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Using a mixed method approach to discuss the intersectionalities of class, education, and gender in natural disasters for rural vulnerable communities in Pakistan

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Abstract

During the floods of 2014, Pakistan lost 267 human lives. 2.5 million people were displaced, 129,880 houses were fully or partially destroyed, and over 1 million acres of cropland and 250,000 farmers were affected, which resulted in the loss of cash crops and standing food. Using Intersectionality Theory, the current study examines the effects of income, education, land ownership, land type, disaster type, gender, and disability on the loss of agricultural crops, controlling for respondents' age. Secondary data was used for this study from a 2012 baseline survey of disaster risk reduction, conducted by a nongovernment organization in District Muzaffargarh, Punjab, Pakistan. Logistic regression was used to analyze the data. Results indicated that education of household head, high income, and land ownership decreased the likelihood of losing agricultural crops, whereas floods, women-headed households, and disabled family members increased the likelihood of losing agricultural crops.

Keywords: intersectionality; natural disasters; rural vulnerable communities

1.0 Introduction

Natural disasters have become a common phenomenon all over the world due to climate change (Bhatta, Aggarwa, Poudel, & Belgrave, 2015; FitzGerald et al., 2010), but they appear worse for developing countries like Pakistan due to lack of preparedness and prevention (Sinclair, 2014). Although the natural disaster affects local communities, which are at a higher risk, there are some other social factors that also increase the vulnerabilities of these communities after a natural disaster, such as lack of access to sources of information and relevant agencies, lack of knowledge and awareness about the preventive measures, and lack of empowerment and ownership (Aliyu, 2015; Jonkman & Kelman, 2005). Many development organizations and government agencies have been working hard to protect people living in at-risk communities after disasters and implementing many projects for recovery, relief, and rehabilitation (ISDR, 2003; Simmons & Adachi, 2012). However, the evidence reveals that there are serious continuous destructions occurring even after natural disasters in terms of causalities, education disruption, economic loss, and chronic diseases (Kron, 2015). There is a lack of preparedness, awareness, and preventive actions in communities that are susceptible to natural disasters (Buckland & Rahman, 1999). Despite investing substantial resources and making extensive efforts, evidence illustrates that there are potential gaps that still exist in the strategies and programs of these development agencies (Buckland &

Rahman, 1999). This indicates a need for development agencies to rethink and reform their approaches to better design and implement their projects for natural disasters in order to address the needs of these communities (Hok, 2015). This may not only help these at-risk communities but also ensure the sustainability of the projects, which are carried out by these development agencies (Kessy, 2014). Therefore, the current study examines the factors, which predict the vulnerabilities of at-risk communities by using a mixed method approach. The purpose of this paper is not to critique the approaches of development agencies since they are making their best efforts but to provide a new perspective to help them rethink and evaluate their approaches to deal with these at-risk communities in natural disasters. This may help development agencies to improve their strategies and ensure the sustainability of their projects.

Pakistan is one of the developing countries with a population of 184 million, which makes Pakistan the sixth most populous country in the world (Pakistan Demographic and Health Survey, 2012-13). The country has been facing different economic, social, and demographic issues, such as high poverty (Saboor, Khan, Hussain, Ikram, & Mahmood, 2015), unemployment (Skirbek, 2008), lack of education (Sarmad, Akhtar, & Manzoor, 2007), lack of health services (Jain, Sathar, Salim, & Shah, 2013), gender discrimination (Sathar & Kazi, 2000), and over population (Pakistan Economic Survey, 2013). One of the serious issues in Pakistan is natural disasters, which destroy infrastructure, agricultural land, cause casualties, and has impacts on health, schooling, and housing (Qurratulain & Munazza, 2014). The recent floods caused serious destructions all over the country but the situation was quite worse in some districts and District Muzaffargarh was one of those districts (Raza, 2012).

District Muzaffargarh is one of the oldest and largest districts in southern Punjab, which has a 3.5 million population in which 87% of the people are living in rural areas and 13% are situated in urban areas (Raza, 2012). District Muzaffargarh lies in between two rivers, the Indus and Chenab. River Indus is situated 35km away on the right side and river Chenab is situated 8km on the left side of the district (Sikha, Sunil, Arti, Sujata, Navdeep, & Kranti, 2014). The district has four Tehsils¹ and 93 union councils². There are floods and storms that come on a regular basis in this district and make people vulnerable regarding housing, livestock, and agricultural land (Raza, 2012). These disasters also cause many casualties and deprive families of their loved ones. During the floods in 2010, almost 131,293 houses were completely damaged, and almost 50% of the cultivated area was destroyed within this district (Qurratulain & Munazza, 2014). The district Muzaffargarh is the second largest district in the Punjab province where most families are dependent on livestock and agricultural land. The livestock includes buffaloes, sheep, cows, camels, oxen, and donkeys (Moharana, Chinmoy, & Kamboj, 2014). The facts indicate that almost one million tons of food and seed stocks were destroyed in the recent floods. Additionally, 50% of the livestock were killed in the floods of 2010 (Qurratulain & Munazza, 2014). Also, there were 89 dispensaries in the district at the time of the floods of which 28 were damaged including five civil hospitals (Qurratulain & Munazza, 2014). This evidence shows

¹ Tehsil refers to an administrative area of a city or town, which serves as an administrative center with additional towns and villages.

