

# Impacts of climate change on marginalized communities, tourism and their sustainable livelihood in a developing economy

S. Khalil

*Applied Economics Research Center, University of Karachi, Pakistan*

## Abstract

It is a well-known phenomenon that marginalized communities living in areas which potentially have great attraction for tourists in Pakistan also suffer most from the effects of climate change. The fact that marginalized communities represent no significant potential and power to combat the increased disaster risks that climate change is bringing is further dragging them to serious vulnerabilities. In developing countries there is a need to bring marginalized communities to the front line of adapting to climate change, as increasing floods and droughts impact upon their livelihoods. These communities are mostly engaged with agricultural activities, fish farming and live close to the natural environment and forests where most of the tourist attractions are located. Marginalized communities should have experience and awareness to build the resilience of their communities to the intensifying natural hazards to come but unfortunately, the situation is against the hypothesis. With no involvement and contribution of marginalized communities while decision-making, real community adaptation to climate change disasters simply cannot be achieved.

This paper aims to point out the critical nexus between marginalized communities' experiences of climate change, disaster risk reduction, and how they can come collectively to make a whole society strong and sustainable. Climate changing patterns of eight districts of Pakistan are being analyzed by using monthly data from 2000 to 2013 on the amount of precipitation (mm) and mean monthly temperature and mean monthly maximum temperature (mean daily maximum temperature) as indicators of distorting climate patterns, especially in the last ten years.

*Keywords: natural disasters, multiplicity of dialects, alternative livelihoods, metrological department, torrential rains, indigenous people, precipitation, dykes, vulnerability, inquiry commission.*

## 1 Introduction

Expanding globalization involves, surrounded by supplementary matters, raising interdependence among nations of the world. The junction of information and communication technologies has enabled nearly seamless entrance to a measureless and varied range of information and awareness sources from anywhere at any time. This is today's emerging knowledge society. However, there is a significant fraction of the marginalized communities in almost every developing and developed country and surprisingly such communities even in some of the highly technologically advanced countries do not appear to be benefiting from the fruits of developments. They do not feel like sharing the society at large. Yet they possess valuable knowledge about nature and its offerings, ethnic, cultural, and spiritual values that can benefit societies beyond their own communities. These communities suffer from several types of misfortunes like poor literacy, multiplicity of dialects, vulnerability to external exploitation, etc.

At a time there may exist a number of communities that could be tagged as marginalized communities. Pakistan's rural areas are posing the presence of such communities. These communities are largely engaged in agricultural activities and leading a vulnerable life. Term marginalized communities in this paper is referring towards those communities of Pakistan that are residing in rural areas and engaged in agricultural, livestock or fish farming activities. The level of their vulnerability has been revealed once after the floods of year 2010–11. No economic manifesto has ever talked about it before 2010–11. Whenever Pakistan is hit by any disaster these communities suffer a lot.

Pakistan has been going through major droughts for the last four years. Apart from drought years, Pakistan has experienced more or less each year from floods due to capricious rainfall patterns. Regular earthquakes varying from moderate to severe in intensity are observed regularly. The coastal areas of the country are reported as prone to cyclones. On Climate Change Vulnerability Index (CCVI) Pakistan has been ranked as 29 among 193 countries and territories in 2009–2010 and now in 2010–2011 it has changed to 16, which shows that Pakistan is more vulnerable to disasters. If appropriate steps are not taken the cost of adaptation are expected to increase in the next few years. The climate disaster adaptation costs are proposed to \$2.03, 2.72, 3.76 billion, depending on the frequency of disasters low, medium, and high respectively during 2010–2050.

Today, the need for effective disaster risk reduction and adaptations brought about by climate change is even greater and more urgent than ever before. The figure and momentum of disasters are currently increasing in Pakistan comprising seismic events, landslides, droughts, floods, fog, torrential rains, tropical cyclones, dust storms, fires, locusts, oil-spills, etc.



Some experts say “Record droughts in Australia and Africa, floods in Pakistan and central America, and fires in Russia and the United States may all be fuelled in part by climate change”. Disasters disorder a performing community, causing human, material, economic and environmental losses, affecting human development all together. It is also evident that the most noteworthy losses of lives and livelihoods occur in the least developed and vulnerable parts of less developed nations.

