

**EFFICIENCY AND EFFECTIVENESS  
IN JOINT FOREST MANAGEMENT:  
A Case Study from Allai Guzara Forests, Khyber Pakhtunkhwa, Pakistan**

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## **ABSTRACT**

In Pakistan, the concept of Joint Forest Management has been implemented as a result of inspiration from the neighbouring countries. This was an effort to replace the hierarchical governance with co-governance with the objective to conserve and protect the forest resource. However, despite of the fact that its main purpose was to improve the forest, the resource depletion has been at constant rise. One of the reasons is the poor forest governance. This study was carried out to assess the current level of forest governance in terms of Efficiency and Effectiveness in Joint Forest Management at Allai Guzara Forests of Pakistan. Multi-stage sampling was adopted and FAOs framework for assessing and monitoring forest governance was used. In total, 20 JFMCs were selected randomly and 100 (40 Users, 40 Owners and 20 Forest Department's Officials) respondents were interviewed on specially designed questionnaire. The data was analyzed using Statistix 8.1 at  $\alpha=0.05$ . The existing level of forest Efficiency and Effectiveness was well below the ideal level of governance. There was no statistical difference between the means of Effectiveness and Efficiency ( $t=-2.16$ ,  $p=0.0561$ ). Perception of the respondents was strongly correlated. Decrease in forest cover; non implementation of JFM Plans; no availability of comprehensive and upto date inventory and growth information; weak law enforcement; limited JFMC's skills; and out-dated harvesting system were some of the identified governance issues that needs redressal both at policy and implementation level.

**Keywords:** Forest Governance, Effectiveness, Efficiency, Joint Forest Management

## **INTRODUCTION**

Andersson and Ravikumar (2010) defined governance broadly as 'the process through which socially binding institutional arrangements are created, implemented and enforced.' The characteristics of Good forest governance include the pervasiveness of rule of law, low corruption level, robust institutions, high competency of officials and other functionaries who implement rules, willingness to address forest sector issues, sanctity of critical legal elements such as enforcement of property right and voluntary contracts, etc (World Bank, 2008). "Forest governance" includes the norms, processes, instruments, people, and organizations that control how people interact with forests. (FAO, 2012).

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Good governance is characterized by significant citizen participation, transparency and free flow of information, high levels of accountability, effective and efficient management of public resources and control of corruption (Kaufmann *et al.*, 2008; Mayers *et al.*, 2002; UNDP 2006; World Bank, 2006).

The process of 'decentralization' can meet the local needs (Fizbein, 1997; Light *et al.*, 2002), more effective public service delivery (World Bank, 1988), more effective public participation in decision making process (Ribot, 2002), enhanced micro-level institutional capability (Johnson, 2000).

Swati (2001) described the principles of JFM as: Collaboration, people's Participation, Gender inclusiveness, Organization and Management, Implementation of JFM plans and capacity building, Sustainable use of forest products, Flexibility of JFM Models, and Integrated NRM approach. Brahmi *et al.* (1997) stressed the need for involving people, women in particular, because it is important for the success of Joint Forest Management system. Women are mostly involved in the fuelwood collection, fodder and NTFPs from forest, so they are in direct contact with the forest. Programmes such as JFM cannot be successful without the involvement of women.

Higman (2005) identified the components of good governance as: Rule of law, Transparency, Equity and Incentives, Efficiency; and Accountability. World Bank (2009) identified five building blocks of forest governance, namely, Transparency, accountability, and public participation; Stability of forest institutions and conflict management; Quality of forest administration; Coherence of forest legislation and rule of law; Economic efficiency, equity, and incentives. Framework for Assessing and Monitoring Forest Governance proposed by a core group constituted by FAO (2012) has established six elements of forest governance. These elements are Accountability; Effectiveness; Efficiency; Fairness/Equity; Participation; and Transparency.

