Sustainable Resin Tapping in Nepal: Challenges and Opportunities
(A case from Salyan District)

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Abstract

This paper attempts to explore a case from Salyan district on resin tapping and its contribution to local and national economy. Resin tapping and its related activities like extraction, collection and transportation are one of the major sources of employment for a large number of rural poor people. Based on the quantity of resin collected and exported outside the district, revenue is generated to central as well as local government and Community Forest User Groups (CFUGs). In the mean time, some issues and challenges have been identified at local level regarding the sustainability of resin tapping. It, therefore, concludes that some practical measures are necessary to overcome the issues and challenges so that resin tapping could be done in a sustainable manner. Sources of information of this paper are records of District Forest Office and rosin companies and net surfing as secondary sources; field observation, interviews with CFUGs and resin collectors as primary sources.

Key Words: Pine forests, Resin tapping, Sustainability, Revenue, Employment, Nepal

Introduction

Nepal is rich in biodiversity, both flora and fauna, at ecosystem, species and genetic level. Within a span of about 200 km (North-South), more than 10,000 different flowering and non-flowering plant species are found. Among them, important Non-Timber Forest Products (NTFPs) are medicinal and aromatic plants, resin, lokta paper, katha and Kutch, sabai grass, bamboo and cane. Resin gums are obtained from chir pine (*Pinus roxburghii*) and blue pine (*Pinus wallichiana*). Only chir pine can be tapped economically, as a chir pine tree yields about 3 to 6 kilograms annually. Blue pines, which occur at higher altitudes and yield only about 1 kilogram annually per tree, are therefore usually not profitable to tap. Turpentine oil and Rosin, which are the products of resin, fetch high price in national and international markets. Rosin and its derivatives are used in paper making, sizing, boot polish, adhesives, paints, printing inks, surface coatings, varnishes, textiles, rubber making, soap making, the entire industry, the sporting goods industry, and many others. It is estimated that about 405,000 hectares of forests are occupied with chirpine in Nepal from which more than 21,700 metric tones of resin could be extracted annually on a sustained-yield basis (Khatri, 1994).

Rosin and turpentine industries were established in Nepal about three decades before in order to process crude resin and create employment opportunities. In addition to factories, so many

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people have been employed in extraction, collection and transportation of resin at local level.

Pine Forests in Salyan

Salyan is a hilly district located in Mid-Western Development Region. It occupies a total of 195178.00 ha of land area out of which 128204.00 ha (i.e., 65.68% of total land area) has been covered with forests (Table 1).

Table 1: Land use of Salyan District

Land use	Area (ha)	% of total area	Remarks
Forest	128204.00	65.68	Excludes private forest
Cultivable land	45567.00	23.35	
Shrub and grassland	2494.20	1.28	
Other lands	18912.80	9.69	
Total	195178.00	100.00	

Source: DFO/Salyan, 2008

According to CBS (2001), population of the district is 223854. Forests are one of the major sources of livelihood for these people. Forests provide them timber, small wood, agricultural implements, fuel wood, fodder, animal bedding, fruits and food items, forage for grazing, medicines and so many other products and services.

Salyan is rich in Chirpine (local name: ***Khote Sallo***), which cover more than 75% of the total forest land (DFO/Salyan, 2008). Chirpine, a multipurpose tree species, is found between 900m to 1950 m above sea level. It is light demander and fire tolerant species. In Salyan, chirpine forests are important resources of livelihood to local people. Its major products are timber and small wood, resin, firewood, twigs and needles for animal bedding and mulching especially for ginger, torch light from heartwood (locally called *diyalo* or *jharko*), etc. It can grow on dry, low fertile and degraded lands where other broadleaf species rarely grow.

Community Forestry Programme is one of the major forestry sector programmes of the district. Up to fiscal year 2064-65, more than 29000 ha of National Forests have been handed over to 345 Community Forest User Groups comprising a total of 28900 households[2]. Major tree species of more than 150 Community Forests is chirpine. Due to hilly terrain and poor road network, majority of the CFUGs (local users) use its timber and firewood for household consumption, whereas very few CFUGs sell its timber outside the district. During last fiscal year, only 4 CFUGs extracted about 14000 cubic feet of chirpine timber to sell outside the district.

