Governance of Clean Energy in Rural Northwest Pakistan

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ABSTRACT

Effective institutional arrangements at local and national levels are important for promotion of renewable energy in a country. The present study attempts to examine the institutional arrangements for development of domestic clean energy in rural northwest Pakistan. The survey data were collected from 100 randomly selected households in District Swat in northwest Pakistan. The data were analyzed using descriptive statistics and Chi-Square test was applied wherever needed. The study describes that very limited number of public and private organizations were working on CD (Clean Development) in the area. Surprisingly, no institutional arrangements exclusively meant for domestic clean energy promotion were observed in the area. The study concludes that the objectives of Kyoto Protocol in Pakistan can be achieved only if the government and NGOs (Non-Governmental Organizations) work together to initiate cost-effective renewable energy interventions, particularly in rural areas. This will not only improve the socioeconomic and environmental conditions in the local context, but will play a key role in achieving the SDGs (Sustainable Development Goals) of the United Nation's post-2015 development agenda.

Key Words: Governance, Renewable Energy, Clean Development Mechanism, Willingness-to-Cooperate.

1. INTRODUCTION

Many governments of the world, including Pakistan, ratified Kyoto Protocol to formally endorse their commitment to reduce GHG (Greenhouse Gas) emissions at national and transnational levels. To curb such emissions cost-effectively [1], the protocol has established three market-based instruments namely; IET (International Emission Trading), JI (Joint Implementation), and CDM (Clean Development Mechanism) [2]. As a flexible mechanism, CDM allows the industrialized countries - the Annex I Parties - to invest in projects aimed to combat GHG emissions in the developing countries - the non- Annex I Parties [3-4]. The aim of increased flow of financial and technological resources to developing countries is to meet two-fold objective of simultaneously stabilizing GHG concentrations in the atmosphere and contributing to sustainable development [5-6].

The emphasis of the CDM is on CD projects; primarily in energy, forestry, agricultural, industrial, and transport

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sectors. Between 2001 (the first year of CDM projects registration) and 2012 (the end of the Kyoto commitment period), the CDM is expected to produce estimated 1.5 billion tons of carbon dioxide equivalent (CO_2e) in emission reductions. Most of these emission reductions are through renewable energy, energy conservation, energy efficiency, and fuel switching [7]. Yet, increased GHG emissions from the aforementioned sectors, which significantly contribute to the global climate change, have been a major challenge for contemporary governments worldwide. To mitigate climate change, the CD initiatives must be promoted effectively at national and transnational levels. This study primarily spotlights the key issues in local governance of CD in Pakistan in the domestic renewable energy sector in northwest Pakistan.

The term *'governance'* means the process of decision-making and the process by which decisions are implemented or not implemented. Governance can be used in several contexts such as corporate governance, international governance, national governance, and local governance [8]. Local governance means the process of decision making and decisions implementation at the grassroots levels by involving all the formal and informal actors in the process [8]. These actors include government (both nattional and local), formal indigenous institutions (farmers associations, religious clerics, and financial institutions), local political leaders, influential landlords, community elders, and community representatives [9]. The term local governance is quite new in the renewable energy context and needs more attention at different levels.

Notwithstanding, a plurality of actors is engaged in the governance of renewable energy worldwide. These include: (i) *'public partnerships'* such as the World Bank, the ADB (Asian Development Bank), the IRENA (International Renewable Energy Agency), etc., (ii) *'public-private partnerships'* such as the REEEP (Renewable Energy and Energy Efficiency Partnership), and the APP (Asia Pacific Partnership) on Clean Development and Climate etc., and (iii) *'private standards'* such as the Gold Standard, the Voluntary Carbon Standard, and the Carbon Disclosure Project [10]. National governments of the countries receiving the CDM funded projects are also key governance actors. In case of absence of any CDM funded project, it is responsibility of the governments and NGOs to govern CD and renewable energy efforts through securing financing. It should be form the multi-lateral or bi-lateral donor agencies, governments of the industrialized countries, and/or own funds allocation for the renewable energy purposes. In this paper, efforts are being made to pinpoint the role of government, local institutions, and NGOs in governance of clean domestic energy at local levels in the research area.