² Union councils refers to an elected local government body, which consists of 21 councilors and headed by a chairman and vice chairman.

the great extent of destruction that was faced by people living in the Muzaffargarh district.

Floods have been happening frequently for decades and are one of the most serious issues in the Muzaffargarh district. Government agencies and development organizations have been working hard and helping communities after floods to protect their lives and provide them with necessary help. However, the above evidence illustrates that there is still much work required in terms of developing effective strategies and programs to find a sustainable solution to this issue. This highlights the importance of finding out which factors increase the vulnerabilities of these communities in order to develop effective interventions for these communities and help to proactively protect them from these disasters. This evidence also emphasizes finding different approaches, which would enable development agencies to effectively work with these rural vulnerable communities in dealing with natural disasters and achieving a sustainable solution for these communities. The following section presents the existing literature, which shows the significance of examining those factors that are important determinants of agricultural loss in a natural disaster. These factors include income, education, land ownership, land type, disaster type, gender, disability, and age.

2.0 Literature Review

Disaster Risk Reduction includes systematic efforts that are made to reduce exposure to hazards, lessen vulnerability of people and property, manage land and environment, and improve preparedness for adverse events (Raza, 2012). Development organizations and government agencies have been carrying out many interventions to help at-risk communities after natural disasters (Kron, 2015). Despite these efforts, almost eight million people became victims of floods and heavy rains and lost their lives in natural disasters, which occurred during the twentieth century (Alexander, 1993). These disasters were considered some of the most dangerous among all natural disasters (Simmons & Adachi, 2012). Floods became a serious risk to human lives and development activities and caused substantial damages to lifelines, vital infrastructure, housing, and agriculture lands (Kron, 2015).

Moreover, flood-related deaths differed significantly among communities based on their demographic and socio-economic characteristics (Saboor et al., 2015). There were distinct patterns of flood deaths between developed and developing countries, while under-developed countries became more vulnerable to other costs, like infrastructure collapse and crop destruction (Saboor et al., 2015). The vulnerabilities to disasters in developing countries are not only due to their susceptibility to natural disasters but also related to both macro-level and micro-level factors (Blaikie, Cannon, Davis, & Wisner, 2014). The macro-level factors belong to social, political, and economic domains of a society. For instance, how the society is politically established, maintained, and perpetuated through an agenda of certain privileged individuals or groups (Blaikie et al., 2014). The extent of social development and economic disparities at macro-level may also influence people's capacity and resiliency to deal with natural disasters and increase their vulnerability against natural disasters (Bankoff, Frerks, & Hilhorst, 2004). At the micro-level, lack of knowledge, awareness, and use of local expertise at individual and community levels are also important elements of increasing vulnerability of local communities, which are susceptible to natural disasters (Bankoff et al., 2004).

These macro and micro level factors turn a natural hazard into a disaster and cost human lives, infrastructure, and destruction in social and economic activities in developing countries (Bankoff et al., 2004). Consequently, people in the community had to rely entirely on personal resources in flooding emergencies, and poor people became more vulnerable and less protected (Saboor et al., 2015). Research showed that people who had less wealth were more likely to face increased vulnerabilities in natural disasters (Phifer, Kaniasty, & Norris, 1988). In the case of a natural disaster, education helped community people to obtain pre-flood information and prepare themselves and their families to handle this situation (Yasunari, Nozawa, Nishio, Yamamoto, & Takami, 2011). This information includes flood forecasting, warnings, and recovery support (Qurratulain & Munazza, 2014).

Furthermore, women and children were more likely to become vulnerable in natural disasters, such as floods (Raza, 2012). This group of the population was more dependent and faced serious challenges in natural disasters, such as health, schooling, and food (Qurratulain & Munazza, 2014). Research showed that women faced a distinct variety of challenges and higher levels of susceptibility than men, which created differences between men and women regarding their experiences with risk, risk perception, preparedness, response, impacts, and rehabilitation in natural disasters (World Health Organization, 2002). During natural disasters, women had less access to food, health services, and other resources (Juran & Trivedi, 2015). The socially constructed and gendered norms limited women's decision making power and mobility during natural disaster, which further increased their vulnerabilities compared to men (Zotti, Williams, & Wako, 2015). Hence, women were more likely to struggle and face substantial challenges in natural disasters than men (West & Orr, 2007). After floods, women experienced depression and anxiety (Ginexi, Weihs, Simmens, & Hoyt, 2000). Women's limited mobility and access to health facilities after a disaster deprived them having appropriate health services, which magnified the negative effects of a natural disaster on their psychological well-being (Ginexi et al., 2000). Women also suffered from pre-flood depression in anticipation of the approaching flood season, especially those who had lower wealth status and were at a higher risk in that situation (Lewis, 2016). Those women who belonged to a low socioeconomic status did not have access to any source of information, such as television, newspapers, or cell phones (Raza, 2012). They also had less education and awareness about institutions and agencies, which provide information to community people about natural disasters (Ginexi et al., 2000). Consequently, natural disasters increased women's vulnerabilities and also decreased their life expectancy (Neumayer & Plümper, 2007).

