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Pitfalls of scientific forestry practices in the Community Forestry of Nepal

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ABSTRACT

The government of Nepal abolished scientific forest management in 2021, however, the underlying reason remained unexplored. Hence, this study explores reasons that pushed on abolishment of this practice in the community forestry. The study followed the qualitative methods and reviewed the policy documents, published and unpublished literature followed by semi-structured interviews with forest officials and community forestry leaders. Though scientific forest management was promoted to maximize timber production and employment generation, stakeholders often raised concern over the exploitation of forests, including the appropriateness of the proposed silviculture system along with the governance issues related to it. On the contrary, forest bureaucracy promoted this as an “one size fit approach” irrespective of management objectives while poorly integrating locality factors, and research-generated knowledge. Apparently, scientific forest management is highly contested on technical and managerial grounds, while it is utterly uneconomical to forest user groups. Diverse views, interests and disbelief of the stakeholders, along with inadequate scientific evidence is primary reasons for a failure. Hence, the study argues for promoting “research in use approach” in strengthening forest management practices with the wider engagement of the stakeholders from knowledge generation, use, and dissemination in the community forestry.

Introduction

In the late eighteenth century, scientific forestry was introduced as a standardized technique for obtaining a sustainable yield of timber and revenue from the forests (Scott 1998). It involves conducting a survey, developing

management plans based on growth statistics and annual sustained harvesting (Guha 1985). Scientific forestry still plays a dominant role in participatory forestry in developing countries, primarily due to the paternalistic and technocratic attitude of the forest bureaucrats, where forest management plans are required

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to ensure sustainable management of forests (Ojha 2006; Ribot 2002). The community forestry of Nepal also faced the same orthodox paradigms of forestry management (Basnyat 2020a).

The classical approaches to silviculture are less effective in the in-forest types that are more heterogeneous (Gilmour 2018). Notwithstanding these realities, the government of Nepal gave priority to the silviculture-based forest management popularly known as "*Scientific forest management*" in 2014, aiming to ensure the sustained yield of timber along with employment generation and increase revenue from the forestry sector. The Scientific Forest Management (SciFM) applies appropriate silviculture systems and forest management principles through the design of systematic compartments of fixed rotation age (Poudyal et al. 2020). It was promoted in the community forests to increase revenue from the forest and thereby enhance the forestry sector's contribution to the national treasury; increase supply to meet local demand for timber and firewood, create local level employment opportunities, and improve forest conditions. This was implemented in more than 600 forest user groups covering 0.12 million ha of forests (MoF 2020).

The SciFM can supply 12.8 million cubic feet of timber annually and create employment for 4.6 million days in a year (MFSC 2014a). Hence, it was recognized as one of the game-changer forestry programmes, which will contribute to the forestry sector vision of "Forestry for Prosperity" and national vision of "Prosperous Nepal, Happy Nepali" However, this practice remained widely controversial due to diverse understanding among the stakeholders, especially lack of sufficient deliberations on the SciFM policy process and inherent dominance by forest technicians (Poudyal et al. 2020; Basnyat et al. 2020). This practice was considered as "technical-sounding re-centralisation" of community forestry in Nepal since the forest bureaucracy had re-captured

the decision-making power of forest resources and associated revenue (see Basnyat et al. 2020).

Considering wider dissatisfaction of the stakeholders and increasing governance issues especially over-harvesting of the timber, the Government of Nepal prohibited harvesting, collecting and selling timber from the SciFM, with immediate effect on May 28, 2020. In addition, the Government of Nepal and the Natural Resource Committee of the parliament formed two separate independent committees to investigate on emerging issues related to the SciFM in 2020. Both committees recommended for the abolishment of the SciFM due to over-harvesting of the timber, increasing corruption cases, poor investment in forest management activities. Consequently, the cabinet of the ministers' decision of January 24, 2021, abandoned SciFM in the country. However, the underlying causes that forced the government to abolish scientific forestry in Nepal remain unexplored, primarily focusing on whether the problem was on the stakeholders' perception or (use of) forestry science itself. Hence, this study explores the underlying reasons that contributed for the abolishment of this practice in the community forestry of Nepal.

