



## RESEARCH PAPER

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## REDD+impacts on the livelihood of the community and their involvement in the policymaking process

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### Abstract

With Global climate change, it is needed to control deforestation, degradation, conservation and implement policies for forest management. In this current industrialized century, local community forests (Guzara forest) play an important role in climate change. The basic role of Community forests to provide benefits to local resident communities and control unmanaged deforestation. In the past, studies have focused primarily on the REDD+ policies implementation in Pakistan. Here in this article, we highlight the role of local Communities and peoples in the implantation of REDD+ policies for controlling deforestation of community forests. In the article, we argue that local people's non-participates for REDD+ policies implementation are also caused by failure to control deforestation, degradation, conservation of community forests. Furthermore, we argue that local community awareness, respondent and community interest are needed to be implemented through REED+ policies. Hence, community forests can be used as a large scale.

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## Introduction

The rise in emissions of greenhouse gases (GHGs) since the industrial insurgency has significantly influenced the global environment. Increases in carbon, as a major GHG, is an essential driver of climate change. The rising concern of ecological changes because of climate change the problem of carbon balance, the main GHG, is important. The elimination of carbon from the atmosphere and its storage in diverse terrestrial ecosystems to decrease the increasing level of carbon dioxide is required (Wani *et al.*, 2016, Ardö and Olsson, 2004). Forests are the biggest carbon sink (Espírito-Santo *et al.*, 2014) and an important factor of the global carbon cycle among terrestrial ecosystems (Zhao and Zhou, 2006). Forests are very important in the balancing of the carbon cycle by absorbing  $2.4 \pm 0.4$  Pg C each year (Pan *et al.*, 2011). Forests cover over 4 billion ha worldwide and store  $861 \pm 66$  Pg C (Wani *et al.*, 2015). Forestland has the capability to stock and sinks possibly 20 to 50 times more carbon than other land use types (Houghton *et al.*, 1995). The woody and long living landscape of the forest makes them more attractive gears for the balancing and decline of GHGs (Sharma *et al.*, 2011) global land use management is modifying through deforestation, as the forest is considered as key players in Carbon sequestration.

Forests are the key players of sequestering CO<sub>2</sub>; however, globally land management actions and land-use change through deforestation, and degradation decline their power, resulting in an emission of  $1.2$  Pg C yr<sup>-1</sup> (Joshua *et al.*, 2017, Van der Werf *et al.*, 2009). Land cover shifting from forest to agricultural and other infrastructure building upsets the existing capacity of the forest to store carbon from local to the regional level (Zhou *et al.*, 2013, Caspersen *et al.*, 2000, Pan *et al.*, 2011). Land use changes are associated with deforestation and forest degradation, which are the main contributors to the current climate change, CO<sub>2</sub> and other greenhouse gases which is a critical issue among the scientific community (Houghton, 2003, Baccini *et al.*, 2012) (Thompson *et al.*, 2011, Sharma and Rai, 2007). Around the world, forests alteration upon

deforestation released 156Pg C to the atmosphere between 1850 and 2005 (Houghton, 2003). Deforestation is the biggest source, accounting for 12% to 15% of total global greenhouse gases emission (Chaplin-Kramer *et al.*, 2015, Le Quere *et al.*, 2009).

Since the last 5000 years, the deforestation process increased due to human involvement which is 360000 hector per annum (Williams, 2003). This has resulted in a loss of 5.2 million hectares of land because of growth in population, need for fuel and need for food (FAO, 2010). The forest around the globe affected a lot including the largest continent Asia, which affected the most from forest degradation till the start of the 20<sup>th</sup> century. The forest cover in the South Asian region in general and Pakistan in specific was most affected as due to change in land forest land cover. Where much of the forest land has been transformed into agricultural land to fulfill the needs of the people (FAO 2012).