Research illustrates that those families that had disabled members faced serious difficulties in moving towards a safer place in natural disasters (Papathoma-Köhle, Kappes, Keiler, & Glade, 2011). These disabilities were physical, which created serious challenges for these families regarding mobility (Phifer et al., 1988). Therefore, these families also were more reluctant to leave their homes because it was quite hard for them to migrate to other locations especially if they did not have sufficient time and transportation (Lin, Shaw, & Ho, 2008). Researchers found that people's perception of risk and social trust had a strong association with taking mitigation measures (Sinclair, 2014). If people already knew that they would have obtained sufficient support from development organizations or government agencies, they were more likely to prepare and leave their homes in the case of

natural disasters (Lin et al., 2008). High levels of trust helped community people deal with natural disasters and decreased their potential vulnerabilities (Sinclair, 2014). In addition, there were different resources that increased the capacities of these high-risk communities, such as social networks, livelihood, technological measures, and institutional actions to reduce susceptibility (Buckland & Rahman, 1999). However, the impact of these measures was quite different for community members based on their social class and gender (Saboor et al., 2015). These different levels of effects revealed distinctive consequences for different groups living in the same communities, which depicted that disaster related efforts were governed by power relations based on social class and gender or were not even considered for rural vulnerable communities (Beenish & Amina, 2014).

Research depicts that development agencies have been using different approaches to deal with these communities, such as top-down approaches (Daiski, 2008), and bottom-up approaches (Hill & Rapp, 2014). It is evident that community engagement and empowerment is the key in any development projects dealing with these communities (McCarthy, 2014). It also is equally important to understand the context of these communities to better examine their needs since these communities are quite diverse (Zukoski & Luluquisen, 2002). Approaches of development agencies, which emphasized active participation of all groups of the population in a decision-making process for all projects, regardless of race, class, and gender helped ensure the sustainability of development projects (Freire, 1993). In such a development process, community people carry out the projects and development agents facilitate this process (Herr & Anderson, 2015). Researchers found that these approaches revealed substantial outcomes and brought sustainable changes in complex diverse communities (Herr, 1999). The current paper used Intersectionality Theory as a theoretical framework, which is discussed in the following section. Taken together, people are situated differently in natural disasters and their social locations, such as class, gender, education interact with each other and shape people's distinct experiences in natural disasters. These experiences are also established, maintained, and perpetuated by societal structures. Hence, it is essential to use such a lens that might better help understand their experiences in a more complex and contextualized way, such as intersectionality lens.

3.0 Theoretical Framework

The current study used Intersectionality Theory (Bowleg, 2008; Falcón & Nash, 2015) as a theoretical framework. This theory explains that the intersectionalities of race, class, and gender, among other areas, create distinctive consequences for one group of the population over others (Cole, 2009; McCall, L. (2005). Some groups obtain more privilege and unfair advantages while others become vulnerable and receive adverse effects of these social inequalities (Van Herk, Smith, & Andrew, 2011). Intersectionality theory further states that systems of power exist in society—which interact with one another and reproduce each other—that characterize disparities between individuals or groups (Collins & Valerie, 2013). Individuals' experiences, which are shaped by their multiple social locations, such as race, class, and gender, are more complex rather than additive (Hancock, 2007; Warner, 2008). These social locations magnify individuals' vulnerabilities and produce distinctive experiences for them (Stewart & Christa, 2004). These experiences are established, maintained, and perpetuated by systems of power in society (Weldon, 2006; Dotson, 2014). Research shows that being a

woman, less educated, and belonging to a poor socioeconomic background increases the risk of facing severe consequences in natural disasters (Reyes & Lu, 2016). These intersections of class, education, and gender produce challenges for one group as opposed to others living in the same communities (Few-Demo, 2014). These groups had less access to the available resources than others. The unequal structures of the current society, which create a non-supportive environment for some groups more than others due to the intersections of race, class, and gender, encouraged those most disadvantaged by these intersections to accept the blame for their situations (Few-Demo, Lloyd, & Allen, 2014). Consequently, people in the community internalize these external norms and start to blame themselves (Reyes & Lu, 2016). They feel a sense of dependency and powerlessness not because they are born with these vulnerabilities but because these social domains (class, education, and gender) create a non-supportive environment for them but not for others who are similar to them (Van Herk, Smith, & Andrew). These social inequalities further amplify the disparities between these groups and create a socially unjust society (Syed, 2010).

