



GOVERNMENT OF NEPAL



EUROPEAN UNION



Ministry for Foreign
Affairs of Finland

Report on Seabuckthorn (*Hippophae salicifolia*) feasibility study



22 November to 2 December 2018
Api Himal RM
Darchula district



Introduction

Seabuckthorn is one of the emerging medicinal as well as multipurpose plant with great ecologic and economic importance. It is a diversified group of plant species distributed throughout the Eurasian area. This species is reported from the High Mountain regions of Nepal such as Mugu, Dolpa, Humla, Darchula, Jumla, Mustang Manang, Rasuwa, Solukhumbu, Taplejung etc. The National Herbarium of Nepal in Godavari, has specimens of three species presently available in Nepal: *H. salicifolia* D. Don, *H. tibetana* Schlecht and *H. rhamnoides* L. However, only the first two species are found with moderate abundance in the mountainous districts of Nepal.

Seabuckthorn has already been proven as an off-farm income generating resource for high mountain people. The value of the plant has been introduced and different development activities have been implementing by some governmental and non governmental agencies in some Northwestern Himalayan districts like; Mustang and Manang. The plant is not only important to protect soil and to improve the environment but also useful for value added products from the berries and other plant parts. Out of different potential products, Seabuckthorn juice is most popular in those districts. Mainly the juice is produced to sell to tourists trekking along the "Great Himalaya Trail".

This plant belongs to the family *Elaeagnaceae*. The morphological structure of the plant indicates great variations between species and to the microclimatic condition influences with its appearance. Generally, it exists as a deciduous small tree or shrub. But sometimes it also may appear as a large tree or even as a small perennial herb.

The plant is very useful for conservation of soil, soil improvement and marginal land reclamation in highly eroding Himalayan river systems. The plant is not only important to protect soil and to improve the environment but equally useful for value added products from the berries and other plant parts. Despite all the benefits, the species is not much explored in Nepal and can be regarded as a neglected and underutilized species (NUS).

Api Himal RM of Darchula district is one of the potential areas to promote and develop Seabuckthorn. Only the tree variety (*H. salicifolia*) is reported to be found in the RM. However, there is a possibility to find the bush variety (*H. tibetana*) in high altitude and border areas of Tibet. Locally it is known as Shankhadhara. The "Rural Village Water Resources Management Project" (RVWRMP) is the first institution which has taken initiation to conserve and utilize the natural Seabuckthorn resource in this RM. However, a juice processing training was conducted with the installation of small processing unit in Marma RM, but it has not been used at all after that first event which was established in support of the Poverty Alleviation Fund (PAF) a couple of years back.

Objective

Major objectives of the visit were:

- To raise awareness on Seabuckthorn resource to the local people
- To conduct a training on the proper harvesting of berries and processing techniques
- To assess resource status and income generation potential of the inhabitants of the RM related to Seabuckthorn

Major activities

The following activities were performed during the consultancy:

- An interaction meeting was organized with Marma RM representatives, RM level RVWRMP staff and locals
- 1 day awareness workshop with all stakeholders including RM and other government representatives, farmers and others in Khandeswori was conducted
- 2 days berry harvesting and processing training was organized in Khandeshowari village with local residents of different villages of Api Himal RM
- Travelled Khandeshowari to Chheti village and observed the major natural distribution of Seabuckthorn stands along the Chamelia, Kapi and associated river/stream basin
- Meeting and discussion with the residents of Chheti village
- Discussion and meeting with the residents of Patha village and demonstration for the preparation of semi-processed and final Seabuckthorn juice (squash)
- Interaction meeting in Darchula HQ with the representatives from API Nampa Conservation Area, Divisional Forest Office, FNCCI, Byas RM and RVWRMP staff
- Debriefing meeting in RVWRMP PSU Office in Dadeldhura with team leader and other staff

Methodology

Introduction and importance of Seabuckthorn resource had discussed during awareness workshop, trainings and meetings. The nearest natural stand of Seabuckthorn was visited during second day to introduce the plant to the participants and to observe conservation status and existing use practices. The effective way of berry harvesting and raw juice extraction was discussed during the field visit. Participants were also informed on the conservation value of the plant and cultivation and management practices for the betterment and sustainability of the resources.

