 persons</td>
<td>400</td>
<td>8,000</td>
</tr>
<tr>
<td>7</td>
<td>Regular watering</td>
<td>20 man days</td>
<td>400</td>
<td>8,000</td>
</tr>
</tbody>
</table>

Subtotal for first year when cultivated from seeds 74,500

Subtotal for first year when cultivated from seedlings 91000

* Nursery preparation is generally not required for seeding plantation

**Value Addition**

Nowadays Kurilo is graded, packaged, and standardized for commercial marketing. Local varieties of Kurilo are processed through steaming, cleaning and drying. It is cooked in a big bowl for 30-40 minutes to remove outer bark and inner hard fibres. Rest of the fleshy part is sun-dried and marketed while the outer bark can be removed by pressing the rhizome between two fingers and drying it in sunlight for a few days. Well-dried roots must be stored in a well ventilated room. The weight so measured in summer season may be 15% lesser than the weight measured in winter season. It is to be noted that unprocessed Kurilo tubers are rarely sold in the market.
Demand and Supply

National Perspective: The documented trade of Kurilo from Nepal is only 6500 kg in FY 2011/12 (source DoF) but it has been estimated that about 60-200 tons of wild Kurilo are traded from Nepal (Pyakurel 2012). Most of the Kurilo are exported to India where they make herbal preparations. The trade of Kurilo was hindered few years ago with the inclusion of hybrid variety that was imported from India. The hybrid varieties has small rhizome compared to the wild ones and the price was one third than that of the wild species.

Panchase Specific: The cultivation and trade of Kurilo has not commenced from Panchase area. However, local communities are collecting Kurilo from wild for household purpose.

Detailed resource assessment is mandatory to assess the present stock of Kurilo in Panchase area. Natural distribution of Kurilo in Panchase is limited. Extensive cultivation campaign in the private lands of Panchase area is needed to meet the demand of Kurilo.

SWOT Analysis of Kurilo

Table: SWOT Analysis of Kurilo

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Good and increased market demand for local variety</td>
<td>– Harvesting usually involves the removal of whole plant for tuber collection that hampers natural regeneration</td>
</tr>
<tr>
<td>– Domestic consumption is increasing due to its medicinal value</td>
<td>– Pre harvesting and over harvesting of wild Kurilo</td>
</tr>
<tr>
<td>– Linear growth of market price</td>
<td>– Inadequate input suppliers in district around Panchase Area</td>
</tr>
<tr>
<td>– Value addition possibilities at local level</td>
<td></td>
</tr>
<tr>
<td>– Traditional knowledge on collection</td>
<td></td>
</tr>
<tr>
<td>– Easy for plantation in marginal land (private lands, CF, LF)</td>
<td></td>
</tr>
<tr>
<td>– Kurilo is a prioritized commodity for export by GoN/ Department of Plant Resources</td>
<td></td>
</tr>
<tr>
<td>– Good initiative to promote export as no fees (any time) and local levy on the transportation within the country</td>
<td></td>
</tr>
<tr>
<td>– Wild variety seeds easily available in several districts</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Provision of soft/long term loan by CFUGs</td>
<td>– Introduction of hybrid varieties without any research has posed negative impression on the farmers for cultivation. The hybrid variety produces small and inferior quality tuber</td>
</tr>
<tr>
<td>– High scope for increased productivity in term of seeds, seedlings and tuber</td>
<td>– Pest and diseases likely to occur in Kurilo is not yet properly identified, which is a potential threat for its commercialization</td>
</tr>
<tr>
<td>– Opportunity to cultivate Kurilo in CF, LF and private land as intercropping</td>
<td></td>
</tr>
</tbody>
</table>

The market based solutions to identify weaknesses and threats, and to tap the existing opportunities are provided as BDS strategy in next section as a part of Value Chain Upgrading Strategy.
Value Chain Upgrading Strategies

End Market Strategy

End market strategy is prepared to fulfil the gap between market requirements and present status (other parts of Nepal). This is shown in the spiderogram looking at six parameters.

Gaps in market where Panchase product can compete: It is important for Panchase to understand how it can compete better to cater to the high demand of Kurilo. It is shown in the spiderogram as:

![Spiderogram showing market gaps and competitiveness](image)

*Figure: Spiderogram to analyzing the market gaps and competitiveness*

Main gaps to be fulfilled are:

a. Quality production: Presently farmers are cooking Kurilo in water and getting yellowish colour. Mechanism for cooking it with specific composition will result in bright yellow colour which has high demand in market.

b. Varieties: There has been practice of cultivation of hybrid varieties all over Nepal. The trend has decreased as hybrid varieties are not fetching a good market price. Conscious decision has to be taken while choosing varieties of Kurilo as well.

c. Demand and Supply: The demand exceeds the supply at the present condition. Panchase Area can brand itself as quality Kurilo supplier in the market.

d. Technical Knowledge: Farmers are less aware about the cultivation practices and choosing right varieties, which results in final products that do not have good price in the market.