Pakistan ratified the Kyoto Protocol as a part of its long term national emission reduction policy and pursuit of eligibility for the CDM projects. The DNA (Designated National Authority) was established in the Ministry of Environment so that to manage the CDM process in Pakistan efficiently and in line with national sustainable development goals [11]. An operational strategy was developed to ensure transparent, participatory, and effective management of the CDM process in the country. Despite being a potential *'recipient'* Pakistan has yet to get benefits from the CDM projects. So far, the country has only seven registered CDM projects. To encourage opportunities for the CDM projects, Pakistan is the first in the region to allow fee-free investment approvals to such projects. The country is fully committed to efficient and transparent operations of the CDM projects through effective governance and institutional linkages such as Pakarab Fertilizer Co-generation Power Project, and Community Based Renewable Energy Development Project in Northern Areas of Pakistan [12].

Apart from Annex I countries and the international development sponsors such as the WB (World Bank), national governments, and their local entities are the actors involved in the governance of renewable energy projects. As noted by Newell [9], a wide range of actors are involved in governance of CD. However, lack of coordination and interaction between formal institutions at different levels and the dispersed nature of authority and decision-making among large number of actors involved in governance of clean energy leads to poor participation, representation, or accountability, making governance processes often weak and to some extent non-existent. Thereby, a number of governance blind-spots are identified such as areas of non-governance and active neglect that need to be brought within the realm of clean energy governance if large scale clean energy transformations are desired [10,13].

The fact that Pakistan is an energy deficient country [14] makes such studies more significant as domestic clean energy issues are not properly integrated into broader energy policy in Pakistan. Although committed to the Kyoto Protocol, Pakistan has not yet much benefited from CDM projects. One of the main reasons of doing so is the lack of sufficient research on identifying energy issues in rural areas and lack of efficient governance mechanisms for clean energy promotion in the country, particularly in rural areas. Increased energy demands of the rapidly growing populations of Pakistan are serious concerns for the government [15]. Besides, the focus on Pakistan is valuable and original as the case of Pakistan is often neglected in the development studies literature and has yet to receive sufficient attention in debates about clean energy. This kind of research may help the researchers and planners to pinpoint the blind-spots in promotion of the effective institutional arrangements for clean energy development in the country. The present study is conducted with the aim to identify institutional arrangements for development of domestic clean energy in the research in the northwest Pakistan.

2. METHODOLOGY

The present study was carried out in District Swat in the northwest of Pakistan (Fig. 1) during September 2010 to January 2011. Two villages namely, Barkaley and Chail, were taken as sample. Majority of people in the area depend on traditional practices of biomass use having environmental impacts such as depletion of the renewable biomass resources and damages to the forest ecosystem. There is a need for proper institutional arrangements at both public and private circles to take effective measures for governing renewable energy projects to ensure sustainability of the renewable energy resources for household use which is essential for socioeconomic growth by improving standards of living [16-17]. Most of the data was collected from the consumers of the energy services, i.e. the household; however, some part of the data came from the organizations working on clean development in the area. Face to face interviews were conducted with the household head using a semi-structured questionnaire. Information from the officials of the organizations was, however, grasped through informal interviews, and their responses were recorded as notes. The household related questionnaire emphasized on information such as energy use patterns, the technology they use for cooking purposes, types of organizations working on renewable energy development in their area, and their perceptions about their cooperation with any potential organization interested to work on renewable energy development. A total of 100 households were randomly selected for data collection. Due to some strict social norms and being patriarchal society, information was mainly collected from the male household head. The main focus of the secondary survey was to identify the intentions of organizations for working on renewable energy promotion in the region in future. The survey data was mainly analysed descriptively. Nonetheless, Chi-Square test was also used for testing statistically significant results.

3. RESULTS AND DISCUSSION

This section provides details of both public and private organizations working in the research area, their work scope, nature of community's cooperation with them, and potential organizations for clean energy development in the region.

3.1 Organizations Working on Clean Development

Perception of the local communities, as shown in Fig. 2, was recorded in order to assess the level of government and NGOs working in the area for clean development. This may possibly reflect the degree of local people's awareness regarding different on-going activities in their area. However, 37% of respondents were unaware of any agency working in their area. Another 46% responded that some NGOs are working on environmental issues in general. Nonetheless, the secondary information acquired from the concerned line departments such as EPA (Environmental Protection Agency), Wildlife Department, and Social Welfare Department, confirmed that EPS (Environmental Protection Society) was the only NGO working on some specific environmental issues in the area. Besides, government's line departments such as forest department and fisheries were also proactively involved on forest and fisheries conservation in the area. However, no organization was exclusively working on renewable energy issues in the area. On the basis of Chi-square test, $P < 0.001$ shows that the results are statistically significant. Hence, it is concluded that the perception of respondents about the nature of organizations working in their areas is different in different villages.

