Conservation practices and sustainability of potential fatty- oil bearing wild plants of Central Nepal

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Following the growing concern on the over-exploitation of all sorts of non-timber forest products (NTFPs) of which oil bearing plants of wild origin is a part, the present paper attempts to analyse the existing conservation practices of oil bearing plants in Central Nepal and the factors that might affect sustainability. Harvesting and handling of all oil seeds are manual and in most cases no conservation practices have been followed nor are there no any set methods of collection which are aimed at supporting sustainablity. Interestingly, whatever practices of collection now exist, have also left not much negative impact on sustainable harvest. Nonetheless four groups have been identified in so far as the conservation practices for sustainable harvest of oil seeds is concerned. The lack of market is cited as the main reasons for non-depletion of this resource.

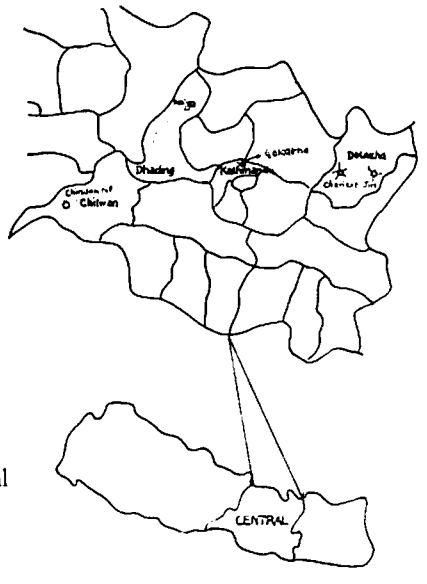
Keywords : Fatty-oil, NTFPs, conservation practices, sustainability, *Mallotus philippnensis, Litsea monopetala, Jatropa curcas, Holarrhina antidysentrica, Melia azadirach, Azadirach indica, Daphniphyllum himalayens Daphniphyllum himalayens, Daphne bholua Neolitsea umbrosum,* Nepal.

Fatty oil is essential for houses and for industries. Mustard (*Brassica compestris* and *B. juncea*) is the main fatty-oil crop in Nepal that covers almost ninety percent of the total acreage under cultivation of oil seed crop (Gupta 1991). The potential of cultivating the other conventional oil crops such as maize, sunflower, soybean, peanut, cotton, etc. which are used all over the world, have so far been overlooked in the country.

Singh (1980) enlisted 286 species (186 are wild) that contain fatty-oil. Baral and Acharya (1996) have shorted out 89 such species which have fifteen or more percent oil content in seeds and or kernal and could be of some commercial potentiality. Their distribution in Nepal has also been given. Five more species that are being utilised by the local people are also added in the list by Baral and Acharya (1997). *Bassia butyracea* in the mid-hills (Thapa 1987; Achet *et al.* 1993; Court and Adhikari 1996) and *Prunus armenica* in Humla (Baral, 1998, unpublished report) of Nepal give us the typical examples of the utilisation of fatty-oils of wild origin. Despite such potentiality fatty-oil bearing plants are one of the least studied areas of research in Nepal (Baral, 1996). Nepal imports oils from abroad, the situation shifting from a stage of vegetable oil-exporter country a few years before (HMG, 1977) to the oil importer at present, whereas on the other, there is a growing concern that over exploitation of all sorts of non-timber forest products (NTFPs) including oil bearing plants of wild origin is continuing for long. It is in this context, the present paper attempts to analyse (i) the existing conservation practices of oil bearing plants in Central Nepal and (ii) the factors that might affect sustainability.

Methods

Direct observation and random interview of local people were the basic methods employed for this study which was conducted in places (as shown in fig) in Central Nepal during the end of 1995 to the middle of 1996.



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Also incorporated are the author's experiences gathered during the two field trips in Humla, a mid-western himalayan region of Nepal for a planning and thereafter monitoring mission on biodiversity conservation. The importance of the latter is reflected by the fact that over seven tonnes of NTFPS comprising of thirteen species were exported from Humla (DoF 1997) of which collection and extraction of essential oils, if not fatty-oil s, from *Nardostachys grandiflora* (jatamasi) is one of the main items of trade. And making all these NTFPs sustainable has always remained a growing area of concern to the informed people.

Results and discussion

The research is more social than technical. Conservation of fatty-oil bearing plants is linked with various factors such as havesting and post-harvest handling of oil seeds by the local people, the local socio-economy, the marketing channel, etc. Present paper describes them in the following way:

Harvesting and handling

Harvesting and handling of different oil seeds are done in a different way, but all are manual. Harvesting is done either through the collection of fallen seeds or the latter are brought down from trees either shaking the whole tree or branches (as in *Bassia butyracea*) or hitting the fruits with the help of a long stick. However, post harvest handling of different seeds might include different procedures. An out-line of post harvest handling of some of the common species in use are given below:

Species	Collection	Post harvest handling
Shorea robusta	Picking seeds or weeping forest floor	Removal of wings-decortication-solvent extraction
Ricinus communis	picking from plants	Removal of outer coat- oil pressing
Bassia butyracea	Shaking tree/branch	Removal of pulp-drying-light roasting-pounding-steaming-oil pressing

Conservation practices and sustainability issues

Conservation of NTFPs for sustainable harvest is a present day issue. Harvesting practices are one, among many factors effect conservation. But no professional skills seem to be existing at present for collecting wild NTFPs. There is a growing concrern that either over-exploitation of this resource base is continueing since long or collecting technique is inappropriate. Either one or both of such factors is responsible for the rapid exhaustion of the NTFPs from the forests of Nepal. The same theory might apply for the collection of oil bearing seeds also. No one have yet studied the sustainable harvest of oil seeds and/or their impact on local biodiversity.