Materials and Methods

The study followed the qualitative content analysis methods and stakeholders' interviews to understand the underlying reasons. The study reviewed different government circulars, SciFM guidelines, community forestry development guidelines, and the literature published in peer-reviewed national and international journals. Moreover, the study reviewed the draft report produced by the two independent committees formed by the government of Nepal and the parliament of Nepal to understand their perspective on abolishing the SciFM.

The study conducted face-to-face semi-structured interviews with 32 forest officials working at the district, provincial and central levels to explore reasons for pitfalls and

validate collected information. The study used snowball sampling techniques to identify the respondents. In addition, the study interviewed eight representatives from the Federation of Community Forestry Users Nepal (FECOFUN) working at the field and central level to understand their perception on the SciFM and the timber traders. In addition, the study interviewed 14 community forestry leaders from the western hills to understand their problems and challenges in implementing the SciFM, including benefits to them. De-briefing meetings with the stakeholders validated the study findings.

Results

Scientific Forest Management (SciFM) in Nepal

Though (then) Ministry of the Forests and Soil Conservation made several attempts to introduce scientific forestry in the country, it failed due to widespread protest from the non-state actors (see Bampton et al. 2007). Hence, the government piloted a new form of participatory forest management in the Terai in 2007, namely collaborative forest management, emphasizing on developing a self-sustaining forestry sector with a high emphasis on technical management (see Bampton et al. 2007). It drives towards new silviculture-based management for timber production through multi-stakeholder engagement (Koirala and Acharya 2017). However, it remained dormant till 2012 due to inadequate investment from the government (Basnyat et al. 2020).

In 2012, the ministry came with a new vision, “Forestry for Prosperity,” and identified sustainable and scientific forest management as one of the four strategic pillars and gave priority to scientific management to improve forest productivity and generate income and employment opportunities (MFSC 2012). However, SciFM expanded rapidly with the support from Multi-Stakeholder Forestry

Programme (2011-2016), which prioritised sustainable forest management for building climatic resiliency (MSFP 2016). In addition, it supported on piloting of the Tilaurakot collaborative forests in Kapilbastu (prepared in 2010), employing advanced silvicultural systems in early 2013, which was replicated in other Terai districts even in the community forestry (MSFP 2016). The ministry also introduced Forest Administration Accountability Improvement Action Plan in 2014, especially for the Terai and inner Terai district, which played an instrumental role in expanding the SciFM (MFSC 2014b).

By 2014, scientific forest/sustainable forests appeared as forest-friendly subjects to address emerging problems of illegal harvesting and contribute to national economic development. Subsequently, the ministry enacted a silvicultural-based forest management guideline in 2014, popularly known as the “Scientific forest management (SciFM). It essentially follows a silvicultural system which is characterized by the intensity of felling of trees, the pattern of felling, and mode of regeneration (MFSC 2014a). This aims to promote sustainable/scientific forest management to increase revenue from the forest, meet local demand for timber and firewood, and create local employment opportunities while improving forest conditions.

Documenting lessons from the SciFM in Nepal, the Forest Department conducted a First National Silviculture Workshop in 2017 to capture diverse silviculture practices and garner knowledge to develop guidelines. The workshop recommended for prescribing appropriate silvicultural systems considering silvicultural characteristics and forest conditions, including species composition, forest size, management objectives, and physiographic characteristics, without compromising the multiple functions of forests (DoF). Moreover, it is recommended to establish research trials (harvesting) to identify suitable silviculture systems across different management regimes and prepare a

10-year silviculture-based forest management plan. However, such a recommendation never came under implementation. The workshop recommendation contradicts the existing SciFM practices, where the management prescription were similar irrespective of forest type, conditions and management objectives (see Basnyat et al. 2018)

