

Industrial feasibility of potential fatty oil-bearing wild plants of central Nepal

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Despite the availability of a number of fatty oil-bearing wild plants in Nepal only two have been exploited at an industrial scale. The present paper analyses the reasons as to why the other species have yet failed to attract industries. The study conducted at various places of central Nepal through direct observation and random interviews with the related people has indicated four major factors responsible for the absence of industrial exploitation of these fatty oil-bearing plants. They are quantity of oil-seeds available; trading system; extraction and processing plants, and market and profit. Also discussed are some problems which if corrected, could help bring about a few other potential species for industrial exploitation.

Keywords : *Bassia butyracea*, *Neolitsea umbrosa*, *Daphne bholua*, *Daphniphyllum himalense*, *Shorea robusta*, fatty oil-bearing wild plants, central Nepal, industrial feasibility, trading system, oil extraction.

A number of fatty oil-bearing wild plants occur in Nepal (see Singh 1980). Baral and Acharya (1996) have shorted out eighty nine species which have fifteen or more percent of oil content in their seeds or kernal. Species such as *Bassia butyracea* (Thapa 1987; Achet *et al.* 1993; Court and Adhikari 1996), and *Neolitsea umbrosa*, *Daphne bholua* and *Daphniphyllum himalense* (Shrestha 1992) are being used locally for various household purposes. *Shorea robusta* is the one that provides a very good example of commercial exploitation of fatty oil-bearing wild plant in Nepal.

Tewari (1994) had compiled a list of species which are being utilised in Indian industries, and perhaps contributing to the local socio-economy. In Nepal, barring *Shorea robusta* at a larger scale, and *Bassia butyracea* at a smaller scale, no other species have ever been commercialised. Lack of such opportunity indicates the wastage of this renewable resource. Our knowledge on this particular area is meagre. The present paper which is the outcome of a study done on distribution, availability, local uses and potentiality on industrial and commercial uses of wild oil-bearing wild plants of central Nepal during February to December 1996 attempts to bridge this gap through analysing the various aspects of industrial feasibility of fatty oil-bearing wild plants in Nepal.

Methods

Direct observation and random interviews with executive members of Baghmara Forest User

Committee, Chitwan District; other related people and with the local farmer at Charikot and Jiri of Dolkha District were carried out. Similarly the authorities of Hetauda Vanaspati Udyog, Hetauda of Makawanpur District, Nepal Sal Seed Industries, Parwanipur of Parsa District, Gorkha Ayurveda of Gorkha District were also interviewed to represent concerned industries.

Results and discussion

Industrial feasibility of fatty oil-bearing plants depend on four major factors:

- i quantity of oil-seeds available
- ii trading system
- iii extraction and processing plants, and
- iv market and profit

Such is the interrelationship between these factors that even a minor disruption in any of these may exert a major impact on industrial/commercial exploitation of oil seeds. Although it is said that Nepal has a number of potential oil bearing plants to uplift national economy and perhaps it is sometimes exaggerated as having the *above ground petrol mine*; but in reality, extracting this particular resources still remains a remote possibility.

Excepting the sal (*Shorea robusta*) seed, the quantity of other oil-seeds are not enough to run any solvent extraction plant in the country on a commercial basis. However edible butter have been extracted from seeds of *Bassia butyracea* at various villages of the mid-hills of Nepal (Thapa 1987; Achet *et al.*

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1993; Court and Adhikari 1996; Baral and Acharya 1996). But its quantitative estimation to run a plant on commercial scale has always remained in doubt. Even such estimation done by the Nepal Vanaspati Ghee Limited, Hetauda (one of the leading vegetable ghee producers of the country) was not enough even to supplement the demand of that industry (personal communication). Similar is the case of *Neolitsea umbrosa*, *Daphniphyllum himalense* and *Daphne bholua*. These species are being utilised by the local people at Kaski and Myagdi Districts of Nepal (Shrestha 1992) but are yet to prove for commercial scale.

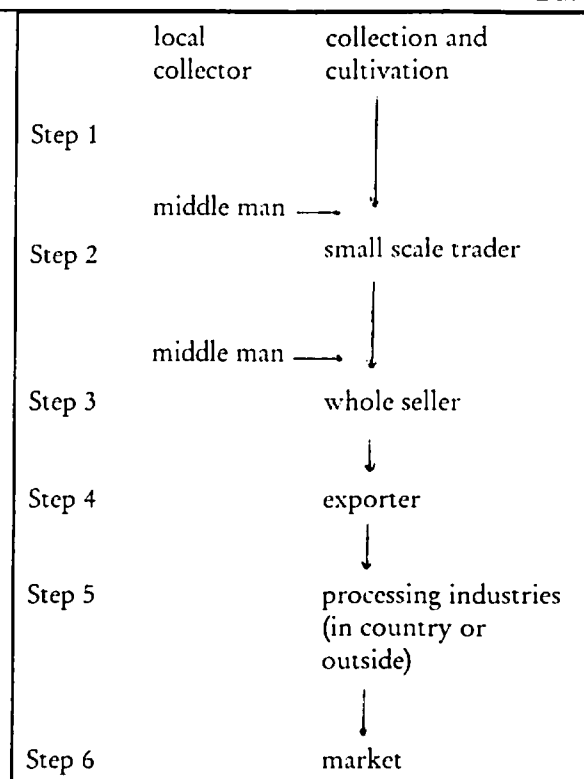
Quantity of oil-seeds available

None of the quantitative estimations of oil seeds done so far satisfy the demand for commercial utilisation. They are either under or overestimated. In fact, quantitative estimation of oil-seeds which are not yet used is a difficult task. The data extrapolated from quadrat estimation have always given a misleading figure, and therefore remained true only on paper, not in practice.