The present study reveals that, although there is no conservation practices *per se* is followed for non of the oil bearing plants considered, nor there is any set methods of collection which aims at supporting sustainable harvest, but, at the same time, it is interesting to note that, whatever practices of collection now exist, have left not much negative impact on sustainable harvest in so far as the wild oil seeds of Nepal are concerned. The sustainablity issue of oil bearing plants especially that of trees and shrubs are therefore, a bit different than those of other annual and/or perennial NTFPs whose vegetative parts are collected.

Sustainability through conservation is one such issue which is, among many other factors, linked with the local peoples' thoughtfulness on conserving oil bearing plants. Such attention which could be deliberate or undeliberate, includes plantation and protection or showing no response at all to a given species. Even the *no response attitude* towards an oil bearing plant could some times help natural regeneration. *Riccinus communis, Melia azadirach Mallotus philippinensis,* etc. provide a good example of the latter attitude, as people have neither collected their seeds nor completely eliminated these species that are growing on their vicinity.

Some plants such as chiuri (*Bassia butyracea*) which is probably the most studied of all the oil bearing plants in Nepal, and also the most used among all other oil bearing species, are being conserved in areas where the local people have any access to markets. Such is the case in Chepang community of Chitwan and Makawanpur districts that chiuri trees are given as dowry to the brides. Similarly, *Juglans regia, Prunus cornuta* and *Princepia utilis* are more or less in conserved state wherever their oils are in use. Many villages in the Karnali zone provide an excellent example of such conservation. The seeds of rest of the species such as *Neolitsea umbrosum, Vibernum coriacium, Riccinus communis,* etc. are either collected in lesser quantity by a minority of people or left unnoticed thereby helping natural regeneration. Some other potential oil bearing species such as *Mallotus philippnensis, Litsea monopetala, Jatropha curcas, Holarrhina antidysentrica, Melia azadirach, Azadirach indica, Daphniphyllum himalayens* are still untapped resources. However, the seeds of *Daphniphyllum*

himalayens, Daphne bholua and *Neolitsea umbrosum* used frequently in the Myagdi and Kaski districts to make edible butter for local trade (Shrestha 1992) is some thing that demands monitoring. Collection of seeds to that extent, that might possibly stop natural regeneration through seeds, is therefore less. However, the conservation through seed regeneration of *Litsea monopetala* which is lopped for fodder, might be a little difficult.

There is one exception of rapidly degrading oil-seed resource of Nepal. It is none other than sal (*Shorea robusta*) which is probably the largest source of wild oil-seed in the country. Seeds of this particular species are collected extensively with no due care of seed regeneration in places wherever they are collected. Forest floor is swept and burned or *vice-versa* so as to make the collection process easy. Such practice greatly reduces the rate of sal seed regeneration and also damages the ground flora of the sal forest while promoting the fire resistant seeds to grow. This is perhaps the single most reason why the Department of Forest took an indirect route of discouraging the collection of sal seed through the increase in revenue rate by four times of the existing price (personal communication with the Department of Forest). Whether or not this policy works is yet to be seen, especially considering that how difficult is it to control illicit collection of sal seeds in such a large tract of sal forest of the country. Also, encroachment of sal forest for timber, firewood, leaf and for agricultural extension, and illegal settlement, etc. are the other important causes that are significantly reducing sal-seed collection in Nepal.

Such backgrounds helped identify the following four groups in so far as the conservation practices for sustainable harvest of oil seeds is concerned:

i. **oil seeds utilised and local conservation practices followed:** examples are *Bassia butyracea, Princepia utilis, Juglans regia, Prunus cornuta, Jatropha curcas*

ii **oil seeds utilised at some places but not at other places: strict conservation practices are not followed but seed regeneration are not much hampered:** examples are *Neolitsea umbrosum, Symplocus pyrifolia, Vibernum coriaceum*

iii **oil seeds not utilised and therefore, chances of seed loss is much less reduced:** examples include all oil seed bearing species except that of the first and the second categories

iv **oil seeds utilised but conservation practices not followed, thereby leading higher risk on seed regeneration:** example is *Shorea robusta*

Conservation of biodiversity, so also the fatty-oil bearing plants, is linked with the rural socioeconmy, local awareness, management and flow of bioresources, etc. Present study indicates that, there is not a big threat for the existence of fatty-oil bearing plants of wild origin at present. It seems because of the lack of demand of such oil seeds in the market. Once appropriate technology of oil-extraction is developed, when an acute shortage of the traditional oil occurs and when the oil seeds enter into trade, depletion ought to occur, unless conservation measures are taken. The seeds of *Shorea robusta* is one such excellent example.

Acknowledgement

Asia Network for Small Scale Agricultural Biotechnology (ANSAB), PO BOx 16, Kathmandu, is acknowledged for the financial assistance given to conduct this research.

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