The national climate change policy in 2012 by the government of Pakistan addresses the present and future issues like deforestation and forest degradation to cope with climate change. It further emphasizes on protection and conservation of forest resources and accessing the gapes like REDD+. Government of Pakistan is the focal point of REDD+ implementation included multi stockholders from government and non-government organizations to process this project all over the country.

This study is the first attempt aiming to investigate the potential impacts on the livelihood of stakeholders under reducing emissions from Deforestation and Forest Degradation (REDD+). For this purpose we conducted surveys to record the perception of the respondent in the study area about the Forest-dependent communities, significant effects of the REDD+ on the socio-economic conditions of the local community. On the basis of perception and respondent survey of the local community, we argue that local community awareness, respondent and community interest are needed to be implemented through REED+ policies in Pakistan. In addition, we

have focused on the local community participation role in the REDD+ policies.

Likewise previous studies done by (Lund *et al.*, 2017) Being new researchers and concern to the forest policies and their implication, we jointly present our experience based on the existing forest policies which includes REDD+ factor. We combined the data gathered from forestry experts, project managers, local elders, students and conservation committee members. In result of above discussion we argued that, REDD+ should encourage the Reasons to settle down deforestation issues on multiple factors to minimize the pressure on local communities of the forest (Larson and Ribot, 2009).

In the previous policies discussing REDD+. The framework of policy in REDD+ in context of financing, community livelihood, awareness and extension of REDD+ remains uneven. In this paper we find the community problems and all the relevant information regarding REDD+. It further argues on the reasons behind the delays in REDD+ implementation.

A few studies has been carried out to identify the nature and magnitude of forest degradation and forest land cover change in Pakistan. As per our knowledge not a single study has been conducted in the district Bajaur on this subject. The local community play important role in the REDD+ policy and its factors. Therefore, this study is the first attempt aiming to investigate the potential impacts on the livelihood of stakeholders under reducing emissions from Deforestation and Forest Degradation (REDD+).

## Materials and methods

### Study area

Bajaur is the smallest agency in FATA. In December 1973, it was declared a Federally Administered Tribal Agency (FATA). Before this, Bajaur almost remained a semi-independent territory and was being treated as an inaccessible area under the political jurisdiction of the Political Agent, Malakand. The landmass of the agency lies between 34°30' and 34°58' N latitudes and 71°11' and 71°48' E longitudes. Bajaur Agency

is the smallest unit of the Federally Administered Tribal Areas (FATA). The terrain of the agency is mountainous and hilly. In the northern part mountain ranges are 3000m high. Towards the south, the height gradually decreases and on the southern border, peaks are slightly over 2,500m high. In the central part, the height further decreases in the north-western half the land slopes down to the southeast direction while the slopes of the central parts to the north-east through the Jandol Khwar and Panjkora river. The Panjkora River flows in southern direction till it joins the Swat River which flows along the eastern boundary of Bajaur Agency.

The Agency, due to its mountainous terrain has an extreme climate. The winter season begins in November and lasts up to March. Winters are extremely cold within the period from December to February, the temperature sometimes plunges below freezing point. The mean maximum and minimum temperature in these months are in the range of 5 to 16 degree Celsius (°C). The summer season lasts from May to October, whereas June, July and August are the hottest months. The mean maximum and minimum temperature in this period are in the range of 23 to 36 degree Celsius (°C). As Bajaur is located on the end of the Himalayan range the monsoons are varied and mostly uncertain due to its peculiar geographical position.

### Data collection

Prior to the field survey, information about the study area was gathered with the assistance of local forest department staff. It was decided to conduct a survey in the targeted villages inhabited in the forest or in near vicinities. Basic information about forest cover and the plantation activities in the area was gathered from the forest department.

A field survey was conducted in the month of February and March (2017) in seven Tehsils (subdivisions of the district) of Bajaur Agency: Mamund Tehsil, Salarzai Tehsil, Barang Tehsil, and Nawaghi Tehsil, Khar Tehsil, Arang Tehsil, Uthman khail Tehsil. Total of nine villages was selected as a target study area followed by area wise survey.

