



VALUE CHAIN DESIGNING OF

Kurilo

OF PANCHASE PROTECTED FOREST AREA



Implementing Agency

**Ministry of Forest and Soil
Conservation, Department
of Forests**



Implementing Partners



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Kurilo

Introduction

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

Habit (Characteristics)

Kurilo is a climber that reaches up to 1-3 m high. It is an extensively scandent 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 arises as a cluster from the basal end of the stem. Stem is woody, sparsely covered with recurved spines. 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. Flowers are white, fragrant, solitary or fascicles have a width of 0.3-0.4 cm. Berries are globose or obscurely 3 lobed. Seeds are black in colour and hard with brittle protective cover. Flowering 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 shrubberies 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 cultivating in districts like Makawanpur, Chitawan, Bara, Parsa, Sindhupalchowk, Kavre, Myagdi, Gulmi, Nawalparasi, etc. However, Makawanpur is the most potential area for Kurilo cultivation.

Distribution of Kurilo in Panchase

Area: It is associated with *Castanopsis indica*, *Castanopsis tribuloides*, *Lyonia ovalifolia*, *Berberis aristata*, *Maesia chisia*, *Mahonia napaulensis* etc in Panchase area. Kurilo is naturally distributed in the Arther, Ramja Deourali and Barsing VDCs. It is most abundant in the southern slopes of Arther (ward no 5, 8 and 9), Barsing Deourali (4, 6, 7, 8 and 9) and Ramja Deourali VDCs. Kurilo can be cultivated in those areas.

Uses of Kurilo

Tender shoots are eaten as vegetable. In central Nepal, vegetable soup prepared from crushed roots is used to cure diarrhoea. Roots are considered effective to cure impotency. The root is considered efficacious in preventing flatulence and to be good for bile. Root powder is beneficial for both breast feeding mother and child. Root powder also helps in reducing the acidity. Powdered root is taken as a tonic. It is also helpful in expelling the placenta of animals after delivery (Manandhar 2002).

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

Roots and seeds have commercial value and traded throughout Nepal. Asparagus rhizome is one of the major exporting NTFPs 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. About 60-200 tons of Kurilo is collected/cultivated and exported every year. Global market demand for Kurilo is about 700 tons (Kunwar 2006). It should be understood that more than 95% of the product is exported to India in raw form. There are prospects of manufacturing powder of Kurilo but it has not been institutionalised yet. The market chain involves collectors or farmers, village level traders, district level traders and exporters. The simplified market chain is given below.

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

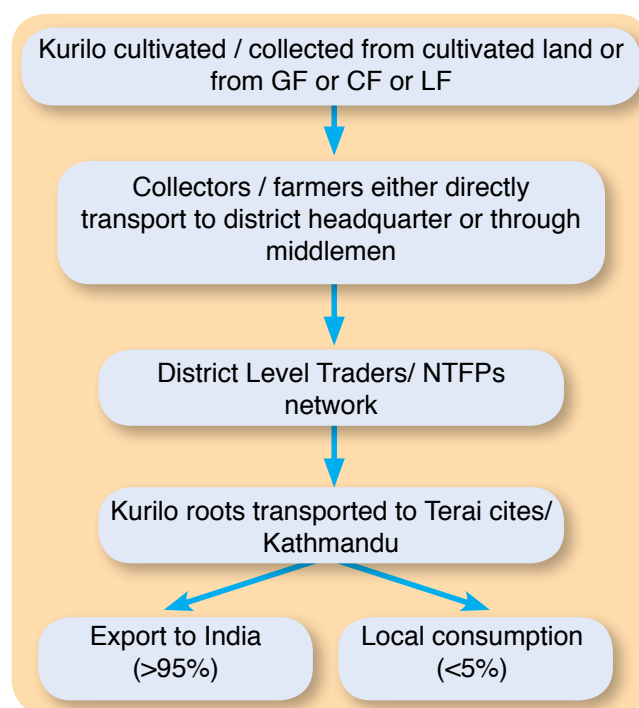


Figure: Supply Chain of Kurilo (Size of box does not represent the volume).

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.

