

LIVELIHOOD ASSETS AND POVERTY NEXUS: A CASE STUDY FROM RAINFED POTHWAR AREA OF PAKISTAN

Naheed Zahra*, Hassnain Shah*, M. Azeem Khan* and M. Zubair Anwar*

ABSTRACT:- The present paper is based on primary data collected from a sample of 40 households around watershed project site at Fateh Jang in Pothwar region. The inter-linkage of livelihood assets and poverty is determined by employing poverty score card technique. The poverty status of household was highly correlated with the livelihood sources ($P < 0.01$), water availability for irrigation ($P < 0.10$) and tenancy status ($P < 0.05$). The results regarding poverty revealed that 2.50% of the sampled households were chronically poor, 5.0% transitory poor, 37.5% transitory vulnerable, 32.5% transitory non-poor and 22.5% was non-poor. Most of the sampled households fall along the transition line which implies their vulnerability to be trapped in poverty due to any shock. Beside other assets, even small scale irrigation was significant and an effective tool to improve income. Therefore along with improvement in irrigation practice through using high efficiency irrigation systems, other water harvesting techniques being demonstrated in the watershed project could also improve livelihood in the area. Better utilization of available resources would also improve livelihood and decrease poverty in the area.

Key Words: Assets; Poverty; Livelihood Sources; Irrigation Sources; Tenancy; Pakistan.

INTRODUCTION

Rainfed area contributes significantly to agriculture and livestock production of Pakistan. Out of total cropped area of 20 mha about 5 mha is rainfed. Farming in arid zone is characterized by low yield of main crops due to low and unreliable rainfall. The Pothwar area is characterized by deteriorating land resources and fragmented landholdings with limited water resources. Farmers in Pothwar area are under great income stress as yields are very low on account of shortage of water (Cheema, 2001). The efforts of gover-

ment and other agencies to improve the livelihoods of farmers in arid zone have not been uniformly successful as most of the past investments in irrigation not specifically targeted poor people (ADB, 1995). Historically irrigation has played a major role in enhancing agricultural production and poverty reduction (Hussain and Biltonen, 2001). Furthermore, the intensification of agriculture requires more water for higher cropping intensity in the irrigated parts in the rainfed areas.

Besides considerable investment for developing some kind of water sources like mini dams, dug wells,

* Social Sciences Research Institute, National Agricultural Research Centre, Islamabad, Pakistan.
Corresponding author: naheedrizvi 83@gmail.com

ponds etc. in the rainfed Pothwar water bodies, the performance of irrigation systems generally remained low in these areas because of traditional irrigation practices. One of the best ways to free up water for other uses is to improve the productivity of water in agriculture. Productivity gains can be achieved from improved agricultural practices and improved water storage combined with the delivery services (IWMI, 2001).

The current information is based on one such initiative by USDA and ICARDA in collaboration with National Agricultural Research Centre under watershed project to improve the water productivity through improved irrigation practices.

The current study tested the hypothesis of relationship between poverty and assets, among which water is one important input. The results are expected to provide empirical evidence for integrating communities having irrigation source with project interventions for wider impact.

MATERIALS AND METHOD

Data Collection

The paper is based on primary data (n=40) collected through a well designed, pre-tested questionnaire from the village Thatti Gujran in Fateh Jhang. The simple random sampling technique was used for sample selection. For the estimation of assets based poverty, poverty score card technique has been used. Descriptive analysis and bi-variate analysis was used to link the poverty levels with different farm assets and farm categories.

Estimations of Poverty Score Card

Poverty score card is a new approach according to which direct measures (income and consumption based poverty) are considered costly and time consuming (Schreiner, 2006). While, indirect scoring costs less, and is more accurate and more easily verified (Schreiner, 2007). To construct the poverty score card, thresholds of each household were administered by the 10 questions by assigning each question with different scores. The scores of all questions were added up to calculate the total scores of each household. The households were categorized into poorest (scoring < 25), transitory poor (scoring 25-34), transitory vulnerable (scoring 35-54), transitory non-poor (scoring 55-69) and non-poor (scoring >70) scores on the poverty score card.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Majority of the sample respondents were heads of the household and their socio-economic characteristics were particularly asked to understand the farm manager's decision making power to adopt a particular livelihood strategy. Age, education and farming experience of the head have strong influence on the decision regarding the crops and livestock management and farm investments (Shah et al., 2005). The results indicated that the average age of the respondent was 44 ± 13.34 years. Education is an essential part of human assets and an important indicator of quality of human resources and development stage of a society. In the study area the educa-