In the current study, the effects of income, education, land ownership, land type, disaster type, gender, and disability on the loss of agricultural crops were examined. In Pakistan, people living in rural communities, who are at high risk to natural disasters, are more likely to have less or no education (Raza, 2012). Most of the people did not have ownership of land, which creates greater dependency of their livelihood on others' land (Saboor et al., 2015). More than half of the population depends on the agricultural sector since they do not have any resources to run other businesses (Qurratulain & Munazza, 2014). Floods are the most destructive disaster, which destroy their agricultural crops, the only source of earning for these community people (Qurratulain & Munazza, 2014). Women are very much dependent on men in these communities since these communities are informed by traditional gendered norms and patriarchal systems (Sathar & Kazi, 2000). Disability is a social stigma and there are rarely any sources of social or institutional support for those families that have any member(s) with a disability (Papathoma-Köhle et al., 2011). The intersections of these social locations create serious challenges for community people and magnify the vulnerabilities of those who are living in rural communities and who are susceptible to natural disasters (Collins & Valerie, 2013; Dotson, 2014). The hypotheses of the current study, which are informed by Intersectionality theory are:

- ***Hypothesis 1:***

Increase in education, income, and having a land ownership will be associated with a decrease in the likelihood of agricultural loss.

- ***Hypothesis 2:***

Increase in having an agricultural land, vulnerable to floods, being a woman household head, and having a disable family member will be associated with an increase in the likelihood of agricultural loss.

4.0 Method

4.1 Sampling

The current study used an observational research design with cross-sectional data. A mixed method approach was used in this study. The data consisted of 200 household survey interviews and six focus groups. This data was obtained from a nongovernment organization working in District Muzaffargarh. This nongovernment organization has been working in the district Muzaffargarh on different areas, such as education, health, gender, and disaster risk reduction for more than two decades. This nongovernment organization conducted a baseline survey on disaster risk reduction in two union councils of District Muzaffargarh. This baseline survey was conducted in order to obtain information about disaster and its consequences for those communities, which are at high risk. The purpose of this baseline survey was to examine the adverse impacts of disasters on the local communities and develop programs to build their capacity of mitigation and preparedness.

This survey was conducted in two union councils of District Muzaffargarh, which are considered at high risk in terms of natural disasters, especially floods. One union council has eight villages and the other union council consists of four villages. One member, preferably the head of the household or any elderly person including men and women aged between 18 to 60 years, was interviewed through a structured questionnaire in 200 households. These households were selected by using a simple random sampling. A village was considered the primary sampling unit and a household was considered the secondary sampling unit. A list of households situated in these villages of two union councils was obtained from the union councils' office and updated accordingly. A sample frame was developed by using the updated list of households and a simple random sampling technique was used to select a sample of 200 households. For qualitative data, two focus groups were conducted with men, two with women, and two focus groups were carried out with children. In each focus group, participants from each village were invited to ensure the equal representation of all selected villages in these focus groups. The structured questionnaire was comprised of several variables regarding background characteristics of a household, household structure, water facilities, damage, disaster effects, and preventive measures etc. Focus groups were conducted to obtain information about community perception about the severity of disasters, challenges after disasters, and capacities for mitigation and preparedness. They also were asked about their levels of trust of government institutions and development organizations, awareness about government policies of disaster risk reduction, and their level of satisfaction about the work that development organizations and government agencies were doing after disasters.

4.2 Procedure

For data collection, qualified and experienced staff was recruited. A comprehensive training was conducted for the field staff. The orientation about the objectives of the survey, research technique including qualitative and quantitative, questionnaires, sampling, and data collection techniques also was conducted in this training. During the training, mock interviews were conducted to provide surveyors with adequate feedback to conduct an interview. Two teams were selected consisting of one male and two females for data collection. The male was

a supervisor in each team while he also collected the data with other team members. Field monitoring was carried out by the nongovernment organization, which conducted this baseline survey. The questionnaires were reviewed in the field as well as in the office of the organization to minimize any non-sampling errors.

Each team was assigned 100 households and three focus groups. The surveyors visited each selected household and found the head of the household. In case of his/her absence, the interview was conducted with an elderly person of the household who was the usual member of that household. If any surveyor did not find any household member for the interview at his/her first visit, a second visit was conducted to ensure the high response rate. This was a face-to-face and paper-pencil based survey. The surveyors asked the questions to each respondent and provided sufficient explanation to make sure that the respondent understood the question since many respondents were either uneducated or less educated who could not fill out the questionnaire correctly.