Weather-linked vulnerabilities put natural resources used by communities, at risk. Farmers in rural areas are chiefly responsible for securing food. Droughts, floods, and erratic rainfall result in scarcities or lack of resources to fulfill the needs of not only poor peasants and fishermen, but also of their entire communities. If marginalized communities are carried to be active participants in preparedness and response efforts, their role within society could be used to immense improvement. Vulnerable community’s responsibilities in family units and as stewards of natural resources, place them well to develop strategies for adapting to changing environmental veracities. National disaster management authorities, policies and programmes will be meaningful and successful merely if the interests of the marginalized communities are taken into concern.

This paper expresses the connection between disaster risk reduction and climate change adaptation, at the same time as contributing to the continuing national efforts to promote gender marginalized communities in socio-economic development. Fine practices picked to illustrate how marginalized communities can be integrated into climate change adaptation practices to reduce community’s vulnerabilities to the impact of climate change and weather-related disasters, paying consideration in particular to agricultural grower’s needs and priorities. Emphasis has been given to farmer’s knowledge and capacity as environmental and natural resource managers. The importance of land use and administration, and alternative livelihood options in the context of climate change are also discussed.

## **2 Farmers as natural and environmental resource managers**

Farmers in rural areas of Pakistan are mostly illiterate or semi-literate. They reside in a number of villages, often scattered, into fragments or communities. But they form a crucial cog in the national economy by producing raw food, cotton for clothing, and other products that are converted into consumable products, used and enjoyed by a larger population in the urban segments both nationally and internationally. They also make up a base of a democratic socio-political system. They hold powerful family and community bonds and influential feudal bodies for making decisions, often suppressed by wealthy landlords. They live close to nature and have the knowledge of and stake in, the nurture and preservation of nature’s offerings – their environment – for survival, and wellbeing (Neelameghan and Chester [1]). They have several skills also. These communities often possess valuable native knowledge relating to the environment, the land, plants and livestock, social and cultural values, ethnic



music and folk arts. Their knowledge is mostly experience based, and possibly will not even be found in contemporary textbook sources.

Seshia *et al.* [2] have quoted: “There is so much traditional wisdom amongst these tribal and forest dwellers accumulated over the years that they are able to live in harmony with nature. Nature and environment are as much a part of their daily existence as food, shelter and clothing and they are continuously in communion with nature. Our plan for forest management must, therefore, take into account the human beings who live in the forests and nothing should be done which would affect their daily existence or their means of subsistence”. Since a farmer’s son becomes a future farmer for generations their knowledge gained by rural and indigenous people through observation and experience, shared by word of mouth for centuries and passed down the generations is not recorded, processed, disseminated and utilized.

For many decades communities at the grass roots are suffering from various societal handicaps. Being barely literate, they are susceptible to economic, social, political, and technological exploitation by influential. Recent climate change has made these communities even worse. Floods, unpredictable rain patterns, droughts and extreme weather conditions have snatched the crop growing capability. Flood 2010–11 made our farmers realize that they have failed to predict weather and thus took wrong decision of sowing seeds. All major agricultural activities consisting of sowing, watering, timely usage of pesticides and fertilizers, crop harvesting times are based on experiences and previously transferred knowledge. Climate change has made growers handicapped in this dimension.

Crop planning is now more sensitive to risk. Recent times have made agricultural risk management approach as a dire need of farmers in this difficult environment of changing climate patterns for agricultural production. No initiative has been taken in Pakistan to consolidate traditional agricultural and climatic knowledge.

Pakistan meteorological department does not have enough capacity to build any framework that could provide technological and financial services to local farmers. Current situation has resulted in substantial crop losses from drought, frost and flooding, and has also derailed the market access for grown crops. Climate change has made marginalized communities poorer than ever.