tion level of the sample respondents was very low with 2 years of schooling on an average. Farming experience is also very important indicator of human assets because as farming experience grows it will further improve the skill and capabilities of the respondent (Shah et al., 2005). According to the results average farming experience of the respondent was 18 years. Average household size of the sample respondent consists of 6 members.

Farm Characteristic of Respondents

Land is an important natural asset and sign of wealth and status as those who possess land have better livelihood opportunities (Kafle, 2008; Narayan, 2000; Sharma, 2008). Land ownership provides status in the social setup as well as it is also important collateral for access to credit markets. There is positive relationship between size of land holdings and livelihood in rural areas; however in the study area the ownership of the

land was very low. On average 42.5% of the respondents were working as tenants, only 20.0% respondents were owner- cum- tenants and 37.5% of the respondents were owners (Figure 1).

The importance of irrigation water cannot be neglected in such a highly water stress area. The availability of irrigation water helps to grow multi crops and hence diversification of the household income. The irrigation water is the basic source for many livelihood activities in rural areas (Hussain et al., 2007; Merrey et al., 2005). The area under study was mainly rainfed. Out of total respondent, 55% depend, exclusively on rain water for their crop. Only 2.5% of the household have irrigated land and have their own dug well for irrigation purpose. About 25% of the respondents have both irrigated and rainfed land (Figure 2).

Due to small land holdings, the households in the study area were involved in both farm and off- farm activities for earning their livelihood.

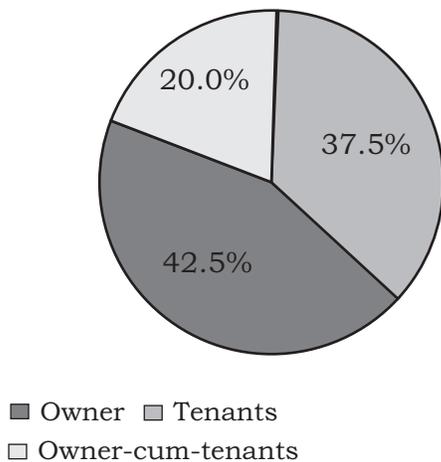


Figure 1. Land status of the respondents

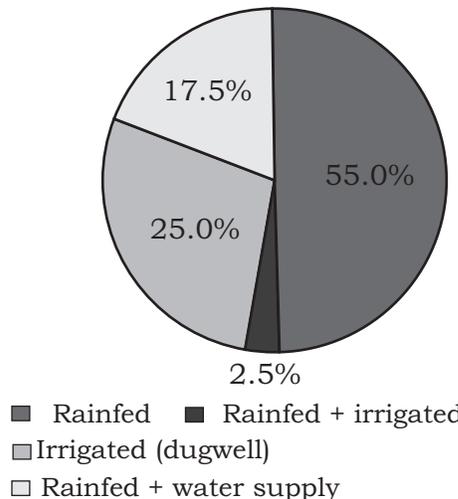


Figure 2. Irrigation status of the respondents

As far as the farm income sources are concerned 2.5% farmers rely on crops only for their livelihood, majority (47.5%) of farmers earn their living by both farm and off-farm income sources. In the off-farm income about 27.5% were working as private laborers, 20.5% were taxi drivers and 10% were daily wage labors. This shows that the households in the study area were usually doing low income off-farm activities to earn their living (Figure 3).

Distribution of households by poverty bands categories in the study village revealed that 2.5% households were facing chronic poverty. Out of total 40 households, 5.0% were transitory poor which indicated that these were lying at the bottom of the poverty line and need additional assets to come out of poverty. About 37.5% of the household were transitory vulnerable. The results indicated that 32.5% of the house-hold were

transitory non-poor that meant they were on the upper side of poverty line but a minor fluctuation in their assets could make them poor or non poor, the 22.5% of the households fall in non poor category (Figure 4).