The technical soundness of the SciFM remained highly contested since it focused on single commodity management, i.e., timber, promoted without demonstrating effectiveness, including the same replication of the same management approaches irrespective of forest type, condition, and species composition and (see Basnyat et al. 2018; Basnyat et al. 2020; Poudyal et al. 2020) Moreover, governance issues, especially over-harvesting of timber, collusion with the timber trader in the selling of the timber and corruption were quite prominent (see Joshi et al. 2018; Basnyat et al. 2020; Bhusal et al. 2020). In addition, over-harvesting from the forests received major attention in the national media. Consequently, the government and the parliament formed an independent committee to investigate the SciFM. Both committees recommended

its' abolishment and suggested adopting a new form of forest management practices in the country. Consequently, this practice was abolished in 2021.

Stakeholders' Interests

Utilitarian concept of forest management dominated the stakeholders' interests where priority was on timber centric management with limited consideration on different services that are delivered from the forests. Forest users, community leaders, and timber traders pursued material or financial benefits while forest bureaucracy had both political and financial interests (see Table 1). All the stakeholders were motivated for increasing productivity of the forests, especially the timber and firewood production. None of the stakeholders showed concern on different ecosystem services that are delivered from the forests, especially soil conservation and biodiversity services. For example, the forest bureaucracy justified SciFM to increase forest productivity; promote sustainable harvesting; shift from conservative to scientific management and meet national demand for timber. One of the forest bureaucrats questioned, *where is forestry in community*

Table 1: Stakeholders motive in the SciFM

Actors	Interests
Forest bureaucracy	<ul style="list-style-type: none"> • Forest productivity improvement/sustainable management/harvesting • Government revenue • Status within department/Image improvement • Forest productivity improvement/sustainable management • Increase timber supply (fallen trees are officially allowed to harvest in addition to Annual Allowable Harvest)
Executive committee members/users	<ul style="list-style-type: none"> • Assured harvesting of forest products/sustainable harvesting • Financial and technical support from district forest office • Social prestige (first to adopt scientific management) • Revenue generation from the sale of forest product outside group and implement community development activities • Local level employment creation/wage earning • Increase fund for community development
Users	<ul style="list-style-type: none"> • Increase availability of forest products, especially timber • Less bureaucratic control on harvesting of timber
Timber traders	<ul style="list-style-type: none"> • Predicted harvest/increase business volume • Cost reduction/Profit (Harvesting, logging & transport)
Development partners	<ul style="list-style-type: none"> • Economic rationale management

forests? Why we are not using our technical skills to manage forests sustainably. Similarly, the executive committee members were interested on SciFM because of increase in the quantity of forest product harvest along with the technical/financial support. In addition to this, local level employment opportunities also motivated the committees to adopt scientific management, especially on forest inventory and harvesting related work. The users were interested with the SciFM as they would get more fund for community development along with increased availability of forest products. Timber traders through their agents motivated or convinced users/executive committee since they are likely to get higher volume of timber from community forests at reduced cost. One of the local timber traders claimed, “SciFM will reduce *harvesting and transport cost as trees for harvesting over next 10 years are already marked. Earlier, we had to harvest scattered trees and make investment without knowing tree quality.*

Scientific forest management emerged as a politically motivated intervention, for improving the image of the forest bureaucracy rather than a planned intervention aiming improving forest condition. SciFM also provided opportunities for the career growth among the forest officials, recognition within department, likely threats from external investigations and material benefits. In 2014, the Department of Forests introduced “Performance Contract System” with the District Forest Officers in selected districts where the area under SciFM remained one of the key indicators for assessment. The DFO introduced concept in community forests since most of the productive forests have been already handed over. Furthermore, appreciation and recognition from senior officials of forest department further inspired to promote scientific management. Many forest officials perceived that “implementing scientific forest management brought prestige among friends. A forest bureaucrat said, *when department recognizes your friend who implemented scientific management as a “heroic personality” we find no option but to follow what*