From these villages, 100 households were stratified and randomly selected for this study. Regarding respondents' perception about REDD+, the information includes participation in decision making, participation in implementation, information sharing/transparency, free and informed consent, access to justice, benefit sharing mechanism, tenure security, income from tree plantations, special attention to vulnerable groups, respect for traditional knowledge, recognition of customary rights and respect for local communities for decision making.

#### *Sampling method*

For evaluating the impacts of present and future situation of REDD+ on the livelihood of forest-dependent communities, appropriate data collection methods are to be set out. For this purpose, the random sample technique was adopted. The questionnaire was prepared and designed to collect all possible data. This method was the most credible way to determine the REDD+ impacts on the livelihood of the stakeholders. The method was suitable to examine how outcomes vary across demographic and socio-economic groups. The focus was to understand local forest users' perceptions of events around their forest and potential impacts on the livelihood under REDD+.

To study the potential impacts of REDD+ on stakeholders' livelihood, eleven villages were surveyed. During the survey, forest-dependent communities in Guzaras of Bajaur Forest Range were interviewed through a questionnaire. Keeping in mind the objectives of the study, questions about demographics, forest dependency and REDD+ knowledge and perception about potential impacts were asked. To study the views of policymakers, forest officers and focal persons were interviewed. Literature regarding Pakistan response to international REDD+ negotiations and National Forest Policy, 2015 were also studied.

#### *Statistical Analysis*

Statistical analysis contains correlation and Multiple Linear Regression (MLR) between dependent

variables and explanatory variables. Quantitative data analysis was performed using SPSS-19. Two MLR models were developed in which respondent variables were community participation in decision making and participation in REDD+ implementation whereas the dependent variables were respondent's income, education, occupation, perception towards participation, and wood collection and employment opportunities with REDD+ mechanism. Significance levels were used to assess the null hypothesis ( $p$ -values) to determine whether the association between REDD+ participation and respondents' socio-economic condition and perception in the model is statistically significant or not. The null hypothesis is equal to zero, which indicates that there is no association between the respondents' socio-economic condition and REDD+ participation. The association is statistically significant ( $P$ -value  $\leq \alpha$ ) if the  $p$ -value is less than or equal to the significance level, we can conclude that there is a statistically significant association between the response variable and the explanatory variables. The association is not statistically significant ( $P$ -value  $> \alpha$ ). If the  $p$ -value is greater than the significance level, we cannot conclude that there is a statistically significant association between the response variable (REDD+ participation) and the explanatory variables (respondent's socio-economic conditions).

#### **Result and discussion**

The survey was conducted in the local community of Bajaur district area. The respondents were asked about different factors that might be influenced by REDD+ management such as income, wood collection, employment, and home. The respondents were required to rate in four-point scale which includes; slight, moderate, severe and 'doesn't know'. The different results are given below:

1. Rating "income", 23% of respondents replied "slight", 37% of respondents replied "moderate" and 40% of respondents rated "severe".
2. Rating "wood collection", 13% of respondents replied "slight", 15% of respondents replied "moderate" and 72% of respondents rated "severe".

3. Rating “employment”, 14% of respondents replied “slight”, 23% of respondents replied “moderate” and 23% of respondents rated “severe”. The rest of the respondents (30%) don’t know about it.

4. Rating “home”, 21% of respondents replied “slight”, 44% of respondents replied “moderate” and 27% of respondents rated “severe”. The rest of the respondents (8%) replied: “don’t know”.