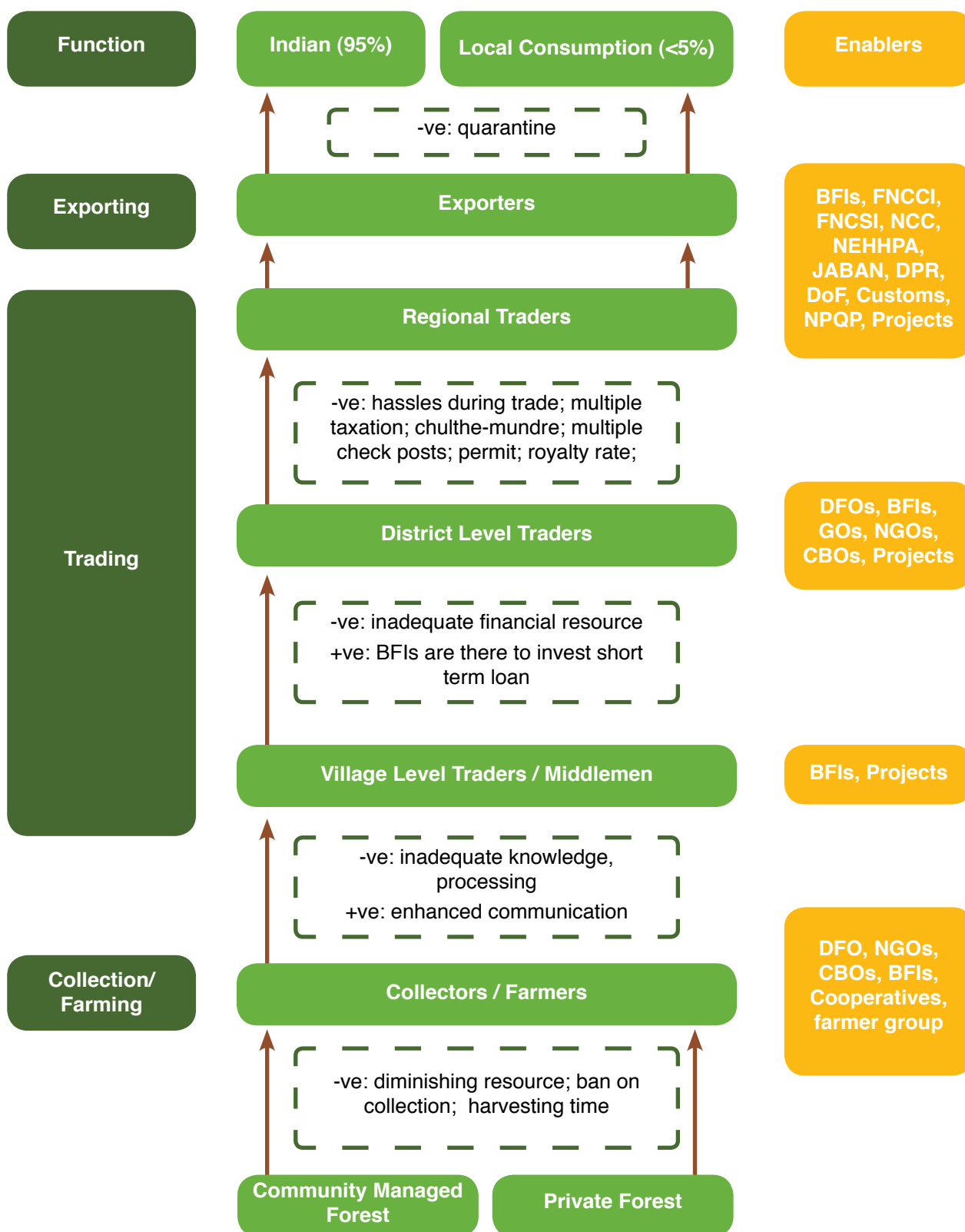


Figure : Value chain map of Kurilo traded from Nepal



Role and Function of Actors and their relationship

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

Kurilo is mostly collected by smaller farmers or poorer 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 price and are compelled to sell at whatever rates the village trader offers them. The establishment of agricultural cooperatives and collective marketing from these cooperatives will ensure optimum benefit for the 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 facilitating and regulatory supports in Panchase area. Activities of enablers ranged 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. The anticipated role of facilitating and regulating organisations for the proper functioning of value chain is given in the following table.

Table: Anticipated role of facilitating and regulating organisations to move Kurilo in the market chain

Major Activities	Facilitating Organizations (anticipated)	Regulating Organizations
Cultivation and Sustainable collection	MDO, EbA, Hariyo Ban, CFUGs	DFO, PPFMC
Processing	EbA, CBOs	
Resource Management	MDO, EbA, Hariyo Ban, CFUGs	PPFMC
Collection permit	MDO, EbA, Hariyo Ban	PPFMC
Harvesting	MDO, EbA, Hariyo Ban, CFUGs	DFO, CFUGs, PPFMC
Royalty Exemption (for cultivated Kurilo)	MDO, EbA, Hariyo Ban	DFO, PPFMC
Transport/ Export permit		DFO, PPFMC
Local Taxes		DDC, VDC
Market Information	ANSAB, AEC	

Economic Analysis of Kurilo Cultivation

Price

The price of Kurilo root is determined by demand and quality, both of which are ever-fluctuating. One kg of Kurilo cost Rs. 350 to Rs 400 as per the quality (Kathmandu and Nepalgunj, September 2013). The price trend of last five years showed the price almost remained stable for the period of last six years (till 2012) except in 2013 when the price has been decrease a little.