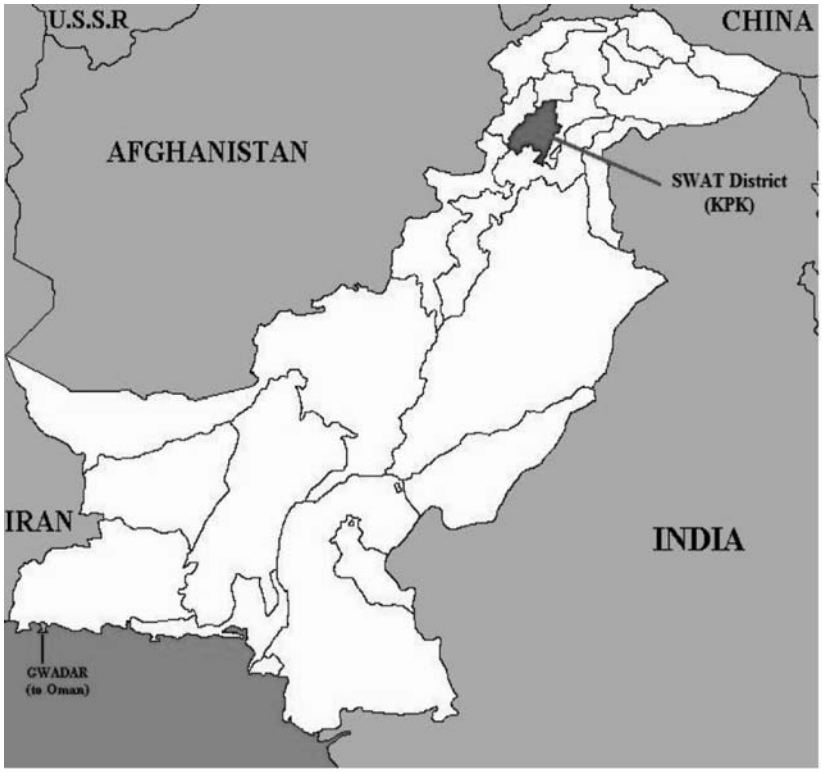

FIG. 1. MAP OF PAKISTAN SHOWING DISTRICT SWAT (RESEARCH AREA) LOCATED IN KHYBER PAKHTUNKHWA (KPK) PROVINCE AVAILABLE AT: HTTPS://WWW.GOOGLE.COM.PK/SEARCH?Q=IMAGES+OF+MAPS+ OF+ PAKISTAN+SHOWING+DISTRICT+SWAT

3.2 Work Scope of the Organizations in the Research Area

As mentioned earlier, the research area was hit by severe flash floods in July 2010; thereby most of the organizations were involved in rehabilitation of the affected communities in the area. They were mainly delivering relief work to the communities. It was found during the data collection stage that fishery and forest departments of the government were working in the area. Swat, especially Madyan is known for the popular fish breed - Trout Fish. Fisheries department is proactive in the area for conservation and protection of fish species, especially the trout. It is worthwhile to mention that the only trout hatchery in Swat, which was located in Madyan has been swept away by floods and no roes, larvae, or fry are left in the area anymore. Similarly, forest department is working on forest protection and reforestation in the area. A number of local and international NGOs were also working in the area, mostly for emergency relief and rehabilitation of the flood affected communities.

3.3 Community Cooperation with Organizations

The level of community cooperation with different organizations working in the area was assessed by knowing their response about their cooperation with those organizations. Seeking this information has importance from the point of view of any future intervention in the area. As evident from Fig. 3, a total of 44% respondents provided effective facilitation to the organizations working in their area. However, 19% noted no willingness for cooperation for *'having no time'* to doing so. Recent research by Moreno and Lopez [18] has highlighted the importance of involvement of local agents for the future development in the field of energy development. This response implies that the role or local agents in future interventions in the energy sector in the area can be instrumental, if initiated by government or any NGO. The P-value < 0.001 confirms that the results are statistically significant, which indicates the different level of community cooperation with the organizations working in their villages.