Giri (2006) used the six elements to assess forest governance mechanism in Community Forest User Groups (CFUGs) in Nepal at internal level. These were Participation, Accountability, Transparency, Legitimacy of rules, Effectiveness and efficiency, and Equity and Inclusiveness. UNDP (1997) listed the elements of good governance as: strategic vision, participation, transparency, rule of law, responsiveness, equity, consensus orientation, effectiveness, efficiency, and accountability. ICIMOD (2005) listed the Governance elements as Vision/ Mission, Participation, Transparency, Accountability, Effectiveness, Commitment, Efficiency, Equity/ Equality, Responsiveness

World Resource Institute (2009) under its programme "The Global Forest Initiative (GFI)" has identified five (05) elements of forest governance: Participation; Transparency; Accountability; Capacity; and Coordination. Mohanty & Sahu (2012)

studied JFM implemented models in Odisha based on seven building blocks of forest governance viz. Efficiency, Democratization, Transparency, Equity, Gender, Accountability and Sustainability. These elements were covered by 32 parameters. The Variables were assigned score based on their relative importance keeping in view the JFM resolution, 2008 of the state. Forest governance entails participation, transparency, accountability and predictability of community based forest resource management among government as well as other stakeholders (Menzies, 2004). World Bank (2009) identified five building blocks of forest governance, namely, Transparency, accountability, and public participation; Stability of forest institutions and conflict management; Quality of forest administration; Coherence of forest legislation and rule of law; Economic efficiency, equity, and incentives. FAO (2012) published Framework for Assessing and Monitoring Forest Governance proposed by a core group constituted by FAO and World Bank has established six elements of forest governance. These elements are Accountability; Effectiveness; Efficiency; Fairness/Equity; Participation; and Transparency. This tool contains indicators list and a modus operandi for assigning scores to the indicators. These indicators of forest governance have been provided with multiple-choice answers. The tool was field-tested in 2010 in Uganda and in Burkina Faso in 2011. The pilot testing of the tool in these countries has confirmed its feasibility for assessing and monitoring the forest governance. Feedbacks have been provided for further improvement of the tool.

According to World Bank (2012), the FAO's Programme on Forests (PROFOR) Framework has been the most targeted and systemic diagnostic tool for assessing the forest governance. This tool offers worldwide relevant key elements of forest governance. This framework has been successfully tested in the four provinces of Russia in 2012 by the Federal Forest Agency with the technical assistance of World Bank and DFIF and its application has been found to be satisfactory. The study revealed that the overall quality of governance in forestry sector is fair. The strengths and weaknesses of the forest governance in Russia were also identified.

Mohanty & Sahu (2012) studied various JFM Models in Odhisa state of India. They adopted stratified purposive sampling method in multi-stages for sample selection. Seven categories of sample was constituted viz: i) Household head, ii) President/Secretary of the Committee, iii) District Forest Officer (DFO), (iv) Forest Ranger, (v) PRI representative, (vi) representative of NGO and vii) NTFP trader.

Gyawali (2009) used Group discussions, household interviews, and personal observations as tools to collect the primary data pertaining to two governance elements in Community Forestry Users Groups (CFUGs) in Nepal viz Participation and Transparency. The data was analysed by using SPSS and MS-excel computer programmes. Grading, scoring and ranking were done to assess the governance in CFUGs. Visual interpretation in the form of bar-graphs and pie-

charts alongwith tabulation was done to represent the governance level of CFUGs in clear and easy-to-understand manner.

Giri (2006) assessed the governance capacity of CFUGs in Nepal based on the four basic attributes of governance: participation, accountability, transparency, and equity. Each attribute was evaluated on the basis of six indicators which were graded according to 4 point scale. Participatory self-assessment, personal interviews and FGDs were used to obtain information on various aspects of forest governance. Under each attribute, the respondents identified their position based on the grades for each indicator. The maximum obtainable score for was 24 for each attribute, which is the ideal condition for forest governance. The score sheet was then transformed into spider web diagram for visual interpretation. The assessment identified current level of forest governance and gap between existing and desired forest governance situation.

Acharya (2005) used participatory assessment tool to determine the current governance status of the Community Forest User Groups (CFUGs) in Nepal. The four elements of governance were used to study the internal governance of CFUGs-participation, accountability, transparency and predictability. Each group member identified his own relative position and scores were marked on each of the attribute. After obtaining the scores from all the group members, it was then translated into spider-web tool which is the visual interpretation of the current and ideal forest governance. This pictorial representation also identifies the gap between the current and ideal governance and helps in the identification of strengths and weakness of forest governance.