Revenue and Employment Generation from Resin

In this district, two rosin companies are involved on resin extraction for more than two decades. At present, resin has been extracted from chirpine forests of about 30000 ha (16000 ha from

[2] *At present there are about 39000 households in the district. Therefore, CFUGs include about 74% of the total households.*

Government Managed Forests and 14000 ha from 122 Community Forests). By this activity, considerable amount of revenue is generated to central government, District Development Committee (DDC) and CFUGs (shown below on table). It has also enhanced employment opportunities to local people especially for poor and excluded groups.

Table 2: Revenue collected from resin in 064/65

Source of Resin	Collected quantity (Kg)	Royalty Rate (Rs.)	Revenue to Central Govt. (90%) (Rs.)	Revenue to DDC (10%) (Rs.)	DDC export Tax (Rs 0.5/kg) (Rs.)	DDC Sharing (Revenue + export Tax) (Rs.)	Remarks
Government - managed Forests	1542854	3.00	4165705.80	462856.20	771427.00	1234283.20	
Community Forests	1399532	3.00	0.00	0.00	699766.00	699766.20	All revenue (Rs.4198596.00) deposited to CFUGs fund
Grand Total	**2942386**		**4165705.80**	**462856.20**	**1471193.00**	**1934049.20**	

Source: DFO, Salyan

In Nepal, rill method is considered the best method of sustainable resin collection, which was introduced in 1976 from Forest Research Institute, Deharadun, India. Cup and lip method was used in the past before introduction of this technique. For sustainable extraction of resin, Resin Collection Procedures (2064) has been published by MFSC and is under implementation. In Salyan, it is found that a chirpine tree yields approximately 4.5 kg of resin annually. During fiscal year 2064-65, a total of 2942386 kg resin has been collected (1542854 kg from National Forest and 1399532 kg from 122 Community Forests). It shows that at least 650,000 pine trees have been tapped per year. A large numbers of human resources are employed on resin collection activities which include site preparation, blazing and marking of trees to be tapped, marking of seed trees those must be left untapped, resin collection from trees and transportation to depots.

Revenue collected at different levels and employment generated during 2064/65 from resin that collected and exported from Salyan district is shown below (see also Fig 1)

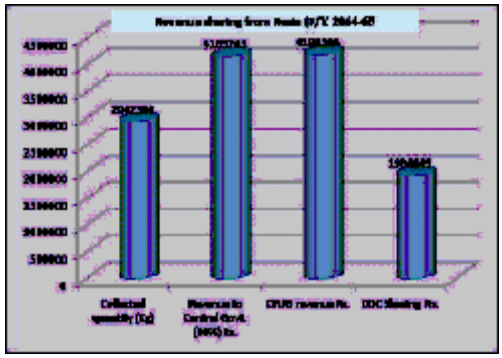

Fig 1: Revenue sharing from resin

- ***Central government***

Central government receives 90% of total revenue that generated from government managed forests. As 15,42,854 kg of resin had been collected from government managed forests last year and

royalty rate was Rs. 3 per kg, therefore, Rs. 41,65,705.8 was deposited as revenue to central government.

- ***CFUGs revenue***

CFUGs receive 100% of total revenue from the sale of resin that collected from the respective Community Forests. During last year, 1399532 kg of resin was collected from 122 Community Forests. Hence, the 122 CFUGs received a total of Rs. 41,98,596 as revenue from resin.

- ***DDC sharing***

DDC receives 10% of the revenue that generated from government managed forests. Therefore, DDC received Rs. 4,62,856.20 as revenue from resin that collected from government managed forests. On the other hand, DDC export tax is charged at the rate of Rs 0.50/kg on total quantity of resin exported outside the district (i.e., 29,42,386 kg). Thus, DDC export tax for resin was Rs. 14,71,193.00. Hence, DDC sharing from resin was Rs. 19,34,049.20 during the last year.

- ***Employment***

Each year, more than 1500 local people are employed for 8 months on resin collection. By this activity, about 360000 persons-days of employment has been created which directly contributes to poverty reduction as majority of resin collectors are poor, women, *dalit*, *janajati*, etc. In a study, a labour involved on resin collection activity for a season[3] can generate income of about Rs. 44000.00 (DFO/Salyan, 2008).