*Correlations and multiple linear regression models*

Result in (Table 2) showed that the relationships between the response variable (participation in decision making) and income, education, occupation, perception, wood collection, employment were statistically significant because the p-values for these terms are less than the significance level of 0.05. While results in (Table 3), showed that the relationships between participation in implementation and income, education, occupation, and wood collection were statistically significant because the p-values for these variables are less than the significance level of 0.05 whereas the relationships between response variable and respondents perception and employment was not significant because p-values for these variables are more than the significance level of 0.05. Regarding the regression summary in (Table 2). The overall R<sup>2</sup> is equal to 0.90 which mean the 90% percentage of

variation in the participation in decision making explained by the ML model. The higher the R<sup>2</sup> value, the better the model fits REDD+ data. While adjusted R<sup>2</sup> was equal to 0.89 which compared models that have different numbers of explanatory variables.

Thus the MLR model showed 90% of the variation in the respondents’ participation in decision making of the explanatory variables. Thus MLR respondents’ data, the R<sup>2</sup> value indicates the model provides a good fit to the data. While in (Table 3), the regression summary for second MLR for participation in REDD+ implementation, the overall R<sup>2</sup> is equal to 0.86 which mean the 86% percentage of variation in the participation in REDD+ implementation was explained by the ML model. While adjusted R<sup>2</sup> was equal to 0.86 which compared models that have different explanatory variables (income, education, occupation, perception, wood collection, employment). However, this MLR model has less R<sup>2</sup> than the first MLR of participation in decision making.

**Table 1.** Influence of REDD+ on local communities’ life.

Factors	Slight	Moderate	Severe	Don’t Know	Total
Income	35	55	60	--	150
Wood Collection	19	23	108	--	150
Employment	21	35	49	45	150
Home	31	66	28	12	150

**Table 2.** Multiple Linear Regression for Respondents Participation in Decision Making.

	ANOVA				Regression Statistics	
	df	SS	MS	F	Multiple R	0.95
Regression	6	84.85	14.1427	221.83	R <sup>2</sup>	0.90
Residual	143	9.116	0.06375		Adjusted R <sup>2</sup>	0.89
Total	149	93.973			Standard Error	0.25
	Coefficients	Standard Error	t Stat	P-value		
Intercept	-0.00092	0.0948	-0.0097	0.992		
Income	0.05356	0.0440	1.2166	0.225		
Education	0.98409	0.0443	22.200	0.000		
Occupation	-0.21769	0.0589	-3.6938	0.000		
Perception	-0.22755	0.0765	-2.9706	0.003		
Wood collection	0.14682	0.0612	2.3980	0.017		
Employment	0.24640	0.0761	3.2366	0.001		
Correlations Matrix	Participation in Decision Making	Income	Education	Occupation	Perception	Wood Collection
Participation in Decision Making	1	.199*	.940**	.529**	.573**	.631**
Income	.199*	1	.222**	.756**	.656**	.697**
Education	.940**	.222**	1	.591**	.625**	.647**
Occupation	.529**	.756**	.591**	1	.871**	.890**
Perception	.573**	.656**	.625**	.871**	1	.869**
Wood Collection	.631**	.697**	.647**	.890**	.869**	1

Dependent Variable: Participation in decision making

\*. Correlation is significant at the 0.05 level (2-tailed).\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Table 3.** Multiple Linear Regression for Respondents Participation in Decision Making.

ANOVA					Regression Statistics	
	Df	SS	MS	F	Multiple R	0.932
Regression	6	71.07	11.844	157.891	R <sup>2</sup>	0.869
Residual	143	10.73	0.075		Adjusted R <sup>2</sup>	0.863
Total	149	81.79			Standard Error	0.274
	Coefficients	Standard Error	t Stat	P-value		
Intercept	0.0454	0.1029	0.441	0.6597		
income	0.0793	0.0478	1.661	0.0989		
education	0.9560	0.0481	19.882	0.0000		
occupation	-0.3798	0.0639	-5.941	0.0000		
perception	-0.1067	0.0831	-1.284	0.2012		
wood collection	0.3053	0.0664	4.597	0.0000		
Employment	0.0791	0.0826	0.958	0.3395		