Upreti and Shahbaz (2010) were of view that the lack of trust, and conflicts between local stakeholders and government departments has led to ineffective forest governance in South-Asia. In Pakistan, JFM programme has been adversely affected due to mistrust and lack of confidence between forest users and forest officials. In Nepal, there is mistrust among the politicians, state and the local people on the issue of 'land reforms'. Shahbaz and Geiser (2009) reported that in the recent past donor driven initiatives in NWFP (Now Khyber Pakhtunkhwa) province of Pakistan has led to the formulation of participation oriented new policy (NWFP Forest Policy, 1999) and legislation (NWFP Forest Ordinance, 2002), re-definition of the role of Forest Department (Matrix Management System), and the introduction of JFM procedures (Community Participation Rules, 2004).

This study was aimed to assess the current level of forest governance in terms of effectiveness and efficiency which are the two major principles of forest governance. In addition, the governance issues were highlighted that needs immediate attention on part of the policy makers to improve the forest governance in Joint Forest Management system.

## MATERIAL AND METHODS

### The study area

This study was carried out at Allai Guzara Forests located in the District Battagram of Hazara Civil Division of Khyber Pakhtunkhwa approximately. According to Khan (1985), the Allai valley lies between 34°-44 ½' and 34°-58' North latitude and 72°-54' and 73°-15' East longitude having an area of 56,081 hectares. The coniferous forests comprise of 40%, agricultural lands 30%, broad leaved forests 4%, range lands 20% and alpine pastures 6% (Muhammad, 2001). The tract is bounded on the east by Chaur, on the north by Kohistan, on the west by Indus River and on the south by Nandhyar valley. These forests are situated on the northern, north-eastern, southern and western aspects.

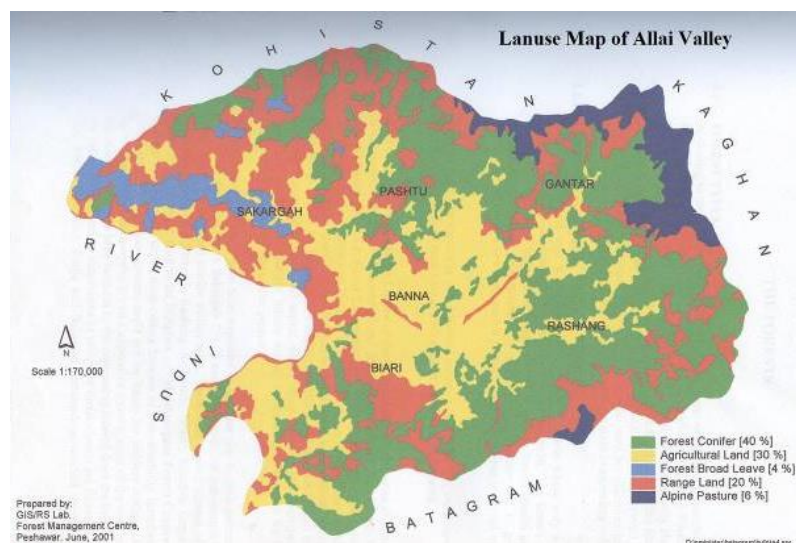


Fig.1. Map of the study area (Muhammad, 2001)

### Sampling Procedure

Multistage sampling (Snijders, 2001; Hankin, 2011; Mohanty & Sahu, 2012) was adopted for this research to achieve time and cost efficiencies associated with extensive field. The first stage sampling consisted of listing all the registered JFMCs of Allai valley. In the second stage, 20 JFMCs were selected randomly. In the third stage, each selected JFMC was divided into the target groups, namely: Forest Owners: 2 Nos; Non-Forest Owners/Users: 2 Nos and Forest Official/Officer representing JFMC: 1 No. Thus 5 persons per JFMC were selected and interviewed on specially designed research questionnaire. In total 100 persons were interviewed.

## Data collection

Data was collected on specifically designed structured questionnaire. Under each element (Efficiency and Effectiveness), six indicators were framed. Each indicator was assigned score 1-4 based on their relative importance, the results of which were combined to determine effectiveness of the forest governance. All the indicators were given equal weightage. In order to determine the validity of the questionnaire; it was pre-tested in the field and corrected accordingly. The data was collected from 18th February 2013 to 20th March 2013.