4.3 Measures

The outcome variable of the current study is the loss of agricultural crops, which consisted of two categories in its original form, such as yes and no. Yes refers to any agricultural loss faced by the household in the recent floods while no refers to having no agricultural loss. The reason for studying this variable is because a large proportion of the population living in those communities is based on farming. In the case of natural disasters like floods, heavy rains or storms, these communities are severally affected and become vulnerable. The independent variables of the current study are income, education, land ownership, land type, disaster type, gender, and disability. Income of a household refers to the monthly income of the household in rupees. The question about income was open ended in the survey questionnaire to obtain maximum responses. This variable was recoded into a categorical variable, such as 500 to 2000, 2100 to 5000 and 5100 and above. Education refers to the formal education level of the head of a household, which was measured in complete years passed at the time of the survey. Initially, this variable was in scale form. It was recoded into a categorical variable, such as no education, primary, middle, and secondary or higher.³

Similarly, land ownership refers to the different types of ownership, which currently exist in these communities, such as none, owned, rented, and shared. This variable was recoded into dichotomous form consisting of two categories, such as owned and not owned for multivariate analysis. Land type refers to the purpose of land use at the time of the survey. There are two common uses of land in these communities, such as agricultural use and animal diet use, which are the two categories of this variable. The variable about most destructive disasters included three categories, such as floods, heavy rains, and storms. This variable was recoded into two categories, such as floods and storms/heavy rains for multivariate analysis. Gender refers to male and female. Disability refers to at least one person in the household with a physical disability at the time of the survey. The only control variable was the current age of the respondent. This was an open-ended question in the survey questionnaire. The age was measured in complete years. For

³ Primary—5 years of education; middle—8 years of education; secondary—10 years of education and above.

instance, if the respondent was 30 years and six months at the time of the survey, he/she was considered 30 years old. This variable was in scale form, which was recoded into a categorical variable, such as 18 to 30, 31 to 50, and 51 and above years.

4.4 Study Limitations

The current study has some limitations. First, the current study used a cross-sectional research design. Therefore, the causal relationship between dependent and independent variables cannot be claimed. Second, this survey was based on self-reported questions, which increases the response bias. Third, the culture of these communities is traditional and collectivistic and people are more connected and live together, which also increases the social desirability bias in the responses. Finally, the interview was conducted with only the head of the household, and thereby lacks the views of other family members. However, the data was collected through two sources (survey and focus groups), which provided richer information and increased research validity. Despite these limitations, the current study substantially contributes to the literature and also provides important guidelines to the development agencies to rethink and evaluate their approaches to deal with such communities, which are vulnerable to a natural disaster.

5.0 Results

Table 1 shows the percent distribution of the dependent variable (i.e., agricultural loss) with respect to the independent variables (income, education, land ownership, land type, disaster type, gender, and disability). According to the results, old age is one of the prime factors to increase the vulnerability of the households in terms of agricultural loss in a natural disaster as 78 % of the households aged 51 and older lost their agricultural land in a natural disaster as compared to the other age groups (18 to 30 and 31 to 50). Moreover, the percentage of households, which had an agricultural loss due to natural disasters increased with a decrease in education level of head of the household. For instance, almost 33% of the households that had a household head with a secondary or higher education lost their agricultural crops compared to those 60% households, which had a household head with no education. This indicates the importance of having a sufficient education level for household head, which helps him/her to access sources of information about disasters. Those households, which had high income levels, lost agricultural crops relatively less than other groups. For instance, 48% of the households, which had monthly incomes of 5100 and above lost their agricultural crops to natural disasters. Those households that had monthly incomes of 2100 to 5000 and 500 to 2000 lost their agricultural crops by 57% and 73% respectively.

Furthermore, those households, which were using rented land (92 %) lost their agricultural crops compared to 85% of the households, of landowners. Both agricultural land and land for animal diet became vulnerable to natural disasters as revealed by 72% of the agricultural land having been destroyed in disasters and 75% of the land used for animal diet. In addition, heavy rains and floods became a core source of destruction in terms of agricultural loss. The data demonstrate that 100 % of the households lost their agricultural crops due to heavy rains, 65% of the households lost their agricultural crops in floods, and 41% had an agricultural loss due to storms. This indicates that all groups are vulnerable, but depending on where they are situated in terms of their intersectional location, they may or may

not have more of a buffer when these disasters occur. Finally, female-headed households were more vulnerable in natural disasters in terms of losing their agricultural crops than male-headed households. For instance, 63% of the households, which had a female head, lost their agricultural crops compared to 55% of male-headed households. Having a family member with a disability also increased the vulnerability of a household. Almost, 86 % of the households, which had at least one disabled person in the family lost their agricultural crops compared to 55 % households which did not have any disabled family member and lost their agricultural crops.