your senior management think right. In addition to this, strong surveillance from the Central Investigation on Abuse of Authority in Nepal on timber harvesting from community forests also forced forest bureaucracy to adopt SciFM. One of the forest bureaucrats argued, with *SciFM plan, we can convince others that forest would be managed sustainably and harvesting would not degrade forest conditions.* Likewise, scientific management would increase government revenue from community forests. The state will earn taxes, when users sold timber outside group.

Underlying reasons for failure

Technical soundness of SciFM remained in questions from the very beginning since the management prescription are decided based on experiences of what constitutes the sustainable forestry to the forest bureaucracy rather than the evidence based scientific knowledge. SciFM Guidelines 2014 prescribed detailed methods for regeneration and thinning regime for increasing production and productivity. Many management prescriptions were generic and provide room for expert manipulation. For example, the guidelines suggest for keeping 15-30 trees per ha, where an expert can decide the number. On what basis, the number should be proposed is not clear, since the guidelines failed to give procedural details by forest types or species composition. Likewise, silviculture prescriptions are also confusing and not clearly articulated. Surprisingly, the research has limited influences on policy prescriptions. A review of preliminary findings on the different silviculture treatments from the long-term permanent research plots in the different physiographic region and forest types of Nepal, revealed that current silviculture treatments differ from the prescriptions of the plan (see Acharya and Acharya 2004; Ojha et al. 2008).

Silviculture prescriptions were proposed from few years of the piloting experiences (less than 5 years) in the Terai, where long-term consequences are yet to be understood.

For example, Baral et al. (2017) question on appropriateness of the typical irregular shelter-wood system of keeping 20-25 mother trees/ha and likely environmental risk in the hills. Similarly, Basnyat et al. (2018) considered the silviculture prescription as textbook science rather than research generated knowledge and argued to explore the origin of the knowledge.

Forest bureaucracy has smartly used an economic rational narrative of SciFM to commodify the community forests toward commercial timber production by incentivizing CFUGs to produce timber targeting the market, introducing a practice, beyond the affordability of the CFUGs, and siphoning off a large part of CFUGs' fund on forestry development (Basnyat, 2020b). Consequently, the forest user groups gave priority to selling timber either in the market instead of distributing to the poor and marginalized members. Hence the SciFM had institutionalized the colonial administrative model of resource governance, for maximizing revenue from the community forest at the cost of users' well-being (ibid). Consequently, poor households are sufferers since they derived less benefits from the forests (See Parajuli et al. 2015).

SciFM is uneconomical to the forest user groups, if timber is distributed at the subsidized price (Basnyat 2020b). Currently, forest user groups were selling timber at a price far below the cost of production and thus efficient economic model of often compromised (see Basnyat et al. 2020). Basnyat (2020 b) argued that forest user groups would bear the financial loss if they do not fix the price of the timber at par with the market in scientific management, and in such a case, the tagged price will be beyond the capacity of the users. As the users had been selling timber at the subsidized prices without considering the management cost required for implementing the plan, the re-investment on the forestry sector has been very limited (Basnyat 2020b; Paudel et al. 2021). This might further impact on forest conditions in the future, including forest sustainability.

All the SciFM plan had estimated the detailed cost and benefits from the forest management intervention, including net present value and benefit cost ratio for making investment decisions. However, such estimation has appeared as one of the necessary elements of the plan but have not guided any forest management decisions (Basnyat 2020a). The financing plan implementation has been one of the weakest aspects, where financial sources and financing mechanism are poorly explored.