Correlations Matrix							
	Participation in Implementation	Income	Occupation	Education	Wood	Employment	Perception
Participation in Implementation	1	.168*	.447**	.906**	.595**	.613**	.518**
Income	.168*	1	.756**	.222**	.697**	.571**	.656**
Occupation	.447**	.756**	1	.591**	.890**	.878**	.871**
Education	.906**	.222**	.591**	1	.647**	.712**	.625**
Wood	.595**	.697**	.890**	.647**	1	.897**	.869**
Employment	.613**	.571**	.878**	.712**	.897**	1	.934**
Perception	.518**	.656**	.871**	.625**	.869**	.934**	1

Dependent Variables : Participation in Implementation

\*. Correlation is significant at the 0.05 level (2-tailed).\*\*. Correlation is significant at the 0.01 level (2-tailed).

*Perception of Policy Makers about Forest Management under Redd+*

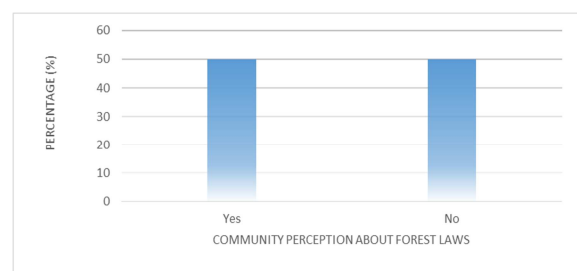
An interview of 20 policy makers and other related people was carried out. Those people and policymakers were questioned about (i) involvement of local community during policy making, (ii) formulation of forest laws that govern the selling of forest products, (iii) the rights and privileges that can benefit the local community (iv) The participation of the local community in developing national REDD+ process.

The interview of the policymakers and other related people was carried out in order to find out the future potential of the REDD+ in Pakistan, to know the impacts of REDD+ on the economy, health and the standard of living of the local community and other stakeholders involved.

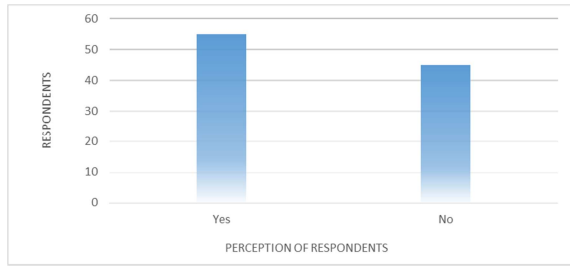
As depicted in (Fig. 1) a total of 60 percent of respondents answered negatively and they argued that every policy is being on the government level and the major stakeholders i.e. the community people are not taken on board, while other respondents responded that the community people have limited access to policy making and sometimes they are informed when the is being implemented.

The result showed, in (Fig. 1.1) that 50% of the interviewers of the view that the local community has rights to sell the products to markets and they have some shares as well in the market to sell the forest products. (Fig. 1.2) represents that 70% of policymakers are of the opinion that the local community should be consulted and must participate in developing national REDD+ process so that the local community and the forest projects can prosper.

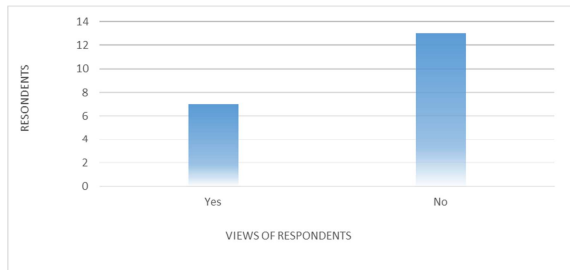
In (Fig. 1.3). shows that major policymakers are of the opinion that REDD+ may improve the income of the local community carbon credits generation and marketing. As indicated in results major policymakers responded in negative that REDD+ would not impact the health of the people of the local community.