### **3 Climate change and alternative livelihood of marginalized communities**

Ninety percent of the village’s energy needs are met by burning wood in Pakistan. After the flood of 2010–11, some productive lands became uncultivable in Sindh. This situation appealed rural communities to explore new piece of land. One way found by them is to bring new pieces of land under cultivation. It has intensified deforestation and desertification at an accelerating pace. Loss of wood cover will enhance erosion, which in turn would make the soil poorer for cultivation, and exposes loose soil that is more vulnerable to



flood. Flooding is expected to happen more often with the heavy rains, and this is seen as partly due to climate change.

Lack of environmental sustainability knowledge and educational training is dragging the vulnerable lives towards more vulnerability. No step has been taken to provide marginalized communities some tools that can enable them to explore alternative livelihood options. Well planned course to generate diversification of income sources, and reduction in wood-cutting will mitigate the future threat of intensified climate change and weather-related hazards such as flooding, landslides, drought and desertification.

#### **4 Marginalized communities and intensifying droughts**

Drought is commonly associated with periods of reduced precipitation of sufficient duration to cause insufficient water resources.

In order to mark the areas vulnerable to drought, a study of the rainfall activity over the country in different seasons and then on the basis of that marking of the areas remaining dry for more than 50% of the time, is required (Farooqi *et al.* [3]). There are two marked rainfall periods namely winter (December to March) and summer monsoons (June to September). If the seasons go dry, they are apt to bring drought conditions. “April to May” and “October to November” are the transition periods. Very little rainfall occurs in the provinces of Sindh, Southern Punjab and Baluchistan during these periods.

Drought risks, worse land-use and inefficient water management are key distorting factors to the lives of these marginalized communities (Britannica [4]). Climate change is predicted to increase water stress. Increasing drought risk is an obstacle to climate change adaptation. No known method exists to reliably predict the occurrence, continuation, cessation or recurrence of drought, although experimental forecasts are being issued in some parts of the world and accuracy does not contain encouraging results.

There isn't any program that is meant to mainstream marginalized communities into its planning process. The biggest problems for these communities are related to water scarcity and seasonal droughts. Analysis of climatological data can help to prepare probability assessments of the occurrence, cessation or recurrence of droughts, thus helping farmers and planners.

#### **5 Fighting desertification using natural resources and local knowledge**

Some areas of Pakistan are mountainous and dry, exposed to drought in summer and torrential rain and landslides in winter [5]. Marginalized communities alone are unable to take initiatives that can tackle desertification, water stress and erosion. Their activities are based on traditional knowledge. Techniques can be built that include rainwater harvesting, innovative irrigation, and increasing the area's biodiversity and plant cover with the incorporation of farmer's knowledge.



## 5.1 Water stress

Climate change is affecting water availability and putting an adverse influence on poverty [6]. Water resources are a basis for the health and welfare of the poor, especially marginalized communities. Both the quality and the quantity of water availability are decreasing.

The proportion of marginalized communities who suffer from hunger, cannot access or afford safe drinking water, and are without adequate sanitation. Moreover, water resources are critical to the viability of the ecosystems through which the poor access the natural resources on which many aspects of their livelihoods are based. Even where water is not a direct input into production, other natural resources (such as forestry, fishing, or grazing) contingent on the viability of ecosystem processes depend on the flows of water through these systems.

## 6 Climate change has put the survival of marginalized communities in question

Climate change has drastically changed the patterns of winter crops (rabi). Production of wheat, which is the basic food item of marginalized communities, is at risk (Azmat *et al.* [22]). As the average temperature is rising in all the provinces of Pakistan, the length of growing season is decreasing. With a rise in temperature, in the range of 1–5°C, wheat yield will increase in the mountainous regions (humid zones) but will considerably decrease in the sub mountainous, arid and semi-arid areas. It is to be noted that more than 90% of the wheat is grown in arid and semi-arid areas, therefore this increase in temperature can have a direct effect on the most important food items of Pakistan.

Summer crops (kharif) of cotton and rice in Punjab and Sindh needs plenty of water. The monsoon facilitates these crops. Despite being the chief export crop of Pakistan, heavy taxes on water are collected on this crop. Climate change has altered the rainfall patterns and the process is still going on. Marginalized communities are getting hurt more in this situation.