Participatory and adult-learning techniques had been applied during the training. All participants paid keen interest during whole training period. Vitamins, minerals, amino

acids and other nutrients found in the juice were discussed during the last sessions. Similarly diverse economic as well as ecological value of Seabuckthorn and utility of each plant parts were also discussed in detail considering the understanding capacity of participants. Power-Point presentation was used during class sessions with relevant photographs and videos and documentaries were presented intensively. The participants of the training and all other meetings had been informed about environmental, nutritional, medicinal as well as cosmetic value of Seabuckthorn products.

Quality of Seabuckthorn berries

The weight of 100 berries (fruits) was found to be around 13 grams. It was calculated by randomly selected berries after collection by the participants during training. Since scattered few dominated bushes found in the nearby stand, participants collected only 4.362 kg of berries. From 4.362 kg of berries 2.07 kg of raw juice (47.5 %) has been squeezed manually by using small juicer and cloths and rest 2.292 kg. (52.5 %) was residues (outer layer of the berries, rest parts of pulp & seeds). In the same practice it was found that 100 berries weight was 11 gram but 60 % raw juice was extracted in lower Mustang district. In case of *H. tibetana*, 100 berries weight was 29 gm gm and 72 % raw juice was extracted in Dinboche, upper Solukhumbu. So there is vast variation in the quality of the berries not only in the juice content, but also in the size and color. Naturally, the berries of *H. tibetana* are bigger and juice content is also higher than that *H. salicifolia*. The weight of the berries collected during Khansdeswori training was somehow normal but the juice content was low due to few weeks delay in berry harvesting. Another reason was unhealthy and scattered bushes which were suppressed by other dominant associated species.

Raw juice extraction and juice (squash) preparation

After the field visit, the participants were taught on raw juice extraction and juice making process in a hygienic way, which was a completely new activity for them. Since most of the participants were new for the training, all basic information was given during discussions. Participants extracted raw juice using a small juicer and sterilized cloth. Before preparing juice, the actual proportion of raw juice, water, sugar and preservative (Potassium Metabisulfite - $K_2S_2O_5$) and boiling limit was taught. The ratio of water and sugar depends upon the acid and sugar content of the raw juice, which is different even in the same species as per the climatic factors and locality of the resources. Therefore, the acid and sugar content of the raw juice should be tasted in authentic laboratory for commercial production. To make Seabuckthorn juice (squash), in general from 1 kg of raw juice, 1,800 gm sugar and 1,200 gm of water are required in case of *H. salicifolia*. As per this ratio, participants in the training were taught to make the juice based on 1 kg (1000 gm) of raw juice for their easiness in the third day of the training. Process of preparing hygienic Seabuckthorn juice had been demonstrated to

the participants step by step. All participants and observers preferred the natural color and the typical taste of the juice.

Use of Preservative (KMS)

Participants were taught that 2.5 gram of preservative (Potassium Metabisulfite) could be added for 1 kg of raw juice when the concentrated juice become less than 45 degree centigrade in its temperature. At the same time it was also informed the participants that it is better to drink organic juice which is better for human health. Participants also preferred to make the juice with out mixing preservative. Participants realized the importance of organic product since they can sell such local products in higher price. Trainees were fully taught for the proper use of preservative but it was not been used during the training.

Major output of the program

- Local people (around 100 people in 3 slots of orientation and awareness) became aware enough on multiple use, importance and potentiality of Seabuckthorn plant resource
- More than 80 participants gained skill to extract juice and able to make hygienic Seabuckthorn Juice
- District level stakeholders (District Forestry Office-DFO, Apinampa Conservation Area office, DCCI, CSIDB office of district, local business persons, and project staff) committed to promote Seabuckthorn products as enterprises and DCCI committed to give space/install for the promotion local Seabuckthorn producers free of cost in the upcoming exhibition in Darchula HQ.