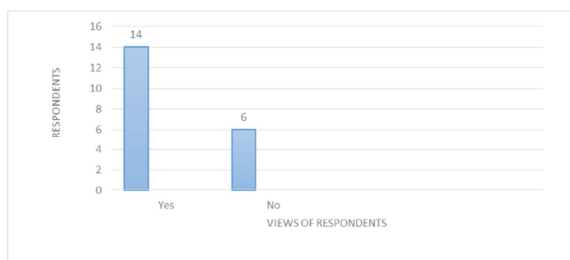
**Fig. 1.** Respondents view about public participation in the policy-making process.



**Fig. 1.1.** Perception about forest laws that govern the selling of forest products by the local community.



**Fig. 1.2.** Views of the respondents about REDD+ improving the health of the local community.



**Fig. 1.3.** Respondents Opinion about REDD+ in increasing the standard of living of the local community.

*REDD+ and National Forest Policy 2015 Perspective*  
*The National Forest Policy describes the status and issue of forests as under*

The climatic, water and soil conditions in most parts of the country are not conducive for afforestation on large scales. Existing forest resources are inadequate for meeting domestic demands for wood for the increasing population of the country. Actual demand for wood is 3 times higher than the annual increment of forests or potential sustainable supply. Moreover, the forest owners and local communities depend on forests as the sole source of livelihood. Resultantly, forests in all provinces particularly in Gilgit-Baltistan and Khyber-Pakhtunkhwa are under severe pressure. At the national level, the rate of deforestation is estimated at 27,000 hectares per year which mainly

occurs in private and community-owned natural forests. Deforestation in watershed areas adversely impacts on the yield and quality of water at outlets besides triggering land degradation and loss of biodiversity. Whereas in riparian, low-lying and coastal areas, deforestation causes catastrophic floods and seawater intrusion inflicting huge economic losses”.

The National Forest Policy, 2015 has the following main points regarding REDD+ implementation in Pakistan:

1. To reduce deforestation and improve conservation.
2. The Government of Pakistan shall ensure implementations of REDD+ in accordance with the international agreements.
3. The benefits arising from REDD+ shall be fully transferred to the owners and right holders. Promote an integrated approach of forests, wildlife and biodiversity management.

**Conclusion and recommendations**

In the light of the above results and discussion, it can be concluded that about 90% of the respondents were agreed or aware of such question and suggested protection of their forests. The respondents were of the view that during last decades these Guzara Forest (local community forest) were severely damaged by deforestation and forest degradation. Most of them had knowledge of forests projects but very less number of the respondents had knowledge about REDD+. However, most of the respondents were willing to participate in REDD+ in the future. Multiple linear regression models showed that the relationships between the response variable (participation in decision making) and income, education, occupation, perception, wood collection, employment were statistically significant because the p-values for these terms are less than the significance level of 0.05. The overall R<sup>2</sup> is equal to 0.90 which mean the 90% percentage of variation in the participation in decision making explained by the ml model. While showing that the relationships between participation in implementation and income, education, occupation and wood collection were statistically significant MLR for participation in

REDD+ implementation, the overall  $R^2$  is equal to 0.86 which mean the 86% percentage of variation in the participation in REDD+ implementation was explained by the MLR model. The local community was unaware about REDD+ and most of them consider it as a risk-free project because they were of the view that it will improve their socio-economic conditions. While other respondents who are dependent think that REDD+ can affect their livelihood pattern and can overpower their rights on the forests but the people are ready to adopt it if enough incentives will be given to them.

Forest department staff answered negatively and they argued that every policy is being on the government level and the major stakeholders i.e. the community people are not taken on board, while other respondents responded that the community people have limited access to policy making and sometimes they are informed when it is being implemented. While the policymakers who are responsible for the policy formulation and its implementation are hopeful for the future of REDD+ in the country. They believe that such projects are for the betterment of the forests and the local community in the future. It is recommended to create awareness in the local community about REDD+ and trained them for its implementation and also to devise a national action plan for involvement of local forest communities, civil society, and other stakeholders.

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