## Data Analysis

The data collected was analyzed statistically by using Statistix 8.1 software and MS-Excel computer programme. Descriptive statistics like Percentages, Weighted Scores, Mean and Standard Deviations were calculated. One-sample Student's t-test was performed to compare of sample means of actual scores to that of ideal/desired scenario. Confidence interval of 95% or  $\alpha = 0.05$  level of significance was used.

## RESULTS AND DISCUSSIONS

### Effectiveness

Effectiveness in forest governance means that the governance mechanism shall achieve the end they are intended to (FAO, 2012).

### Extent of condition of forest cover after the introduction of JFM system

The mean value for the indicator is  $1.70 \pm 0.6435$  SD with weighted score of 170. The mean value is slightly below the score "2". This implies that the forest cover has reduced slightly (Table 1).

Despite of the fact that the main purpose of the introduction of JFM was to conserve and manage the forest resources on sustainable basis, the forest cover has declined in comparison to past. The results are in consonance with the findings of the study conducted by Swiss Development Agency & Cooperation, Inter-Cooperation in 2010, according to which an area of 1,012 hectare was lost during the period from 1996 to 2008 in Allai valley. In terms of percentage, the forest area lost come to be 8.4% (Table-4.16). These findings also seconded Shahbaz and Geiser (2012) who narrated that the already meager forest cover in Khyber Pakhtunkhwa is depleting quickly, the major reason being the ineffective forest governance.

### **Extent of implementation of management plans by JFMCs**

The mean value for the indicator is  $1.00 \pm 0.00$  SD with weighted score of 100. The mean value is at the score "1". This implies that no JFM Plans were implemented by the JFMCs (Table 1).

No comprehensive JFM plans are prepared at the present. The Yearly Plan of Operation that is prepared solely by the Forest Department and that contains only "developmental activities" and other aspects of sustainable forest management are not attended to. This plan is implemented by Forest Department and not by the JFMCs.

### *Extent of comprehensive & up-to-date forest inventory and growth information and its use in decision making and planning by the agency*

Table 1 indicates that the mean value for the indicator is  $1.00 \pm 0.00$  SD with weighted score of 100. The mean value is at the score "1". This implies that no comprehensive and upto date inventory and growth information were available for the forested areas.

No up-to-date forest inventory and growth information is available at present that can be used for planning and management of forest resource. The Working Plan or Management Plan for Allai Guzara Forests has been expired since 2011. The plan is under revision and the collection of inventory data at field level is under process by Working Plan Division, Unit-V, Mansehra of Forestry Planning and Monitoring Circle, Khyber Pakhtunkhwa Forest Department.

### **Extent of mode of grant of trees for domestic use**

The mean value for the indicator is  $1.00 \pm 0.00$  SD with weighted score of 100. The mean value is at the score "1". This implies that no permit is issued at present for the grant of trees for domestic use in Allai Guzara Forests (Table 1).

Currently, no permit is issued by the Forest Department for the grant of trees for domestic use. The reason explained by the Forest Department was that the Working Plan for Allai Guzara Forests has been expired and in the absence of allotted quota for the free grant of timber mentioned therein, the Forest Department can not issue any permit to the right holders. As per view of the Forest Departments officials, the Department discourages the issuance of permit as it had been observed that the same was used for ulterior motives by the grantee, smuggling for example.

### **Extent of apprehension of offenders involved in illicit cutting of trees & other offences by JFMC**

Eighty one (81%) respondents were of view that no offender has been apprehended and or reported by JFMC. The balance 19% answered that <50% of forest offenders have been apprehended and or reported by JFMC (Table 1). The mean value for the indicator is  $1.19 \pm 0.3943$  SD with weighted score of 119. The mean value is slightly above the score "1". This implies that no offender has been apprehended and or reported by JFMC.

The crux of the governance in JFM was to ensure the forest protection in lieu of benefits to the beneficiaries. However, in practice the JFM acted mainly as "harvesting committee" rather than the "Forest Management Committee". The interests of the owners remain intact only till the sale of timber and hence income generation. Their role in the protection of forest resource has been a question mark. Rule 15 (7) of the JFM (Community Participation) Rules, 2004, stipulates *"It [JFMC] shall perform the duties of forest officer particularly protection of forests as provided in the Ordinance, 2002 and assigned to it from time to time jointly by the Village Development Committee/Women Organization and Forest Department including the erection of forest check posts and ejection of encroachment etc."*

### **Extent of punishment of crimes of illicit cuttings in the past one year**

Table 1 depicts that the mean value for the indicator is  $2.83 \pm 0.3775$  SD with weighted score of 283. The mean value is slightly below the score "3". This implies that that >50% of crimes resulted in punishment in the past one year.