Table 1: *Percent Distribution of the Household, which Faced Agricultural Loss*

Variables	Categories	Agricultural loss		N
		No	Yes	
Age of respondent	18 to 30	44.2	55.8	86
	31 to 50	38	62	71
	51 and above	22.5	77.5	43
Education level	No education	39.9	60.1	158
	Primary	44.4	55.6	9
	Middle	43.3	56.7	30
	Secondary/Higher	66.7	33.3	3
Income level	500 to 2000	26.9	73.1	52
	2100 to 5000	42.7	57.3	96
	5100 to above	51.9	48.1	52
Land ownership	None	66.2	33.8	71
	Owned	15.3	84.7	72
	Rented	7.7	92.3	26
	Shared	71	29	31
Land type	Agri. use	27.5	72.5	109
	Animal diet	25	75	20
Most dangerous disaster	Floods	34.1	65.9	123
	Heavy rains	0	100	10
	Storms	59.1	40.9	66
Sex	Male	45.4	54.6	107
	Female	37.2	62.8	93
Disability	No	45.3	54.7	172
	Yes	14.3	85.7	28

For multivariate analysis, logistic regression was used due to the dichotomous dependent variables in the current study. Two models were run. In the first model, control variable (age of the household head) was modeled with the outcome variable. In the second model, all independent variables were modeled with the dependent variables. Table 2 (see appendix) shows the odd ratios of the households in terms of losing their agricultural crops. According to the results, those households, which have at least one family member aged between 18-30 years are 0.78 times less likely to face the loss of their agricultural crops than those which do have any family members aged of 51 and above years ($OR = 0.78$; $p = 0.04$). Similarly, those households that have family members aged between 31-50 years are 0.69 times less likely to face an agricultural loss than those, which have family members aged between 51 and above years ($OR = 0.69$; $p = 0.03$). The results are consistent with previous studies (Bei et al., 2013; Phifer et al., 1988).

Moreover, those households, which have a head of household with a primary education level are 0.31 times less likely to lose their agricultural crops than those households that have a household head with no education ($OR = 0.31$; $p = 0.04$). Similarly, those households, which have a household head with middle education level are 0.39 times less likely to lose their agricultural crops than those households that have a household head with no education ($OR = 0.39$; $p = 0.02$). Likewise, those households, which had a household head with secondary or higher education are 0.55 times less likely to lose their agricultural crops than those that have a household head with no education ($OR = 0.55$; $p = 0.004$). Similar results are found in the past studies (Yasunari et al., 2011). Furthermore, those households, which have a monthly income level between 500-2000 rupees per month are 1.83 times more likely to lose their agricultural crops than those which have a monthly income level between 5100 and above ($OR = 1.83$; $p = 0.01$). Similarly, those households, which have a monthly income level of 2100-5000 are 5.18 times more likely to face an agricultural loss than those who have an income level of 5100 and above ($OR = 5.18$; $p = 0.04$). These results are consistent with the previous studies (Saboor et al., 2015).

In addition, those households, which do not own the land are 1.4 times more likely to face an agricultural loss ($OR = 1.41$; $p = 0.03$). Those households, which have land for animal diet are 0.61 times less likely to lose their agricultural crops than those, which have their land for agricultural use ($OR = 0.61$; $p = 0.05$). Floods are considered the most destructive disaster in terms of agricultural loss. The results show that floods are 2.76 times more likely to destroy agricultural crops than heavy rains or storms ($OR = 2.76$; $p = 0.001$). The results are consistent with the previous studies (Alexander, 1993; Ahsan & Warner, 2014; Cyr, 2005). Furthermore, the results also reveal that female-headed households become more vulnerable than male-headed households in natural disasters in terms of losing agricultural crops. It is evident that male-headed households are 0.55 times less likely to face an agricultural loss than female-headed households ($OR = 0.55$; $p = 0.02$). Similar results are observed in the previous studies (Juran & Trivedi, 2015). Additionally, those households that have at least one disabled family member are 2.8 times more likely to face an agricultural loss than those which do not have any family member with a physical disability ($OR = 2.76$; $p = 0.001$). These results also are consistent with the previous studies (Papathoma-Köhle et al., 2011). The Hosmer and Lemeshow test showed that the model was a good fit with the data ($p = .061$). The F change illustrated that both models had a significant change. There

was almost 2% variance explained by the first model and 8% variance explained by the second model.

Table 2: Summary of Logistic Regression Analysis for Variables Predicting Likelihood of Households, Which Face Agricultural Loss: Disaster Risk Reduction Survey, 2012

Variables	Model 1			Model 2		
	OR	SE	p	OR	SE	p
Age (51 and above)*						
18 to 30	0.78	0.73	0.04	0.74	0.77	0.02
31 to 50	0.69	0.91	0.03	0.61	0.93	0.04
Education level (No education)*						
Primary (5 years)				0.31	0.43	0.04
Middle (8 years)				0.39	0.61	0.02
Secondary/Higher (10 years or higher)				0.55	0.59	0.004
Income per month (5100 rupees and above)*						
500 to 2000				1.83	0.89	0.01
2100 to 5000				5.18	1.03	0.04
Land ownership (Owned)*						
Not owned				1.41	0.98	0.03
Land type (Agriculture use)*						
Animal diet				0.61	0.27	0.05
Disaster (Storms/Heavy rains)*						
Floods				2.76	0.93	0.001
Sex (Female)*						
Male				0.55	0.39	0.02
Disability (No)*						
Yes				2.76	1.23	0.001
R ²	0.02			0.08		

Source: Disaster Risk Reduction Survey, 2012.