Table: Price trend of Kurilo for last seven years

Year	2007	2008	2009	2010	2011	2012	2013
Dried Kurilo Tuber (Rs/kg)	300	300	350	350-400	350-400	400-450	375-400

Cultivation Cost

One hectare (one hectare equals to about 20 ropani) of plantation needs about 10,000 to 11,000 seedlings when planted at the distance of 1m X 1m. About 800 grams of seeds are required to plant in a hectare when planted at the distance of 1m X 1m. One kg seeds have 20,000 seeds and seed 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 1650 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. 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

SN	Particulars	Quantity	Rate	Total
1	Nursery preparation	10 persons	400	4,000
2	Pipe and other	L/s		20,000
2	Land preparation	30 persons	400	12,000
3	Seed	1 kg	3500	3500
	seedlings cost	10000 pcs	2	20000
4	Compost fertilizer	10 tonnes	700/tonne	7,000
5	Plantation in the field	30 persons	400	12,000
6	Weeding and composting	20 persons	400	8,000
7	Regular watering	20 man days	400	8,000
Subtotal for first year when cultivated from seeds				74500
Subtotal for first year when cultivated from seedlings				91000

* Nursery preparation is generally not required for seedling plantation

Kurilo, Cost per hectare for second year

SN	Particulars	Quantity	Rate	Total
1	Compost fertilizer	10 tonnes	700/tonne	7,000
2	Weeding and composting	20 persons	400	8,000
3	Regular watering	20 man days	400	8,000
Subtotal for second year				23,000

Kurilo, Cost per hectare for Third year

SN	Particulars	Quantity	Rate	Total
1	Compost fertilizer	10 tonnes	700/tonne	7,000
2	Weeding and composting	20 persons	400	8,000
3	Regular watering	20 man days	400	8,000
4	Harvesting	20 man days	400	8,000
5	Drying, Cooking and storage	30 man days	400	12,000
Subtotal for third year				43,000

Total cost, productivity and profit for Kurilo

SN	Particulars	Quantity	Rate	Total
1	Total cost when planted from seeds			140500
	Total cost when planted from seedlings			157000
2	Expert consultation cost (Lumpsum for three years)			30,000
3	Kurilo production	1650 kg	375	6,18,750
4	Total profit when planted from seeds			448250
	Total profit when planted from seedlings			431750
5	Profit per year per hectare, planted from seeds			149416
	Profit per year per hectare, planted from seedlings			143916

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 cover and inner hard fibres. Rest fleshy part is sun-dried and marketed. Outer cover can be removed by pressing the rhizome between two fingers and drying it in sunlight for a few days. Well-drained roots must be stored in a well ventilated room. The weight measured in summer season may be 15% lesser than the weight measured in winter season. 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 2011/012 (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 been commenced from Panchase area. However, local communities collect 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 Timur.

SWOT Analysis of Kurilo

Table: SWOT Analysis of Kurilo

Strength	Weakness
<ul style="list-style-type: none"> – Good and increase market demand for local variety – Domestic consumption is increasing due to its medicinal value – Linear growth of market price – Value addition possibilities at local level – Traditional knowledge on collection – Easy for plantation in marginal land (private lands, CF, LF) – Kurilo is a prioritized commodity for export by GoN/ Department of Plant Resources – Good initiative to promote export as no fees (any time) and local levy on the transportation within the country – Wild variety seeds easily available in several districts 	<ul style="list-style-type: none"> – Harvesting usually involves the removal of whole plant for tuber collection that hampers natural regeneration – Pre harvesting and over harvesting of wild Kurilo – Inadequate input suppliers in district around Panchase Area
Opportunities	Threats
<ul style="list-style-type: none"> – Provision of soft/ long term loan by CFUGs – High scope for increase productivity in term of seeds, seedlings and tuber – Opportunity to cultivate Kurilo in CF, LF and private land as intercropping 	<ul style="list-style-type: none"> – 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 – Pest and diseases are least identified for Kurilo, which is a potential threat for its commercialization

The market based solutions to identified weakness 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 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 high demand of Kurilo. It is shown in spider diagram as:

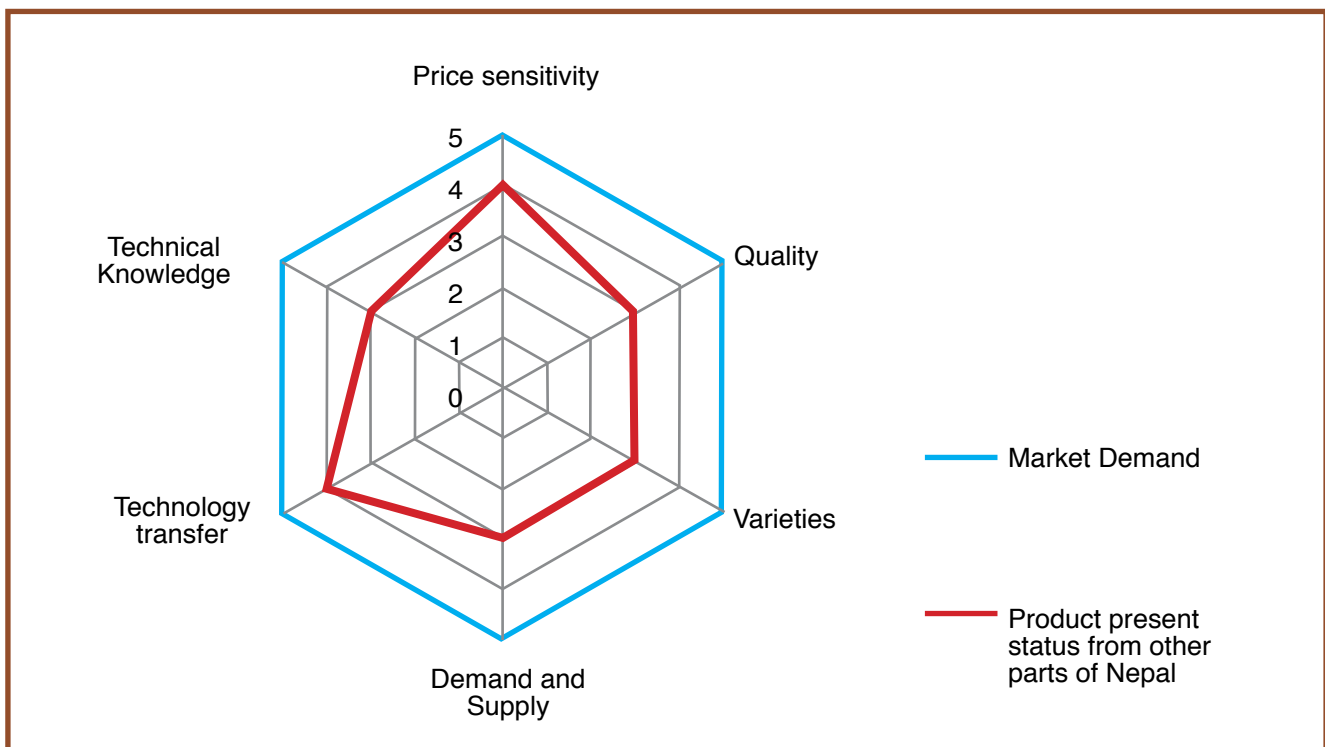


Figure: Spiderogram to analyze the market gaps and competitiveness

Main gaps to be fulfilled are:

- Quality production: Presently farmers are cooking Kurilo in water and getting yellowish colour. Mechanism for cooking it with specific composition with result in bright yellow colour which has high demand in market.
- Varieties: There has been practice of cultivation of hybrid varieties all over Nepal. The trend has decreased as hybrid varieties are not fetching good market price. Conscious decision has to be taken while choosing varieties of Kurilo.

- Demand and Supply: The demand exceeds the supply at present condition. Panchase Area can brand itself as quality Kurilo supplier in the market.
- Technical Knowledge: Farmers are less aware about the cultivation practices and choosing right varieties, which results in final products that are not fetching good price in the market.

Firm level upgrading

Product upgrading

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

- Sales of quality tuber Kurilo for marketing
- 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 farmer 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

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

Channel upgrading

The current trade of Kurilo showed that Nepalgunj, Bhairahawa, Kathmandu, Biratnagar, Kakadbhitta 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 VDC also follows 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 Allo, Timur, Chiraito and orchids value chain to cater the demand of the market.

Interfirm upgrading

Kurilo has demand in market 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 also has 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

SUPPLY SIDE OF BDS	Very strong		Mobilization and sensitization of communities		Subsidized input and social mobilization of user groups
	Strong		Access to market information		
	Weak	Provision of advocating organization and coordination for advocating	Business sensitization training: Business Plans, Production Plan, Crop budgets,	Provision of training on Kurilo cultivation Access to quality led market information and linkages	Technical knowledge on Kurilo cultivation Access to market information
	Very weak		Access to financial services		
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

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

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
BFI	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
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

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