Similar to agricultural sector, livestock sector is also vulnerable to the impacts of climate change (Oxfam [20]). Direct impacts of increase in temperature is bringing physiological stress in animals due to raised temperatures, lower productivity of milk and meat as a result, climate related epidemics and impacts on the animal habitations and environment due to extreme climate events such as floods, droughts, heavy rainfall, etc. Indirect effects could be negative impacts of climate change on the productivity of the fodder; decreased nutritional quality and palatability of forage plants due to increase in CO<sub>2</sub> concentration; competition of land between staple food and fodder and increased water requirements for both animals and crops and thus questioning the lives of marginalized communities that depend on either crops or livestock.



## **7 Analyzing and understanding the vulnerability and understanding of women in climate change**

The most vulnerable segment of marginalized communities is women. Women have limited power in household and community decision-making processes, face starvation, disease and sexual assault. The only duty they perform is to cook food, fetch water and raise children. They get no education or health facilities even in severe conditions. Climate change has altered the lives of women in particular. Local environmentalists estimate that 70 per cent of the poor, who are far more vulnerable to environmental damage, are women. It is women and the children who tend to suffer the most, both in the immediate disaster and in the long one.

Flood of 2010-11 has destroyed homes; women continue to live in makeshift shelters along exposed roadsides. In Sindh, approximately 143,750 of flood affectees were pregnant women. Of these, 15 percent – or 21,562 women – needed medical treatment for obstetric complications. Women's marginalized status and dependence on local natural resources increases their domestic burdens. Women being highly vulnerable to climate change and related natural disasters face a significant risk of disaster-related fatalities.

## **8 How marginalized communities were politically abused in the flood of 2010–11**

During the floods and the post-flood period media and personal accounts of the IDPs indicated that dykes were breached to facilitate unauthorized diversion of floodwater to protect the estates on influential landowners, despite the gravity of allegations, not just against influential landlords but against the irrigation department and related state machinery (PILER [21]). Several petitions in this regard were also filed in the court. The magnitude and intensity of the allegations compelled the Supreme Court to institute the 4-member flood commission to investigate the cause of breaches and mismanagement of flood of flood water. The major damage during 2010 floods had occurred due to breaches on embankments along the river Indus.

The assessment reveals 141 breaches all over the country among which 60 were delineated in the province of Punjab while there were 76 in the province of Sindh. Most of the breaches were byproducts of three main breaches that are Left Marginal Dyke (LMB) in Punjab, Tori and Kot Almo in upper and lower Sindh respectively. The breach in LMB of Taunsa barrage which burst and produced a 1900-meter-long breach. This breach created a lot of damage in Layyah, Bhakkar, and Muzaffargarh Districts. Several breaches formed as a consequence of LMB breach in adjacent dykes and canals particularly left bank canals (Muzaffargarh Canal, Taunsa-Punjab Link Canal) of Taunsa barrage.

In Sindh, a breach which almost diverted the whole flow of water of the Indus River is Tori breach. The Tori breach on River Indus caused multiple breaches in canals and roads. Tori breach resulted in vast destruction in the province



particularly in Kashmore, Jacobabad, Qambar, Shahdadt and Dadu. Tori breach resulted in producing a number of breaches in canals and roads and caused a major loss of infrastructure.

A few embankment breaches are not very destructive because of the presence of a second defense line of embankments. Destruction of infrastructure creates a major hurdle in evacuation and rehabilitation especially due to the roads getting damaged. A 60 meter breach which occurred on Dadu-Moro road embankment on Indus river (links National Highway N-5 to Indus Highway N-55) produced a major infrastructure loss as it disconnected the residents of left and right bank of River Indus in this region.

The supreme court of Pakistan took SUO MOTO action after taking the latter sent by Mr Fakhrudin G. Ebrahim and Mr Jan Muhammad Jamali, deputy chairperson senate and three human rights applications regarding unauthorized diversion of flood water. The facts of the petitions in a nutshell were that in the month of July/August, 2010, due to unprecedented flood devastation, the citizens of the country suffered huge losses against their lives and properties. The flood had commenced from the province of Khyber Pakhtunkhwa and flowed up to the Arabian Sea at Thatta.