Bivariate Analysis

This analysis was carried out with the help of cross tabulation. A cross tabulation is called a contingency table because it help to look at whether the value of one variable is contingent upon that of other. It is useful when each variable contains only a few categories (Gardner, 2000). Bivariate analysis was used to link the poverty levels with different livelihood sources, farm assets and farm categories.

The results indicated that poverty was high if the household were dependent on farming alone (Table 1). The household having some non-farm supplemental income source

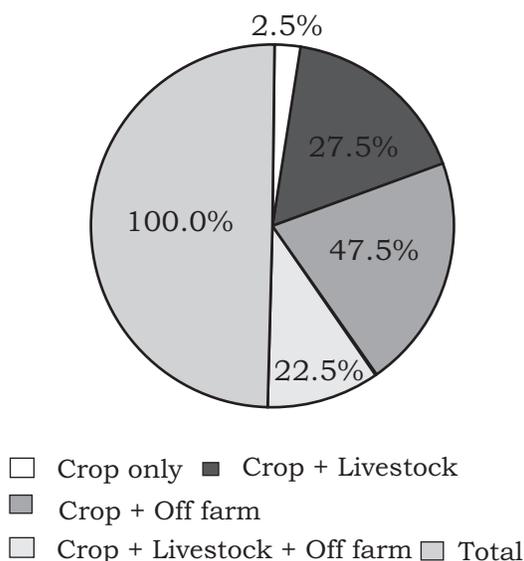


Figure 3. Livelihood sources of the respondents

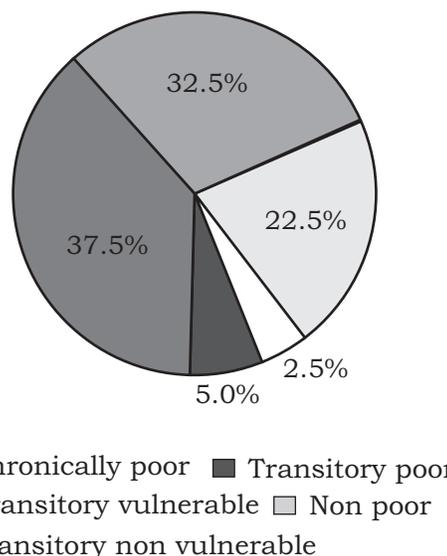


Figure 4. Distribution of household according to the poverty scores

LIVELIHOOD ASSETS AND POVERTY NEXUS

along with farm income were relatively less poor. This implies poor productivity of both land and labor. Furthermore assets based poverty and livelihood sources were also highly correlated ($P < 0.01$).

Normally, agricultural land is considered as a main livelihood source of the rural poor and the engine of economic growth. Its growth reduces poverty directly, by raising farm incomes, and indirectly, through generating employment and reducing food prices. According to the results both variables are correlated at 5% level of significance (Table 2). The results depicted that poverty was high if the households were tenant. The households having some ownership of land were relatively less poor. DFID (2001) also put forth the same conclusion. There is positive relationship between size of land holdings and livelihood in rural areas (Cook and Grut, 1989; Lutz and Young, 1992). Therefore efforts are required to increase the productivity of farm income through better water management both at irrigated and

rained areas through better rain water harvesting and water conservation practices (Table 2).

The importance of livelihood system and livelihood sources has been well documented and accepted for targeting the development objectives (Delali et al., 2005; Ellis, 1998; Chambers and Conway, 1992). The livelihood assets are well interconnected and interdependent but different endowments resulted in shaping different livelihood strategies (Scoones, 1998). Poverty is also linked in overall system of livelihood and further depends upon the quantity and quality of these assets (Dharmawan, 2001). However technological inputs and business solutions are always helpful to improve the livelihood through better management and use of livelihood resources (Saadi, 2008; Moser, 2006; Andrea et al., 2010). The possession/access to irrigation water helps in multi-cropping and hence diversifies household income. The area under study was mainly rained. The results also indicated that poverty was high if