The scientific forestry failed to develop ownership among the stakeholders since many of the stakeholders were poorly engaged in the implementation processes. Rather the forestry knowledge, which often contradicts with the local people practice were used, thus raising conflicts at the ground level. While forest user groups consider that the SciFM had led to massive over-harvesting of the timber from the forests, the forest bureaucracy was not able to convince the stakeholders about the silviculture prescription. This has happened mainly because neither the users' nor the forest bureaucracy had trust over the knowledge of each other. While the forest bureaucracy had expanded knowledge from the few years of piloting in the Terai region, the users' often questions them about the success stories of these management approaches. Until and unless, both the actors worked together at the forest management unit and learn from the success and failure of the system, this practice would continue further.

Each actor blames other stakeholders for the resultant effect, but they were neither accountable nor responsive for effective implementation. From the early days of the SciFM, actors were neither satisfied with implementation approaches nor with the benefits they received from the forests. During the six years of the implementation, none of the actors expressed their satisfaction over the management practices. Earlier promises or expectation of the stakeholders' i.e improvement of forest productivity and increase income from the forests remained

unachieved, mostly due to (a) limited production of timber and firewood, (b) poor compliance with the plan, (c) limited investment capacity. While the timber traders, forest user groups leader and users' expressed concern over the extensive harvesting of the few plots and leaving the larger area unattended, the forest bureaucracy justified these approaches as the scientific forestry which would give higher return in the coming years, especially after completion of the tenure. On the other hand, the users often considered that the current forest management had demanded extensive involvement of the forest bureaucracy and thereby, increasing financial burden to them. The forest bureaucracy often blamed the forest user groups for not implementing the management prescription as per the plan especially using the income on non-forestry related activities, especially on community development.

SciFM incentivized CFUGs to sell timber in the market and thereby created a conducive environment within CFUG leaders, traders, and forest bureaucrats to collude for personal gains. Forest bureaucrats are extracting unofficial financial and non-financial benefits incentives for delivering statutorily no-cost services to user groups (Basnyat et al. 2018). However, the forest bureaucracy's rent-seeking culture is now shifting towards a "rent seizing culture", where they position themselves as gatekeepers between CFUGs and their forest resources and have framed rules or practices in such a way that CFUGs cannot benefit without their support or consent (Basnyat 2020b).

This is not the only time that the forestry has suffered from the political decisions. It was too early to conclude that forests would be devastated from the scientific forestry. While several scholars had identified the positive aspects of the scientific forestry, especially in producing timber, improving regeneration conditions of the forests and local level employment creation, thus creating the ecological as well as economic benefits from the forests (see Awasthi et al.

2015; Khanal, 2017), none of the stakeholders understand this ground reality. The forestry professionals failed to convince stakeholders about the advantages of the silviculture based management, including effect of harvesting. The political actors often raised concerns from the small micro-impact observed at the field and considered that forests are being over harvested and exploited. The trust has been one of the very missing elements among actors where each actors intended to justify their claim with limited communication and dialogue among each other.

Discussion

SciFM was primarily driven by social and economic interests rather than ecological concerns (Bhusal et al. 2020). The policy prescriptions were designed based on limited field experiences mostly through the consultative and participatory processes with active engagement of the development partners. Development partners influenced on developing different guidelines for promoting SciFM, where priority was on engaging and bringing different actors on board rather than designing the guidelines based on technical evidence (Poudyal et al. 2020). While there are no problems with the participatory processes, stakeholders often put their interests in the policy prescriptions. Consequently, technical procedures were often compromised, and provisions were included to satisfy the interests of the other actors (Baral et al. 2019). Furthermore, decisions were made on personal interests or on perception of what constitutes sustainable forestry but often lacked scientific research and evidence to support the claim (Poudyal et al. 2020).