Issues and Challenges

After two decades of experience, some issues on sustainability of resin tapping have been identified in Salyan. These can be categorised as: Environmental, Technical and Socio-economic issues, which are briefly discussed below:

Environmental issues

- ***High concentration of acid mixture applied as stimulant***

As a stimulant for resin extraction, mixture of Dilute Sulphuric Acid and Dilute Nitric Acid (20%) can be applied to trees where rill is formed for resin tapping (MFSC, 2007). If mixture is concentrated, it may negatively affect the growth and development of pine tree tapped. Some people say that the mixture applied is more concentrated than that permitted by Resin Collection Procedures (2064). They also add that majority of resin collectors are poor, so they spray heavily with the hope of more resin extraction and hence making more money. The acid mixture flows from trees during rainfall and causes severe effects to soil as well as growing vegetation.

[3] *A season here means duration of performing complete set of resin collection activities, which is generally 8 months, and includes activities like site preparation, blazing and marking of trees to be tapped, resin collection from trees and transportation to depots, etc.*

• ***Dying of pine trees***

Small study carried out in some Community Forests reveals that about 0.2% of pine trees, from which resin is extracted, are dying. Local people also extract *diyalo* (locally called *jharko*) as torch light from resin extracted trees. Forest technicians argue that some chirpine dying is due to *jharko* extraction not from resin tapping as *jharko* is heartwood of pine. Political parties and civil society argue that the dying is due to heavy resin tapping. Although, trees are biological entity and they also dye naturally, indepth study is lacking in this aspect whether the dying is natural or due to heavy resin tapping or due to extraction of *jharko*.

• ***Mother trees***

In the past, there was no any provision to keep mother trees as a source of fertile seeds. Therefore, all tapable sized pine trees were taped. It is mentioned on Resin Collection Procedures (2064) that mother trees up to 5 trees per hectare are to be selected and numbered with enamel paint. People say that seed produced from tapped trees are of poor qualities and also the timber quality is decreased.

• ***Fire control***

Every year, fire occurs in hot season which damages small regeneration, wildlife and resin itself. Political parties and media argue that rosin companies, rangeposts and CFUGs are not paying much attention on fire prevention and control.

Technical issues

• ***Selection of trees to be tapped***

During monitoring of resin tapping by District Forest Office (DFO), it has been observed that some under sized pine trees are also tapped. Resin Collection Procedures (2064) mentions that trees above 30 cm diameter (or 95 cm girth) at breast hight are tapable.

• ***Control of heavy tapping and leakage***

Companies have been suggested by DFO to control heavy tapping by making rill size and angle, groove, etc., as per Resin Collection Procedures (2064). DFO has also suggested arranging necessary training to labours and manpower involved on it and to do regular supervision from companies' side. Training has been conducted but still there needs improvement on technical aspects of rill making, collection in time without spoiling on the ground, etc. It has been observed in some places that resin collected on funnel from the rill spilt at ground due to lack of timely supervision.

• ***Low quality timber production from tapped trees***

People are saying that resin tapped trees yield low quality timber. However, a thorough study in this aspect is lacking.

Socio-economic issues

- ***Low wage for labour***

It has been argued from civil society that wage rate for labour on trees marking, resin tapping and transportation to depots is very low. Resin companies answer that wages are increased per year as per mutual understanding made between company and labours. Labours are involved on coupe formation, clearing grounds 1 m round from tapping trees, rill making, mother trees marking, resin collection from trees to container, resin transportation to depots. Labours are also employed to transport resin tapping tools and containers to coupes/forest.

- ***Investment on social sector development***

Civil societies and people demand that rosin companies should expend some percentage of benefit for social sector development activities at local level like construction and/or maintenance of schools, temples, suspension bridge, etc.

Opportunities

Resin collection and transportation activities need huge amount of man power. Therefore, there is a good opportunity of **employment** for local poor, women and disadvantaged groups. Likewise, **forest technicians could be employed** by companies in order to monitor implementation of Environmental Impact Assessment report and technical aspects of resin tapping. Similarly, a huge amount of **revenue** has been generated each year to local and central government from resin, which could be invested for sustainable forest management, poverty reduction and livelihood and infrastructure development activities.