Note: The dependent variable in this analysis is agricultural loss coded such as 0 = no agricultural loss and 1 = agricultural loss.

*Reference category

R²: Variance explained by the independent variables.

In the qualitative part of the study carried out via focus groups, the respondents explained that floods and heavy rains destroyed their houses, agricultural crops, and infrastructure of their communities, rendering them vulnerable. Families that had mud houses faced the most destructive effects of floods and heavy rains. The respondents further discussed that these disasters usually happened in the summer season. According to the respondents' views, all age groups, such as men, women, and children were affected by these disasters, but women, children, and disabled persons were more susceptible to many problems after these disasters, such as drinking water, diseases, mobility, and food. Anticipating recurrent disasters, people in the community developed some strategies; a female participant discussed her experiences after the recent natural disaster (i.e., floods) in one of the focus groups:

We became vulnerable after the recent floods. We had small children and it was extremely difficult for us to take care of our children after the disaster. There were no proper bathrooms available after disasters and when our houses and agricultural land were destroyed in the floods, we had no shelter to live and perform daily activities. We and our children were caught by several diseases and there was no medicine or treatment available in our communities after disasters. We could not move to any other places ourselves to find any medical assistance, which made us and our children miserable.

Moreover, people in the community develop some strategies to protect their most important items, such as jewelry or ownership documents from disasters. For instance, they prepared safety bags in which they put their legal or any necessary documents and gold in order to move to safer places in natural disasters, but they did not have any long term plans to protect themselves from these disasters. In addition, due to poverty and being situated between the two rivers made them more susceptible to natural disasters. Community people cannot carry their necessary luggage because they do not own any sources of transportation and transportation costs shoot up in natural disasters, which they cannot afford and thereby, they lose their assets. In a focus group, one male participant discussed the issue of transportation:

We did not have tractors or buses to carry out our important luggage and move us to any safer places in the last floods. We had to hire the transportation and they charged a lot of money, which we could not afford and we lost all our possessions.

There is no early warning system in these communities, which could provide community members with any information about the disaster, allowing them to carry out some preventive measures in time to protect their goods and families. Usually, people depend on the media to obtain information about the natural disaster if it is accessible for them. If these sources of information are not

available, experienced adults in the community go and observe the movement of the river. Based on the movement of the river, they inform community people about their prediction of floods allowing them to take action to move to safer places. The government does not have sufficient programs about disaster risk reduction and risk management in these communities. Community people do not have knowledge about any relevant government department, which might be responsible to help community people in a natural disaster. One male member talked about his experiences of the past floods:

No one came during the last floods except the army to help our families. They did not care about us, whatever happened. Some welfare organizations came after the floods and they worked at whatever they could do, but there was no proper strategies or programs to handle floods in this area, which brought us and our families at high risk.

There are many diseases, which occur after the disaster in these communities, such as fevers, stomach problems, and allergies. The most serious disease in the last floods was an eye infection, which caused adverse effects and exacerbated several issues for the community people especially for the children. Due to the lack of safe drinking water, sewerage, and water contamination after the floods, several water borne diseases attacked the children especially newborns. During one focus group, one child participant talked about his experience of the previous floods:

There were several diseases that harmed children after the past floods, such as allergies and fevers. We drank contaminated water, which also caused several stomach diseases, especially for the newborns. The eye infection was the most severe disease that we had after the last floods. There was no adequate medicine and treatment to protect us from these diseases.

To sum up, those households, which had high income, an educated male head of household, land ownership, and no disabled family members, were less likely to face the agricultural loss in natural disasters. Floods were the most destructive disaster in these vulnerable rural communities. Community people are willing to make the best effort to protect their families from natural disasters but they are unable to make this happen due to the lack of resources. The intersectionalities of income, education, and gender produced worse consequences for rural vulnerable communities in natural disasters, which decreased the well-being of men, women, and children living in these communities.

6.0 Discussion

The current study used Intersectionality theory to examine the effects of income, education, land ownership, land type, disaster type, gender, and disability on the loss of agricultural crops, controlling for age of the respondents. The results

indicate that those households, which had high income, a male and educated household head, land ownership, and no disabled family members, were less vulnerable in a natural disaster in terms of loss of their agricultural crops. This shows that the intersectionalities of class, education, gender, and disability created more challenges for some groups than others, even though these groups are living in the same communities (Falcón & Nash, 2015; Few-Demo, 2014; Few-Demo et al., 2014; Van Herk et al., 2011).