Conclusion

There was an adequate natural stock for local level use as well as potential areas to domesticate the Seabuckthorn resources from Khandeswori to Chheti village along the different river basin of Api Himal RM. Local uses of the species in comparison to its possible and potential uses is found almost negligible till now. The curiosity shown by the local people during the training reveals that some innovative people in the locality will certain start to produce juice and other products in commercial level in the future if necessary technical and/or financial support is provided to them.

Production and marketing of Seabuckthorn products not only generates the income generation opportunities to the local people for their improved livelihoods but also ensures the conservation and promotion of such wonderful high value natural resource in the RM area. In conclusion, the species is of tremendous potential for the area if local people, RVWRMP and other concerned agencies plan for the effective implementation for sustainable resource management.

Recommendations

- Considering the importance for sustainable utilization for the benefit to the local people and to follow up on the difficulties and further improvement, refresher training should be organized in the coming harvesting season. Besides, such trainings should be organized in the future to aware the local people for the new products like; Seabuckthorn jam, pickle, green tea etc.
- Byas RM is the next potential area of Darchula District to promote Seabuckthorn. So, to ensure the raw materials for future Seabuckthorn based enterprise development, both Api Himal and Byas RMs should be incorporated.
- *Hippophae tibetana* is a high yielding native species with highest medicinal properties and easy to harvest. So, it should be promoted in the potential areas of RVWRMP working Districts like; upper Humla, Bajhang and even in some upper parts of Darchula.
- The market confidence i.e. the guarantee of buying the products ensures the production and encourages the people to the business. Therefore, feasibility of the market of different types of products and the viable options for marketing management should be studied.
- The total resource stock and actual production possibility should be studied as soon as possible for commercial harnessing and future enterprises development.
- Extension of the native species as well as high yielding exotic varieties in similar and potential natural habitat in the near future should be most important to meet future demand and commercialization of different products.
- Management interventions to improve the existing natural stands should be adopted based on the ecological considerations and the site feasibility as soon as possible (controlled grazing of livestock, thinning to maintain spacing, appropriate ratio of male and female plants, removal of over aged and dead trees and so on.)
- As overall, the Seabuckthorn species should be given top priority so that sustainable utilization of the resource and together its *in-situ* and *ex-situ* conservation should be ensured. This declaration should be done forthwith to recognize its ecological, medicinal and socio-economic values and importance to the rural people.

Annex: 1 Itinerary

| Date | Destinations |
|-----------------|--|
| 22 Nov, 2018 | KTM-Dhangadi-Gokuleshowar |
| 23 Nov, 2018 | Gokuleshowa-Makaregad |
| 24 Nov, 2018 | Makaregad-API Himal |
| 25 Nov, 2018 | Seabuckthorn Awareness Workshop Khandeshowari, API Himal |
| 26-27 Nov, 2018 | Harvesting and processing training Khandeshowari, API Himal |
| 28 Nov, 2018 | API Himal-Chheti |
| 29 Nov, 2018 | Cheti-API Himal |
| 30 Nov, 2018 | API Himal-Darchula HQ |
| 01 Dec, 2018 | Darchula- Dadeldhura |
| 02 Dec, 2018 | Dadeldhura-Dhangadi-KTM |

Annex: 2 Some pictures



Ripe berries of Seabuckthorn in Khandeswori, ready for harvest



Participants collecting berries using different tools and techniques



Extraction of raw juice using small juicer from collected clean Seabuckthorn berries



Double filtration of raw juice after extraction



Checking of temperature during raw juice sterilization



Filtration of boiled mixture of sugar and water



Training participants with prepared juice & training materials



The final product of the training (concentrated Seabuckthorn juice)



Small meeting and discussion on Seabuckthorn with the residents of Chheti Village



Awareness campaign with brief processing demonstration in Patha village



Natural Seabuckthorn stands with potential areas along Kapi river bank



Ripe Seabuckthorn berries on the way to Chheti from Khandeswori

"This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of RVWRMP and do not necessarily reflect the views of the European Union"