Firm level upgrading

Product upgrading

Kurilo in Panchase area is not yet traded. The product strategy generally comprised of the following

a. Sales of quality tuber Kurilo for marketing
b. Selling of seed and seedlings of Kurilo
Process upgrading

The process upgrading in Panchase has to be carried out for:

c. Adopting scientific cultivation practice (hiring expert farmers who can provide the inputs when needed)
d. Appropriate mechanism to increase brightness of final products (from yellowish to bright yellow)

Functional upgrading

The functional upgrading at each level of value chain can be carried out as:

Table: Functional upgrading matrix

<table>
<thead>
<tr>
<th>Actors</th>
<th>Present Function</th>
<th>Upgraded Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herders, Collectors</td>
<td>Collection of Kurilo for domestic use</td>
<td>Commercial level cultivation of Kurilo in private lands and CFs</td>
</tr>
<tr>
<td>Farmers and young entrepreneurs</td>
<td>NA</td>
<td>Cultivation of Kurilo in private lands and abandoned farmlands and barren lands</td>
</tr>
<tr>
<td>Traders</td>
<td>NA</td>
<td>After amendment in the Panchase Protected Forest Management plan, traders should purchase Kurilo from farmers (after cultivation), ensuring the fair price</td>
</tr>
<tr>
<td>CFs</td>
<td>Conservation of NTFPs</td>
<td>CF should Allocate lands for herders to cultivate Kurilo</td>
</tr>
<tr>
<td>Cooperatives</td>
<td>Most of the cooperatives are engaged in savings and credit</td>
<td>Cooperate and invest in the cultivation of Kurilo, and later carry out collective marketing. Look after the new technology for processing and value addition</td>
</tr>
</tbody>
</table>

Channel upgrading

The current trade of Kurilo showed that Nepalgunj, Bhairahawa, Kathmandu, Biratnagar, Kakaddhitta are major centre for export. Though Kurilo is not marketed from Panchase area, the possible routes would be as follows

- Bhadaure Tamagi-Kande-Pokhara
- Chitre-Dimwa-Pokhara
- Arther/Ramja Deourali-Syangja or Pokhara
- Syangja-either to Bharawaha via Butawal or to Pokhara
- Products from other VDCs also follow the Pokhara or Syangja route

Once the product reaches Pokhara, the product will follow the Kathmandu or Tarai route.

Transectoral upgrading

The actors involved in Kurilo value chain can also work in Alio, Timur, Chiraito and orchids value chain to cater to the demand of the market.

Interfirm upgrading

Kurilo has demand in markets and Panchase Kurilo can be sold in any markets like Pokhara, Kathmandu and Nepalgunj depending on market price. There is no need for strategic alliance required at value chain actor level and Kurilo can be sold at various markets.

Business Development Services and Financial Services

The assessment of Business Development Services and Financial services in this report has also been considered taking in view of:

a. Categorization of business service demand from beneficiaries (value chain actors) in terms of very strong, strong, weak and very weak categories
b. Categorization of supply side of BDS provider’s in terms of very strong, strong, weak and very weak categories.
Table: BDS and FS Matrix

<table>
<thead>
<tr>
<th>SUPPLY SIDE OF BDS</th>
<th>Mobilization and sensitization of communities</th>
<th>Subsidized input and social mobilization of user groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very strong</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strong</td>
<td>Access to market information</td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>Provision of advocating organization and coordination for advocating</td>
<td>Provision of training on Kurilo cultivation Access to quality led market information and linkages Technical knowledge on Kurilo cultivation Access to market information</td>
</tr>
<tr>
<td>Very weak</td>
<td>Access to financial services</td>
<td></td>
</tr>
</tbody>
</table>

DEMAND OF SERVICES BY VALUE CHAIN ACTORS

Above table shows the business and financial service requirement that can be catered by following commercially viable business service providers:

Table: Listing out commercially viable business options

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Services</th>
<th>Service Providers</th>
<th>Types of payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input supply</td>
<td>Farmers are not getting seed/seedlings for Kurilo cultivation</td>
<td>Lead farmers for nursery, linkages with farmers in Makawanpur for Kurilo seedlings</td>
<td>Pay for services for buying seedlings and subsidy for Gha barga for buying seedlings</td>
</tr>
<tr>
<td>Cultivation</td>
<td>Provision of training on Kurilo cultivation</td>
<td>Training from farmers of Makawanpur Nepal to lead farmers</td>
<td>Subsidized services</td>
</tr>
<tr>
<td>Market Information and markets linkages</td>
<td>Provision of market linkages and information</td>
<td>Through district CCI and Cooperatives</td>
<td>Embedded services</td>
</tr>
<tr>
<td>Access to financial services</td>
<td>Provision of financial services for technology transfer</td>
<td>Cooperatives</td>
<td>Pay for services and subsidized services if in group</td>
</tr>
</tbody>
</table>

Business enabling environment

The prime importance for Panchase area is to lift ban for Kurilo business.

Sustainability Strategy

The most important sustainability strategy for Kurilo is supply of high quality Kurilo tuber in the market with provision of nursery and market information system. Kurilo is high in demand and it can be sold in the market like Kathmandu, Pokhara, Butawal and Nepalgunj. Sustainable harvesting practice has to be exercised for sustainable business of Kurilo.
ABBREVIATIONS

AEC  Agro Enterprise Centre
ANSAB  Asia Network for Sustainable Bio-resources
BDS  Business Development Services
BFIs  Banks and Financial Institutions
CBOs  Community Based Organisations
CFs  Community Forests
CFUGs  Community Forest User Groups
DCCI  District Chamber of Commerce and Industry
DDC  District Development Committee
DFO  District Forest Offices
DoF  Department of Forests
DPR  Department of Plant Resources
EbA  Ecosystem Based Adaptation
FNCCI  Federation of Nepalese Chamber of Commerce and Industries
FNCSI  Federation of Nepalese Cottage and Small Industries
GF  Government Forests
JABAN  Jadibuti Association of Nepal
LF  Leasehold Forests
MDO  Machhapuchre Development Organization
MoFSC  Ministry of Forests and Soil Conservation
NA  Not Available
NCC  Nepal Chamber of Commerce
NEHHPA  Nepal Herbs and Herbal Products Association
NGOs  Non Governmental Organisations
NPQP  National Plant Quarantine Programme
NTFPs  Non-Timber Forest Products
PPFMC  Panchase Protected Forest Management Council
SWOT  Strength, Weakness, Opportunities, Threats
VDC  Village Development Committee

REFERENCES


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