Revenue generated from resin is becoming a **major source of income for CFUGs**, which could be allocated for community forest management, income generating activities for poor and excluded user households and for social and infrastructure development activities. There is also a great opportunity of sustainable management of pine forest for **multiple benefits** so that resin could be extracted for a longer period of time and after that the trees could be felled for other benefits like timber, furniture and firewood, etc.

Way Forward

In order to manage chir pine forest and tap resin on sustainable basis and contribute income/ employment at different levels, following initiatives are recommended so that they will also address the issues and challenges discussed on the previous chapter:

Environmental aspects

- ***Proper mixture of acid and spray***

Acid mixture must be prepared as per Resin Collection Procedures (2064) by rosin companies in presence of forestry staffs, CFUGs and local leaders before applying to trees. For example, 18 litre water, 1 litre Dilute Sulphuric Acid and 1 litre Dilute Nitric Acid can be mixed and applied on rill of trees to be tapped.

- ***Promoting natural regeneration and plantation***

At least five healthy and seed producing untapped tress per ha must be left as mother trees. If all pine trees have been tapped in a particular area, at least 5 healthy seed producing trees could be chosen as mother trees which are less than 3 times tapped in the past. They must be marked with enamel paint treated as mother trees. Likewise, marking must be done for those future mother trees, which are now at pole stage and are of good growth and left them untapped in the future. Due to this, quality regeneration of chirpine will be assured which helps quality resin production in a sustainable basis.

- ***Participatory fire prevention and control***

Participatory fire prevention and control mechanism must be developed on resin tapping sites. For fire prevention, extension activities must be conducted like fire prevention and control training/workshops, distribution of leaflets, brochure, broadcasting on media, etc. Fireline must be constructed at fire prone areas and cleared time to time so as to prevent fire extension.

Technical aspects

- ***Selection of trees to be tapped***

Resin Collection Procedures (2064) must be followed so that trees selected for resin tapping are of proper size and quality. Trees must be selected by company staffs in presence of CFUGs, forestry staffs and labours.

- ***Control of heavy tapping and leakage***

Necessary training must be provided to labour and CFUGs involved on resin collection activities so as to assure leakage control, perfect rill making, etc. Regular supervision must be done from company side so as to assure resin tapping as per procedures.

- ***Monitoring and evaluation***

Regular monitoring must be done from DFO side as well so as to assure process followed on trees selection, rill making, mixure of acids and spray, collection of resin, transportation, mother trees selection and marking, etc.

- ***Reward and punishment***

Those CFUGs, labours and staffs whose effort is towards following rules and procedure for resin tapping must be rewarded so as to encourage them for sustainable resin tapping. On the other hand, those who are breaking rules and procedures must be punished.

- ***Producing quality timber***

It is not sure yet whether the timber produced from resin collected trees is of poor quality. Therefore, a study in this aspect is necessary comparing timber quality between untapped and tapped healthy pine trees. From the study, if it is proved that the timber from tapped trees is of

low quality, then seedlings must be produced from the seeds of untapped trees so as to plant on bare lands or on areas where there are no untapped pine trees left as mother trees.

Socio-economic aspects

- ***Wages of labour***

It is possible to control over spray of acid and heavy tapping of resin if the wages are based on daily works not on the basis of amount of work done or quantity of resin collected. Labour networking is important in this aspect so as to raise their voice on systematic and organized way to concerned agencies.

- ***Priority to poor and excluded on resin collection***

Priority must be given to women, poor and excluded households, *dalit* and *janajati* on resin collection and transportation activities. It helps poverty reduction and contribution to their livelihood.

- ***Investment on social sector development***

Companies should allocate some percentage of benefit for social sector development targetting poor and excluded groups. This is a good way to get support from local people on resin tapping and other activities related to it.

- ***Leasing pine forest by companies***

It may be a good start of resin companies leasing part of national pine forests for sustainable resin production. By this, local employment opportunities will be increased and at the same time private sector will be involved on managing forests for the fulfillment of particular objectives.

- ***Coordination***

Regular coordination and information sharing among stakeholders like District Development Committee, political parties, media and other civil society is necessary so as to develop mutual understanding and get support from them.

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