The utilitarian concept of forest management was introduced under the SciFM, which focused on the single commodity, i.e., timber (Basnyat 2020b). Within the five years of piloting experiences in the Terai, this practice was promoted throughout the country, especially in the hilly forests, which differ

in size, forest type, and species composition, including local communities' needs of forest products. This management system also faced governance issues, especially over-harvesting and limited investment in the forests. The SciFM was introduced as an alternative to the earlier system without considering the locality factors in the context. Consequently, the forest bureaucracy did not learn from the past system but tried on promoting a new system. Scientific forest management is being promoted as a face-saving approach, where the forest bureaucracy has designed new systems without identifying and addressing the technical and governance issues of the previous system (Basnyat et al. 2018).

Another reason for the failure of scientific forestry in Nepal is the high political interests of the stakeholders (Paudyal et al. 2020). Whenever the new system was introduced, there was always resistance from the political actors, especially interest groups and right holder agencies. They often criticize that forest bureaucracies are clearing the forests for their economic interests (Basnyat et al. 2018; Paudyal et al. 2020). In the case of SciFM, these actors believed that massive deforestation had occurred; however, the forest bureaucracy failed to convince the stakeholders. This has happened mainly because there was no ground evidence to convince the stakeholders that the forest would regenerate in the coming years with the current management practices. As there was no blueprint on how the forest would look like in the future, it was not possible to convince stakeholders that forests would improve in the future. Rather they observed the felling patches and considered the forest has been destroyed due to over harvesting though harvesting was below the growth potential of the forests. Apparently, there was diverse view among forest bureaucracy and stakeholders (Joshi et al. 2018; Poudyal et al. 2020).

The present form of the SciFM, which focused on timber production has a technical flaws in design, especially on deciding rotation period,

selecting the exploitable diameter for harvest, improving regeneration within the forests, including some design defects in terms of construction of fire line and forest road, re-investment in community forestry and financing forestry interventions. In contrary, forest bureaucracy often ignored these issues rather than gave priority on improving forest governance issues and regulate timber harvesting and trade operations. Moreover, the performance of the forest's growth exceeded than what is proposed in the plan itself. For example, singling was to be carried out within three years though it was planned after five years (Baral and Vacik. 2018; Baral et al. 2019). However, no research was carried out to explore why this situation occurred and what did not work in our planning approaches. Rather we justified our technical forest management as forest science which was not even backed up by research-generated knowledge and underlying reasons were never explored, on deviation with the plan prescriptions. The study argues to develop and strengthen action research within forest management system for shared learning among the stakeholders.

While the current SciFM failed on the technical aspects, it is not free from the governance and social issues. There is a need to define what constitute a scientific forestry, prior to the start of the implementation. In a developing country, the reliable information on forest growth and site factors is very limited, one size forest management approach might not work. The best approach could be managing following precautionary principles, i.e., not depleting the existing resource stock. However, this practice has been considered as unsustainable in the community forestry (Paudyal et al. 2020; Basnyat 2020). Forest in developing countries offers the multiple good and services and provides livelihoods to the poor and marginalized communities, which should be taken into consideration for designing forest management approaches.

Conclusion

Scientific management in the community forestry often emerged as the political process rather than the technical forestry. Apparently, the technical soundness of the proposed interventions was neither considered nor discussed and hence remained in a question from the very beginning. The country shifted from one approach to another approach as a face-saving game, pretending that doing something good for the country, however, the technical suitability in the local context was never discussed, including knowledge gap. Moreover, political processes of the country had driven the decision rather than the technical failure within the system. It is too early to conclude that SciFM is a failure on a technical ground since forests were never over-harvested than the growth potential. Moreover, the forests remain under-harvested even in the SciFM.

No doubt that there are problems and challenges in the SciFM, even from the governance and financial aspects, which

should not be overlooked. The failure is largely a political reason rather than a failed technical intervention. High stakeholders' expectation along with the political interests lead towards the failure. Hence, the paper argued for strengthening research initiatives to drive forest management as robust technical interventions, but not as a political process. The potential approach could be "research in use approach" where all stakeholders from the policy makers, planners, researchers, and local communities could be engaged in all stages of knowledge development and dissemination, i.e., planning, implementation, and monitoring.

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