Deforestation and degradation is a dilemma for the country in general and for the study area in particular. As discussed earlier, the forests of Allai valley has been lost to a considerable degree (8.4%) from 1996 to 2008.

### **Efficiency**

Efficiency in forest governance means that the forest governance should achieve its objectives with minimum of waste (FAO, 2012).

### **Extent of JFMC capacity and skills to sustainably manage forest resource**

Table 3 depicts that the mean value for the indicator is  $1.91 \pm 0.2876$  SD with weighted score of 191. The mean value is slightly below the score "2". This implies that the capacity and skills of JFMC were at primary level to sustainably manage forest resource, and need improvement.



Table 1. Distribution of Respondents according to their perception regarding the extent of Effectiveness in JFM

S. No.	Indicator	Extent of Effectiveness				Weighted score	Mean	S.D
		4	3	2	1			
1.1	Extent of condition of forest cover after the introduction of JFM system	0	10	50	40	170	1.70	0.6435
1.2	Extent of implementation of management plans by JFMCs	0	0	0	100	100	1.00	0.00
1.3	Extent of comprehensive & up-to-date forest inventory and growth information and its use in decision making and planning by the agency	0	0	0	100	100	1.00	0.00
1.4	Extent of mode of grant of trees for domestic use	0	0	0	100	100	1.00	0.00
1.5	Extent of apprehension of offenders involved in illicit cutting of trees & other offences by JFMC	0	0	19	81	119	1.19	0.3943
1.6	Extent of punishment of crimes of illicit cuttings in the past one year	0	83	17	0	283	2.83	0.3775

Table 2. Explanation to the scores assigned to respective indicators under the element of Effectiveness

S. No.	Score			
	4	3	2	1
2.1	The forest cover has increased significantly	There is no change in the forest cover	The forest cover is slightly reduced	The forest cover has decreased significantly
2.2	All forest management plans are routinely implemented	Most forest management plans are implemented.	Only some forest management plans are implemented	No plans are implemented.
2.3	It is comprehensive and up-to-date for all forested areas and is used in planning and decision making.	It is comprehensive and up-to-date for most areas and is used in planning and decision making.	It is comprehensive and up-to-date for only a few areas or is not used in planning and decision making.	No forested area has comprehensive and up-to-date inventory information
2.4	JFMC verifies and recommends the application to RFO and keep its record.	The JFMC verifies and issue permit for domestic use.	Forest Department issues permit without consultation of JFMC	No permit is issued for domestic use.
2.5	Nearly 100% offenders have been apprehended and or reported by JFMC	About half of offenders have been apprehended and or reported by JFMC	Less than half of offenders have been apprehended and or reported by JFMC	No offender has been apprehended and or reported by JFMC
2.6	Nearly 100% of crimes resulted in punishment	More than half of crimes resulted in punishment	Less than half of crimes resulted in punishment	No crimes resulted in punishment

The institutional sustainability of the JFM depends largely on the capacities and skills of the JFMCs. At present these capacities and skills are at minimal level. The territorial field staff of Forest Department is responsible for discharging their technical, managerial and administrative functions. They often did not find adequate time to deal the issues of social mobilization. There is a dire need to capacitate the members of JFMCs in book and recordkeeping, financial management, nursery raising and field planting techniques, Leadership Management and Skills Training, Community Mobilization and Skills Training, landuse planning process, participatory Monitoring & Evaluation.

### **Extent of effectiveness of collection, sharing and redistribution of royalties and charges**

The mean value for the indicator is  $2.80 \pm 0.7521$  SD with weighted score of 280. The mean value is slightly below the score "3". This implies that the collection, sharing and redistribution systems are somewhat effective but need improvement (Table 3).