3.4 Potential Sponsors for Renewable Energy Projects

Pakistan has a greater potential for renewable energy promotion which has been underlined by a number of studies [19-22]. Fig. 4 highlights the perception of community about the potential actors that can work in their area for clean energy development. It is clear from the figure that 52% of the respondents unanimously opted for government as the main actor to work for energy development and environmental sustainability in the area.

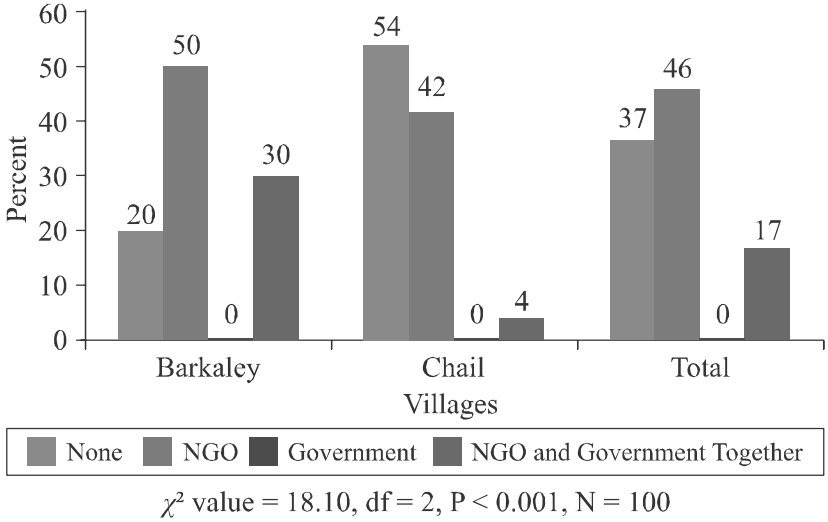

FIG. 2. ORGANIZATIONS WORKING ON CLEAN DEVELOPMENT IN THE RESEARCH VILLAGES

Energy systems in many areas throughout the world have exhibited positive changes through governments' R&D efforts in energy sector and deployment of new energy efficient technologies [23]. Another 48% deemed both NGOs and government as the potential actors for improvement of the domestic energy situation in the region. A government funded initiative in Pakistan called Fuel Switching Technology which was launched through NGOs and community based organizations has already shown tremendous results in terms of improving the quality and efficiency of cooking technology [24].

3.5 Clean Energy Development from Organizational Perspectives

This portion is based on the information obtained from officials of government and NGOs working in the research area with particular focus on clean energy development. It was however; found that most of the organizations in the area were working on community development and rehabilitation of flood affected people. There was no public or private organization working exclusively on clean energy development. The main aim of administering