Trading system

Trading of almost all of Nepal's NTFPs involves a number of steps. The same thing applies for fatty oil-bearing plants of wild origin. The more such steps increase, the more complexities arise in terms of transport, paying of revenue and profit sharing, etc. This also reduces the margin of profit to be accrued in each step. One of the main reasons for the occurrence of a number of steps is the lack of direct link of producer/collector with processor. Also the country's topography and socio-economic conditions of the collectors are such that the latter have no direct access to the processors. Middle-men (also called as brokers) are therefore, bound to be involved at different steps. And, they are the ones who enjoy most of the profits. This in turn, may create a lack of interest for primary collectors or producers. A typical trading system applicable for the majority of Nepal's NTFPs of which wild oil-bearing plants are a part, is represented in box.

Every step (especially step 2 to step 6) indicated above adds a little price on the commodity and is responsible for price hike. This ultimately affects the promotion of fatty oil at a commercial scale. One of the ways, therefore to promote fatty oils is to reduce steps involved in trading system. It can be done through establishing co-operatives at village level. Also establishment of efficient expellers at easily accessible places helps collectors to make direct link with processors thereby reducing price.



Extraction and processing plant

There are two possibilities of extracting fatty oils viz:

- i. solvent extraction plants
- ii. expellers

Solvent extraction

Solvent extraction plants have a greater advantage over expellers for giving far better oil recovery. However in a small country like Nepal installation of even baby solvent extraction plants with the capacity of 60 mt per day have proven to be a huge industry. For the six solvent extraction plants so far established in the country only two raw materials are available for fatty oil extraction: one from the forest origin i.e. sal seed and the other comes from agriculture which is non other than rice bran. Barring this these plants depend most of the time on foreign countries for raw materials.

Unless there is 60 mt of raw materials/day for a considerable number of days per year are available no solvent extraction plants will be interested to work on fatty oil-bearing seeds. This seems ironical that meeting such demand of oil-seeds from the shrinking forests is a difficult task. Also collection of oil-seeds depends on accessibility. Unless there is a proper network of roads and entrepreneurship developed for guaranteed supply of raw materials to the factory gate, there is a very little chance of extracting wild fatty-oil at the solvent extraction plants established so far in Nepal.

Expellers

Much has been said about the efficient expellers such as Sundhara Oil Expeller (SOE) made by DCS, Butwal (see Neupane 1997). Unavailability of such machines in those areas where there is some possibility of extracting some of the oil-seeds, is probably one of the reasons why commercial exploitation of such oils could not be made feasible. No matter the technology has had a great leap in the other parts of the world but rural Nepal still depends on the traditional technology of the ancient age such as *saa*, *chepua*, *kol* and to much surprise *silauta* (a grinding earthen device operated by hand), *okhal* and *duno* to extract oil. The process is so arduous, tedious, inefficient and time consuming, exhausting and boring that, presumably, describing the process of oil extraction through such technology to any one except Nepali, would be no less than saying a joke.

The popularity of traditional expellers are decreasing day-by-day. It is not only because the market is full of conventional oils but also running them is a boring job and oil recovery from such expellers is also much less. Wherever there is an easy access to market and availability of other oils, traditional expellers are becoming gradually disused or even replaced for not being able to compete with the existing edible or non-edible oils.

Such is the paradox, that one industry is so big for the country that supplying raw material is virtually impossible and the other is so small and inadequate that extracting oil from it is nearly impossible; and there exists none in between.

Market and profit

In the present study a systematic market survey for fatty oils have not been carried out. Nevertheless let us assume that there exist three possibilities for marketing such as :

- i consumption of fatty-oil by Nepal's soap industries
- ii consumption for edible purpose
- iii export

Finding market to fatty-oils seems less worrying. Markets are plenty. It is the margin of profit accruing at each steps of trading system that is much worrying. The profit seeking middle men of each step add price to the commodity in such a way that the end product becomes much expensive and less competitive. Sometimes this may make the product to lose its chance even to get into the market. The

situation worsens much more when there is no guarantee of supplying raw-materials at the required quantity. Combination of all such factors have made a vicious circle that is hampering the commercial and industrial utilisation of fatty oil-bearing wild plants of Nepal. Should it be corrected, there is no reason why this resource, otherwise wasted, could not be used at commercial scale to help support the rural as well as national economy.

Acknowledgement

The author thankfully acknowledges Asia Network on Small Scale Agricultural Biotechnology (ANSAB) for the financial support given to carry out this study.

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