The law (NWFP (now KPK) Forest Policy, 2009; NWFP (now KPK) Forest Ordinance, 2002) clearly recognizes the collection, sharing and re-distribution of royalties among the beneficiaries. However, the JFMC owners sell their forests to contractors off the record. The owners are paid agreed amount on agreed modes of payment on species-cum-volume (per cft converted volume) basis. The contractor bears all the expenses on harvesting, conversion, carriage and transportation of timber. The signatures of owners are used as a "symbol" only throughout the process. The sale proceed (owners share) is deposited after deducting FDF, managerial charges and taxes etc in JFMC joint account whose signatories are Chairman and Treasurer JFMC. The Chairman get "Bachh" signed from all the beneficiaries and the amount is paid to the contractor. In this way the middleman hijacks the real profit from timber harvest. The owners were of view that they were poor and could not afford the expenses incurred on exploitation; hence they sell their royalties to contractors in advance in lieu of sale proceed (owners share).

### **Extent of competitiveness of timber market**

Table 3 depicts that the mean value for the indicator is  $3.34 \pm 0.4761$  SD with weighted score of 334. The mean value is slightly above the score "3". This implies that the timber market was competitive; but at times ring formation occurred.

Open and fair timber market is necessary for ensuring good forest governance in JFM. The timber from Allai Guzara Forests is transported to timber market at Gohar Abad, Havelian. Prior to auction, reserve rates are fixed separately for each species by the Conservator of Forests beyond which the

timber could not be sold. An earnest money (security deposit) at the rate of 10% of the total value is deposited in advance by all the bidders. The timber market is competitive, however at times ring formation occurs and the one who wants to buy the timber succeed in his endeavours.

### **Extent of comparison of forest technology in the country compare to the “global best practices,” particularly with regard to minimizing costs and wastes**

Table 3 depicts that the mean value for the indicator is  $1.27 \pm 0.4462$  SD with weighted score of 127. The mean value is slightly above the score “1”. This implies that the domestic technology was entirely or almost entirely below global best practices.

Efficient timber conservation and transportation is key to minimize waste in the timber felling, harvesting and conversion and hence guarantee handsome profit. The current outturn % of the dry standing and windfallen trees in Allai valley is between 27-30% which means that 70-73% of the timber is waste during the harvesting and conversion operations.

The trees in Allai valley of Hazara Tribal Forest Division, Battagram are harvested/logged by using chain saw; converted into scants by using axe and saw; and transported by trucks (in case access road is there) or through pathroo\* (in case compartment is near water). Contrary to this practice, in advance countries the logging, conversion and transportation are highly mechanized that enhance the efficiency in terms of control on wastage. For example, power saws, cable crane/sky line and even helicopters are used for the transportation of timber.

### **Extent of effectiveness of current harvesting system**

Table 2 depicts that the mean value for the indicator is  $4.00 \pm 0.00$  SD with weighted score of 400. The mean value is at the score “4”. This implies that the cost of exploitation was many times lower than the revenue realized from the sale of timer.

The cost of exploitation (harvesting and carriage) of timber is much lower than the revenue realized from its sale. The harvesting and carriage cost at present varies for Rs.70-80/-cft whereas the Fir /Spruce and Kail, the major trees species of Allai, are sold at Rs. 700-800/cft and Rs.900-1000/-cft respectively.

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\* Carriage/skidding of timber (scants or logs) on a dry slide from uphill side to downwards

### Extent of utilization of Forest Development Fund

The mean value for the indicator is  $2.00 \pm 0.00$  SD with weighted score of 200. The mean value is at the score "2". This implies that the FDF was utilized solely by Forest Department without consultation of JFMC (Table 3).

The FDF is generated as result of deduction of Rs. 4/-, Rs. 6/-, Rs. 8/-, Rs. 10/- per cubic foot (cft) from Chir, F/Spruce, Kail and Deodar respectively plus 20% managerial charges. The FDF was meant for the regeneration/ replenishment of the cut-over forests by carrying out development activities like nursery raising, afforestation, check dams etc. Since the inception of JFM, an amount of Rs.7, 69, 57,210/- on account of FDF has been remitted upto December, 2012 in respect of Hazara Tribal Forest Division.