Table 1. Poverty bands and livelihood source

Poverty Bands	Crop	Livelihood Source			Total
		Crop + Livestock	Crop + Off farm	Crop + Livestock + Off farm	
Chronically poor	1 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.5)
Transitory poor	0 (0.0)	2 (5.0)	0 (0.0)	0 (0.0)	2 (5.0)
Transitory vulnerable	0 (0.0)	5 (12.8)	6 (15.4)	4 (10.3)	15 (38.5)
Transitory non-poor	0 (0.0)	2 (5.1)	8 (20.5)	3 (7.7)	13 (33.3)
Non-poor	0 (0.0)	1 (2.6)	5 (12.8)	3 (7.5)	9 (20.5)
Total	1 (2.5)	10 (27.5)	19 (47.5)	9 (22.5)	40 (100)

Figures in parenthesis are percentages; Chi square= 64.677 (significant at 1%)

Table 2. Poverty band by tenancy status

Poverty bands	Categories of tenancy status			Total
	Owner	Tenants	Owner-cum-tenant	
Chronically poor	0 (0.0)	1 (2.5)	0 (0.0)	1 (2.5)
Transitory poor	0 (0.0)	2 (5.0)	0 (0.0)	2 (5.0)
Transitory vulnerable	3 (7.5)	10 (25.0)	2 (5.0)	15 (37.5)
Transitory non-poor	5 (12.5)	4 (10.0)	4 (10.0)	13 (32.5)
Non-poor	7 (17.5)	0 (0.0)	2 (5.0)	9 (22.5)
Total	15 (37.5)	17 (42.5)	8 (20.0)	40 (100)

Figures in parenthesis are percentages; Chi square = 105.67 (significant at 5%)

the household were totally depending upon rain water for their crop. Moreover, poverty status of the respondent was correlated with the irrigation source ($P < 0.1$). This result is also supported by Carney (1998). Due to mostly rainfed area majority of the household cultivate only wheat crop on their land and keep their land fallow for the next wheat crop. While on the other hand the household having any type of irrigation facility like dug well at their field area were relatively less poor. As they cultivate maize and some other seasonal vegetable at their field area (Table 3). Therefore along with improvement in irrigation practice through high efficiency irrigation systems, other water harvesting techniques being demonstrated in the watershed project could be helpful in improving livelihood in the area. Better utilization of available assets would also improve livelihood and decrease poverty in the area.

Livestock rearing is an important part of agricultural economy contributing substantially to household

income and food security. The ownership of livestock plays a vital role in the household wealth and income generation, just as its absence contributes to the inability of poorer households to escape from poverty (Cain et al., 2007; Adams, 1996; Kurosaki, 1995). Keeping livestock, has been a traditional activity in rainfed Pothwar areas of Pakistan, it is also a primary source of livelihood for people below the poverty line. Mostly household in the study area kept small and large ruminants at their home. The different livestock products help in fulfilling the household requirements. There is correlation between poverty band and ownership of livestock among the sample respondents. The results indicated that rearing livestock is the activity of typically poorer household at the study area (Table 4). Mostly 37.5% of the respondents who kept livestock at their home were in the transitory vulnerable category. Moreover poverty status of the respondent was correlated with the livestock ownership at 10% level of significance.

LIVELIHOOD ASSETS AND POVERTY NEXUS

Table 3. Poverty status and irrigation source

Poverty bands	Irrigation sources			Total
	Rainfed	Dug well	Water supply (kitchen garden)	
Chronically poor	1 (2.5)	0 (0.0)	0 (0.0)	1 (2.5)
Transitory poor	1 (2.5)	0 (0.0)	1 (2.5)	2 (5.0)
Transitory vulnerable	9 (22.5)	2 (5.0)	1 (2.5)	12 (7.5)
Transitory non-poor	7 (17.5)	3 (7.5)	3 (7.5)	13 (32.5)
Non-poor	5 (12.5)	5 (12.5)	2 (5.0)	12 (30.0)
Total	22 (55.0)	11 (27.5)	7 (17.5)	40 (100)

Figures in parenthesis are percentages; Chi square = 51.018 (significant at 10%)