Members of one group living in the same community that have more wealth, high education, and social support in terms of male household head, are more protected from natural disasters and have decreased vulnerabilities (Raza, 2012). For instance, families belonging to this group have higher wealth status (Alexander, 1993). These families are more likely the owners of the large scale agricultural land (Ahsan & Warner, 2014). They also are most likely to have other businesses, which decrease their dependency on agricultural land (Cyr, 2005). These families also own houses in the city areas or at least in safer areas, which are not at a high risk of natural disasters (Alexander, 1993). They also have transportation to move their household material and any physically disabled family members (Ahsan & Warner, 2014). Additionally, advantaged families are more likely to have an educated household head who might have knowledge and exposure to different sources of information where he/she could obtain early warning information about disasters and make decisions to move towards safer places well before disasters occur (Aliyu, 2015). An educated household head also is more likely to be a male, who will have more social support from community people because he spends most of his time outside of the house interacting with community people and performing economic and social activities with them (Yasunari et al., 2011). Therefore, having a male household head creates an advantage for families living in these communities in terms of protection from natural disasters (Bhatta et al., 2015).

In contrast, the other group living in the same communities with less income, education, and a female household head, has increased vulnerabilities during natural disasters. For instance, families belonging to this group either work on a small agricultural land or they rent a piece of land and grow agricultural crops on that land (Qurratulain & Munazza, 2014). These families are completely dependent on that small agricultural land since they do not have any other business in the city area (Saboor et al., 2015). These families also rely on livestock, which also is susceptible to natural disasters (Raza, 2012). Due to poverty, these families are less likely to have access to electronic media, such as a television, radio, or mobile phones (Aliyu, 2015). They also do not have vehicles to move their goods or any disabled family members and since the transportation costs increase during natural disasters, they cannot pay that much money to move their household material to safer places (Papathoma-Köhle et al., 2011). According to Intersectionality theory, disparities not only exist between men and women but they also occur between men when men intersect with other social locations, such as class (Bowleg, 2008). For instance, in a natural disaster, men are less vulnerable than women but some men are also vulnerable than other men due to their low socioeconomic status. Hence, Intersectionality Theory not only focuses on identifying disparities between privileged and under-privileged groups but it also helps examine the distinctive experiences within the same groups due to the intersections of different social locations (Cole, 2009; McCall, 2005).

Furthermore, due to the lack of education, these families do not have knowledge and access to the relevant government or nongovernment agencies to obtain information about disasters (Yasunari et al., 2011). In the case of a female household head, these families faced increased vulnerabilities because female household heads do not interact with other community members due to traditional cultural norms and, thereby, lack social support (Sathar & Kazi, 2000; Lewis, 2016). Therefore, the intersection of gender and education reduces the positive effects of education of household head for families belonging to the relatively more vulnerable groups living in these communities (Few-Demo, 2014; Few-Demo et al., 2014). Intersectionality Theory explains that systems of power intersect with each other and coproduce each other, which results in disparities and inequities among groups or individuals and shape their differential experiences in society (Collins & Chepp, 2013). Hence, being a woman explains a causal mechanism of having low socioeconomic status in society, which may be the result of losing agricultural crops in a natural disaster (Hancock, 2007). Additionally, being a poor woman and living in a vulnerable community amplifies this causal mechanism and magnifies women's vulnerability in natural disasters (Weldon, 2006). These causal effects do not occur in isolation but these effects are the product of being related to multiple social locations and much stronger than women might have while belonging to each social location separately (Bowleg, 2008; Cole, 2009; Dotson, 2014; McCall, 2005).

The use of socio-demographic variables to operationalize intersections is consistent with the previous studies and considered to be important (Warner 2008). However, experiences of community people are more complex and beyond the quantification and statistical procedures (Dubrow 2008). Hence, experiences of community people may be better understood qualitatively by using Intersectionality Theory (Bowleg, 2008; Stewar & McDermott, 2004). It should be mentioned that the current study used a mixed method approach to examine the intersectionalities that helped provide a nuance of understanding about the experiences of people in the community during a natural disaster. Therefore, the current study makes a unique contribution in the literature of intersectionality to understand the unique experiences of rural vulnerable communities, which are susceptible to natural disasters.

It should also be noted that many development organizations have been carrying out different projects to help high-risk communities (Bankoff et al., 2004; Daiski, 2008; Kessy 2014; Simmons & Adachi, 2012). However, these projects do not show long-term effects on these communities and lack sustainability overall (Daiski, 2008). This may be due to a lack of appropriate knowledge and understanding of the experiences of people living in rural vulnerable communities, which are the product of intersections of their multiple social locations and are more complex than additive (Dubrow 2008; Bowleg, 2008; Stewar & McDermott, 2004). A better understanding of such diverse communities might inform effective interventions and best practices (Buckland & Rahman, 1999). A community empowerment approach would be a useful approach to understand such diverse communities and gain adequate knowledge about the experiences of people living in these vulnerable communities (Freire, 1993; Herr, 1999). This approach towards rural vulnerable communities might also help development agencies to engage and empower these communities (Herr, 1999). A community empowerment approach might be helpful but that it can't be one size fits all since people are differently situated in the community—for example women versus men (Gonzalez et al.,

2007; Herr & Anderson, 2015). People in the community have differential vulnerabilities due to where they are situated in terms of their social locations. Any monolithic interventions may not address these complex intersectionalities and how they shape the experiences of people in the community (Herr & Anderson, 2015; Thomas, Pate, & Ranson, 2015).

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