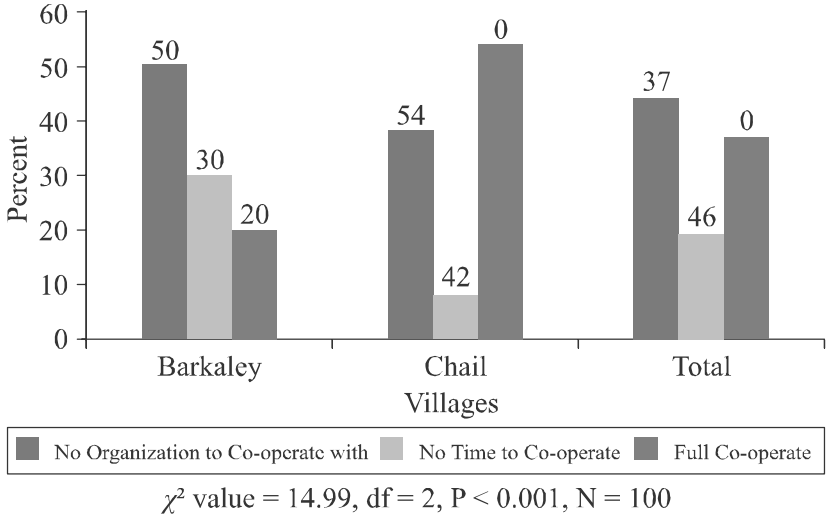

FIG. 3. NATURE OF COOPERATION WITH ORGANIZATION (NGOS) WORKING IN THE AREA

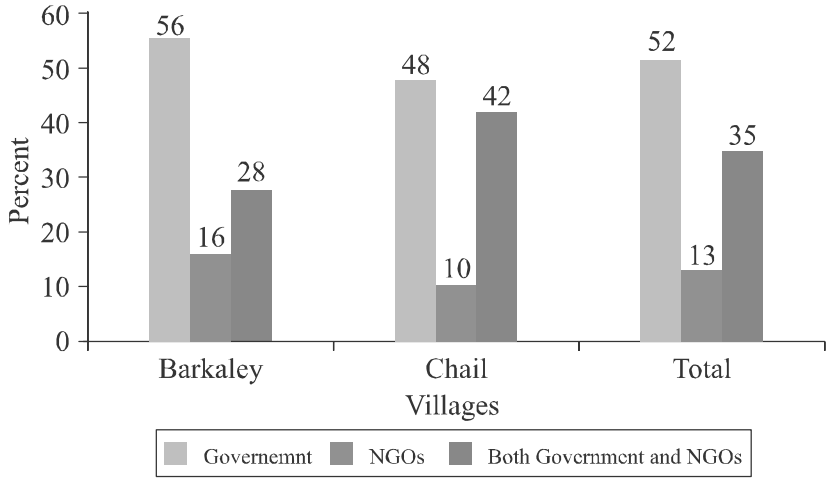

FIG. 4. PERCEIVED POTENTIAL SPONSORS FOR RENEWABLE ENERGY PROMOTION IN THE AREA (N = 100)

interviews with the officials of organizations was to know their future plans for clean energy development and their knowledge about the CDM, external financing, and carbon markets. None of the organizations had any vision or future plans for working on domestic renewable energy promotion with the reason that their organizational work scope was different. However, few organizations were determined to work in future for clean energy development provided they were financed by government or international donor agencies. In response to the community needs for energy, several organizations reported that community's needs are both software and hardware. The people needed to be well aware of the strengths and limitations of the use of clean renewable energy carriers. The hardware needs of community were provision of efficient cooking technologies for sustainable use of renewable energy carriers such as biomass fuels, and/or cleaner fuels such as gas and electricity. Fig. 5 shows that 35% of officials from different organizations reported ignorance of any external financing programs such as those by the WB, or the UNDP. Another 50% noted of their knowledge about CDM. However, only 15% were aware of the role of CDM for Carbon Financing. This discussion implies that due attention is needed to be given to clean energy promotion in the area on both supply and demand sides.

3.6 Community Willingness-to-Cooperate with the Organizations

In order to identify community's opinion for future, their willingness was recorded whether or not they wanted to see any organization working in their area on domestic energy development. All respondents unequivocally confirmed that they wanted to see organizations working in their area on clean energy development. Encouragingly they were willing to cooperate with any organization working in their area. Table 1 shows that 93% respondents confirmed their willingness to cooperate in kind (e.g., facilitation, community mobilization, and/or physical labor, etc.) [25]. Communities were also willing to welcome and cooperate with any micro-finance scheme providing loans to enable poor people to adopt energy efficient carriers. The role of microfinance in climate change adaptation and particularly renewable energy promotion has been adequately discussed in the recent literature [26-27]. Communities were also willing to cooperate even in cash. This shows that there is a great potential for organizations to come forward and initiate pro-poor renewable energy interventions in the area which will be run and managed by the local communities after the intervention is finished. Current literature on energy issues provides enough evidence of renewable energy development interventions being managed and owned by the local people [28]. This will build capacities of the indigenous communities to

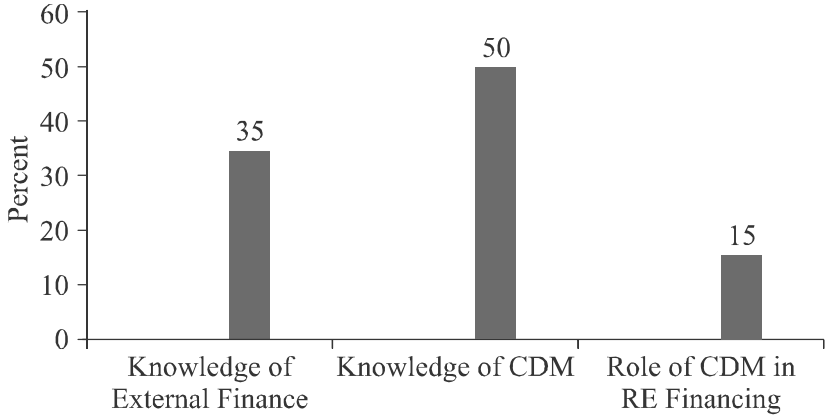

FIG. 5. ORGANIZATIONAL AWARENESS REGARDING CLEAN DEVELOPMENT IN THE AREA (N = 100)

sustainably manage future energy promotion activities in their area without external financing.