CONCLUSION AND RECOMMENDATION

The characterization of the households across the study area indicated that mostly respondents were doing farming on small scale. A very few of the household have some

Table 4. Poverty bands and livestock ownership

Poverty bands	Livestock ownership		
	Yes	No	Total
Chronically poor	0 (0.0)	1 (2.5)	1 (2.5)
Transitory poor	1 (2.5)	1 (2.5)	2 (5.0)
Transitory vulnerable	15 (37.5)	1 (2.5)	16 (40.0)
Transitory non-poor	10 (25.0)	2 (5.0)	12 (30.0)
Non-poor	6 (15.0)	3 (7.5)	9 (22.5)
Total	32 (80.0)	8 (20.0)	40 (100)

Figures in parenthesis are percentages; Chi square = 96.416 (significant at 1%)

kind of irrigation facilities like dug well that is also very limited. The conventional irrigation practices at these dug wells were inefficient and uneconomical. The relative poverty in the households depending only on agriculture also highlights the poor performance and low productivity. The availability of labor and participation of female in farming activities could offer opportunities for labor intensive high value agriculture at household (where dug well or some water sources is available) or engaging them as partners/share cropper at the large farms having some water resource. However such intervention would require first the capacity building by making the willing household partner through some long term agreements and providing surety based on some social values and traditional practices. The incidence of asset based poverty is low among sample farmers however large number of respondents lie on the transitory vulnerable band with the chances to lift in the trap of poverty with any reduction in their

owned assets.

The vulnerability of the significant number of respondents to fall in the trap of poverty as a result of any socio-economic shock, calls for the sustained poverty reduction strategies for the study area. Therefore along with improvement in irrigation practice through using high efficiency irrigation systems, other water harvesting techniques being demonstrated in the watershed project could be improving livelihood in the area. The introduction of small scale irrigation technologies like rain water harvesting through roof top, drip and sprinkler irrigation should be launched to reduce the risk of crop failure under less rain or drought. However, household economic integrated surveys these have to be imparted at each level starting from drip bucket, roof top to dug well. Light supplemental irrigation at critical stages through rain gun could also be promoted, subjected to their cost effectiveness.

ACKNOWLEDGEMENT

The current study is based on the work done under USDA funded watershed project implemented in collaboration with ICARDA. The technical support provided by ICARDA scientists and financial support by USDA to collect data are highly acknowledged by the authors.

LITERATURE CITED

- Adams, R.H. 1996. Livestock income, male/female animals, and inequality in rural Pakistan. Discussion Paper No.21. Food Consumption and Nutrition Division, International Food Policy Research Institute, Washington, D.C., USA. (Retrieved April 30, 2009: <http://www.ifpri.org/divs/fcnd/dp/papers/dp21.pdf>)
- ADB.1995. Sector synthesis of post-evaluation findings in the Irrigation and Rural Development Sector. Post Evaluation Office. Asian Development Bank (ADB), Manila.
- Andrea, B, M. Silvia, and T. M. Smeeding. 2010. Asset-based measurement of poverty. *J. Policy Analysis and Management*, 29 (2):267-284.
- Cain, P., M. Anwar, and P. Rowlinson. 2007. Assessing the critical factors affecting the viability of small-scale dairy farms in the Punjab region of Pakistan to inform agricultural extension programmes. *J. Agric. Systems*, 94(2):320-330.
- Carney, D.(ed.) 1998. Sustainable rural livelihoods: What contribution can we make? Papers presented at the Department for International Development's Natural Resource Advisers Conference. July 1998. London.
- Chambers, R., and G. Conway. 1992. Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Brighton: IDS.
- Cheema, M.A. 2001. Social mobilization for poverty alleviation: Experience and lessons from small dam areas in Pakistan. Proceedings of the Regional Workshop on Pro-Poor Intervention Strategies in Irrigated Agriculture in Asia, Bangladesh, China, India, Indonesia, Pakistan and Vietnam, Colombo, August 9-10, 2001. International Water Management Institute (IWMI), Colombo, Sri Lanka. p.187-195.