Table 3. Distribution of Respondents according to their perception regarding the extent of Efficiency in JFM

S. No.	Indicator	Extent of Efficiency				Weighted score	Mean	S.D
		4	3	2	1			
3.1	Extent of JFMC capacity and skills to sustainably manage forest resource	0	0	91	9	191	1.91	0.2876
3.2	Extent of effectiveness of collection, sharing and redistribution of royalties and charges	20	40	40	0	280	2.80	0.7521
3.3	Extent of competitiveness of timber market	34	66	0	0	334	3.34	0.4761
3.4	Extent of comparison of forest technology in the country compare to the "global best-practices," particularly with regard to minimizing costs and wastes	0	0	27	73	127	1.27	0.4462
3.5	Extent of effectiveness of current harvesting system	100	0	0	0	400	4.00	0.00
3.6	Extent of utilization of Forest Development Fund	0	0	100	0	200	2.00	0.00

Table 4. Explanation to the scores assigned to respective indicators under the element of Efficiency

S. No.	Score			
	4	3	2	1
4.1	Capacity and skills of JFMC are upto the mark to sustainably manage forest resource	Capacity and skills of JFMC are adequate to sustainably manage forest resource	Capacity and skills of JFMC are at primary level to sustainably manage forest resource, and need improvement	Inadequate capacity and skills of JFMC to sustainably manage forest resource
4.2	The collection, sharing and redistribution systems are highly effective.	The collection, sharing and redistribution systems are somewhat effective but need improvement.	The collection, sharing and redistribution systems are largely ineffective.	There is no collection, sharing and redistribution system for
4.3	It is competitive; there are many sellers and buyers and no one dominates the market.	It is competitive; but at time ring formation occurs	It is not perfectly competitive; a few firms dominate the market.	It is not competitive; one firm dominates the market.
4.4	Domestic technology is uniformly at par with global best practices.	Domestic technology is varied, but most is at par with global best practices.	Domestic technology is varied, and less than half is at par with global best practices.	Domestic technology is entirely or almost entirely below global best practices.
4.5	Yes. Cost of exploitation is many times lower than the revenue realized from the sale of timer.	Yes. The cost of exploitation is a bit higher than the revenue realized from the sale of timer.	The cost of exploitation is equal to the revenue realized from the sale of timer.	No. The cost of exploitation is higher than the revenue realized from the sale of timer.
4.6	The FDF is utilized in consultation with JFMC, and as per JFM plan.	The FDF is utilized in consultation with JFMC but not as per JFM plan.	The FDF is utilized solely by Forest Department without consultation of JFMC	The FDF is not utilized.

### Stakeholders' perception in relation to Effectives and Efficiency

The Pearson's Correlation Co-efficient (r) value for the perception between FD officials and owners is 0.9445 and 0.9279, between FD officials and users is 0.7565 and 0.7902 and between owners and users 0.8683 and 0.9278 respectively for Effectiveness and Efficiency. The correlation so obtained suggests that association between the different categories of respondents is strong. This also shows uniform response of FD Officials, Owners and Users (Table 5).

Table 5. Correlation between Stakeholders' Perceptions

Correlation between	Effectiveness	Efficiency
	"r" value	
FD Officials and Owners	0.9445	0.9279
FD Officials and Users	0.7565	0.7902
Owners and Users	0.8683	0.9278

### Effectiveness vs Efficiency

The t test suggests that there is no statistical difference between the means of the two sets of information i.e Effectiveness and Efficiency ( $t=-2.16$ ,  $p=0.0561$ ). Therefore, the hypothesis of equal means is accepted and it is concluded that there is no statistical difference between Effectiveness and Efficiency (Table 6).

Table 6. Effectiveness Vs Efficiency

Variable	Mean	SD	SE	T	p
Effectiveness	1.4533	0.7269	0.2968	-2.16	0.0561
Efficiency	2.5533	1.0139	0.4139		

### CONCLUSIONS

To sum up, the existing level of forest Efficiency and Effectiveness was well below the ideal level of governance. There was no statistical difference between Effectiveness and Efficiency ( $t=-2.16$ ,  $p=0.0561$ ). Decrease in forest cover; non implementation of JFM Plans; no availability of comprehensive and upto date inventory and growth information; weak law enforcement; limited JFMC's skills; and out-dated harvesting system were some of the governance issues. These forest governance issues need immediate attention to strengthen the existing governance mechanism.

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