3.7 Community Willingness-to-Adopt New Interventions

Fig. 6 illustrates the willingness of a household to adapt to clean energy initiatives in their area. A vast majority of 88% recorded their willingness to adapt to any new intervention. They were inspired to attain new cost-effective, environment friendly clean energy interventions in their area. Only 11% households were indecisive and reported that their choice would be based on time and kind of intervention. The P-vlaue of 0.478 indicates that the results are statistically non-significant and it is concluded that the willingness of respondents about to adapt to any new intervention is similar in different villages. Since majority of respondents in both villages are willing to adapt to new interventions, it is a positive sign for any future initiative in the research area.

The above discussion implies that renewable energy issues in the area as a whole are mainly on the supply side. But for better management of energy, both the demand and supply sides of the energy equation must work in balance [29]. Community's positive attitude to cooperate with any public or private organizations testifies that lack of renewable energy development interventions and lack of institutional framework for promotion and governance of such initiatives are blind spots on the part of the supply side stakeholders. In case of absence of any such CDM project, the government and NGOs role in initiating such projects will be a fruitful effort [10].

TABLE 1. COMMUNITY COOPERATION FOR CLEAN DEVELOPMENT IN THE RESEARCH AREA

		Barkaley	Chail	Total
Would you welcome any organization work on RE	Yes	50 (100)	50 (100)	100 (100)
	No	0 (0)	0 (0)	0 (0)
Your cooperation for RE projects	Cash	0 (0)	7 (14)	7 (7)
	Kind	50 (100)	43 (86)	93 (93)
Total		50 (100)	50 (100)	100 (100)
N = 100, Percent values in parentheses				

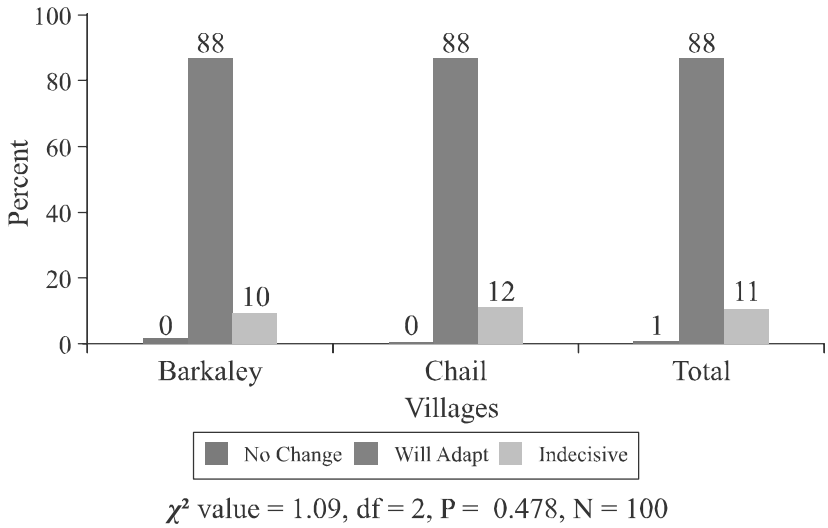

FIG. 6. WILLINGNESS TO ADAPT TO ANY NEW INTERVENTION IN THE AREA

4. CONCLUSION

Being a member of the Kyoto family, the government of Pakistan is committed to mitigate GHG emissions at national level. The focus of this study was to examine the nature of this commitment through evidence of effective governance of the CD projects with particular focus on renewable energy sector. However, limited institutional arrangements for CD initiatives were observed in the area. The apparent but non-convincing reason for which is that NGOs were mostly involved in rehabilitation of the flood affected population. It is concluded from the statistical analysis that the willingness of community to cooperate with any clean energy development initiative and to adapt to any future intervention is an encouraging indicator. This may further lead to achieving the objectives of emission reductions and sustainable development through effective governance of clean energy development by government and private organizations at grassroots level. Before that, however, the need is to have pro-poor, environment friendly renewable energy interventions in the region. Since there was no formally registered CDM project in the area, the study recommends that government and NGOs should play their role to govern CD and renewable energy efforts through securing financing form the multi-lateral or bi-lateral donor agencies, governments of the industrialized countries, and/or own funds allocation for the renewable energy purposes.

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