The court constituted a four members commission comprised of four retired bureaucrats to investigate the embankments breaches and its horrible results. After hearing all the parties and on the basis of oral and documentary evidence, related information in public domain and its interaction with affecters, the commission submitted report , supported by hundreds of documents which have been kept separately in the record.

The question of what precautionary measures were adopted, particularly in view of warnings issued from time to time by the metrological department of Pakistan? However specific evidence was not produced to confirm or deny whether these inspections fulfilled the official instructions had been compiled in letter. In many cases, field inspections ere claimed but not even recorded. The PMD's revised forecast was late, but sufficient time was still available particularly for authorities in southern Punjab and Sindh to take corrective and preventive measures. However, these were not effective, particularly as extremely wide margins were noted in the PMD's flood predictions and actual flows due to unguided torrents streams and rivers.

Most embankments of the River Indus were not maintained, as required and specified in SOPs, this also reflected miss-match in resource allocation, except in case of LMB on Taunsa, rehabilitees in 2008–2009 at the considerable cost under a World Bank funded project. Most breaches also indicated serious organizational and managerial issues impinging upon professionals' apathy besides being an indicator of widespread corrupt practices in the hierarchy .That is also due to disproportionate commitment to canal water distribution under political influences, local committees and user-charges for recovery of maintenance funds may be considered ,as offered by KP farmers to improve communication for timely.

The biggest province, Punjab, had limited but reasonable notice for preventive measures and for issuing warning to people .While threat to Jinnah





Barrage was averted, other breaches including the breaches to LGB/LMB of Jinnah Barrage and those induced by human intervention could have been checked, partly or wholly, to minimize loss to life and property, though these had indirectly but considerably benefited by easing out the pressure on controlled irrigation structure in southern province, Sindh.

## **9 Climate change has snatched the prediction power of marginalized communities**

Farmers and fishermen predict the weather purely out of their observations over the years in natural sequential changes that took place before the climate change. They do not possess any extraordinary sensory perception about the weather. Hence, it is just experience that gives good judgments.

The sharper the observations the greater the credibility of the person who predicted the weather and all decisions of agricultural activities and fish farming are taken on the basis of it. But today only are accurate and reliable to climate changes.

In Pakistan also, farmers have used traditional knowledge to understand weather and climate patterns in order to make decisions about crop and irrigation cycles. Increasing variability in climate has reduced farmers' confidence in traditional knowledge. Change in climate is the main obstacles in sustainable agricultural development today. Without providing the scientific knowledge to the marginalized communities, it is very difficult to communicate about the sustainability of farmers in specific and economy in general. Thus it is necessary to bridge two different knowledge systems.

Exhaustive dialogue between the scientific knowledge providers and user groups helps to define the strategies for bridging the knowledge systems. To develop a decentralized system of forecasting system at the village level by bridging the traditional and scientific knowledge needs a participatory approach to mobilize the farmers around the technology is required. On the other hand, access, availability of infrastructure, skill and expertise are crucial to develop reliable region-specific scientific forecast to serve the farming societies. Due to my limited experience and observation it is difficult to derive any concrete conclusion.

## **10 Supporting data and graphical analysis**

Major districts have been covered that are mainly engaged in agricultural activities and can thus reflect the facing climatic shocks by local marginalized communities.

These districts were badly hit by flood 2010 followed by capricious rainfall. Vulnerable marginalized communities had no prior information of floods and rainfall. In 2010; marginalized communities lost almost everything from crops and livestock to their National Identity Cards (NICs), but managed to save their lives luckily.



Climate change patterns have been analyzed by using monthly data from 2000 to 2013 on the amount of precipitation (mm) and mean monthly temperature, mean monthly maximum temperature (mean daily maximum temperature) as indicators of distorting climate patterns in last five years especially.

This data has been processed in software SPSS to get descriptive statistical analysis. Graphical representation has been further used to depict changing patterns every month every year. This information can be obtained from the author at samina.khalil@googlemail.com.

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