- Cook, C. C., and M. Grut. 1989. Agroforestry in sub-Saharan Africa. A farmer's perspective. World Bank Technical Paper Number 112. Washington, DC, USA.
- Delali, B.K.D., E.T.F. Witkowski, L., and M.S. Charlie, 2005. Monetary valuation of livelihoods for understanding the composition and complexity of rural households. *Agric. and Human Values*, 22(1): 87-103.
- DFID, 2001 Sustainable Livelihoods Guidance Sheets, London. (Available at www.dfid.gov.uk/)
- Dharmawan, A.H. 2001. Farm household livelihood strategies and socio-economic changes in rural Indonesia. *Socioeconomic Studies on Rural Development*. 271p.
- Ellis, F. 1998. Household strategies and rural livelihood diversification: Survey Article. *J. Develop. Studies*, 35(1): 1-38.
- Gardner, R.C. 2000. *Psychological statistics using SPSS for window*, 1st edn. Prentice Hall, New Jersey, USA.
- Hussain, I., and E. Biltonen. 2001. Managing water for the poor: Proceedings of the Regional Workshop on Pro-Poor Intervention Strategies in Irrigated Agriculture in Asia, Bangladesh, China, India, Indonesia, Pakistan and Vietnam, Colombo, August 9-10, 2001. International Water Management Institute (IWMI), Colombo, Sri Lanka. 220p.
- Hussain, Q. A., A. Bhatti, M. Yasin, and M. M. Ahmad. 2007. Supplemental irrigation to improve wheat production and water use efficiency under rainfed farming conditions. *J. Engg. Appl. Scs.* 26 (2): 49-57.
- IWMI Report 2001. A basin perspective on water savings. (Available at www.cgiar.org/iwmi/homn/product.htm).
- Kafle, M.R. 2008. Contribution of community forestry to users household income: A financial analysis, M.S. Thesis. Inst. Forestry, Univ. Tribhuvan, Nepal. p.43.
- Kurosaki, T. 1995. Risk and insurance in a household economy: Role of livestock in mixed farming in Pakistan. *J. Develop. Econ.* 33(4): 479-483.
- Lutz, E., and M. Young. 1992. Integration of environmental concerns into agricultural policies of industrial and developing countries. *World Development*, 20(2): 241-253.
- Merrey, D.J., P. Drechsel, F.W.T. Penning, and H. Sally. 2005. Integrating livelihoods in to integrated water resource management: Taking the integration paradigm to its logical next step for developing countries. *Regional Environmental Change*, 5:197-204
- Moser, C. O. N. 2006. Asset-based approaches to poverty reduction in a globalized context. An introduction to asset accumulation policy and summary of workshop findings. Working Paper No. 1, Brookings Institution 1775 Massachusetts Ave., New Washington, DC, USA.
- Narayan, D. 2000. Poverty is powerlessness and voicelessness. *Finance and Development*, 37: 4.
- Schreiner, M. 2006. A simple poverty scorecard for Pakistan. Grameen Foundation USA. (Available at http://www.microfinance.com/English/Papers/Scoring_Poverty_Pakistan.pdf).

- Schreiner, M. 2007. A simple poverty scorecard for the Philippines. *Philippine J. Develop.* 63 (2): 43-70.
- Saadi, F.A. 2008. A profile of poverty in Union Council Jamal Chapri, District Layyah-Application of poverty scorecard. UC Poverty Profile Series Report #1 Impact Assessment Unit (IAU) Rural Support Programmes Network (RSPN), Pakistan.
- Sharma, V.P. 2008. India's agrarian crisis and corporate-led contract farming: Socio-economic implications for smallholder producers. *International Food and Agribusiness Management Review*, 11(4): 25-48.
- Scoones, I. 1998. Sustainable rural livelihoods: A framework for analysis. Working Paper No. 72. Institute of Development Studies, Sussex, UK. 22p.
- Shah, H., M.A. Khan, A. Nadeem, and M. Sharif 2005. Livelihood Assets and Livelihood Strategies of Small Farmers in Salt Range: A Case Study of Pind Dadan Khan District Jhelum, Pakistan. *Pakistan J. Agri. Sci.* 42(1-2):82-88.
-