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GENDER ROLES IN LIVESTOCK MANAGEMENT AND THEIR IMPLICATION FOR POVERTY REDUCTION IN RURAL TOBA TEK SINGH, PUNJAB– PAKISTAN

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The present study was designed to measure the role of livestock in poverty reduction in the rural areas of the Punjab province. For present study, district Toba Tek Singh was selected due to its central location in the Punjab Province and a sample of 600 small farmers was taken from three Tehsils of the district. A majority (58.0%) of the farmers of the sample area reported that livestock was their first choice to augment their income while 27 percent and 11 percent of the farmers put livestock at a second or third place respectively. In other words a very huge majority (96.0%) of the farmers recognized the role of livestock in poverty reduction. The results depicted that crops & livestock combination was the main source of respondent's income and sharing about 69 percent of total income. As the women's involvement in various livestock related activities increased, the proportion of income from this source also increased and subsequently poverty reduced. The poor and non-poor farmers comparison showed that the reduction in poverty among the small farmers was significantly related to the livestock keeping in conjunction with crop growing.
Key words: Livestock, poverty, crops, farmers, gender

INTRODUCTION

Poverty in Pakistan is a rural phenomenon. The occurrence of poverty in rural areas has always been higher than urban areas and about three-quarters of the country's poor are living in rural areas. Majority of the rural poor (both male and female) are engaged in agriculture sector as small owner-operators, share cropping tenants, and laborers. Livestock sector is an important sub-domain of agriculture in Pakistan's economy. The annual milk production has been recorded as 28.62 million tones and Pakistan had ranked fifth among large milk-producing countries in the world. This sub-sector has tremendous scope for pro-poor growth, as the value of milk is more than that of the major crops in Pakistan.

The Punjab province is mainstay of agriculture system in Pakistan and plays a pivotal role to meet the growing food demand of the nation. The Punjab province supplies 73 percent of total milk production, while, Sindh and other provinces supply only 23 and 7 percent, respectively (Arain and Somroo, 1998).

Generally, small farmers are dealing with livestock in a traditional way while commercialization is only limited around urban areas and approximately 5 million families in Punjab (about 40 million people) are dependant on livestock sector for economic viability of their livelihood.

The landless farmers are taking livestock production as a vital activity, which augment their family income and explore employment opportunity in addition to their off-farm occupation. Livestock provides food, or more specifically animal protein in human diets, income, employment and possibly foreign exchange. For low income producers, livestock also serve as a store of wealth; provide draught power and organic fertilizer for crop production as well as means of transport. Consumption of livestock products in the developing countries, starting from a low base, is growing rapidly (Garcia, et al., 2003).

The present study aims to assess the role of livestock towards the poverty reduction in the rural areas of district Toba Take Singh, Punjab, Pakistan and will be useful for policy makers, researchers and academia for future reference. The following methodology was used for data collection and analysis for deriving results being presented in this paper.

MATERIALS AND METHODS

District Toba Take Singh was selected as the study area from the central Punjab. A sample of 600 females was selected for interviews. The collected data was analyzed on bivariate and multivariate levels to draw conclusions. A proportion of landowners 80 percent landowners and 20 percent landless females were taken for survey.

To characterize the poor in the study area, a probability model was used in which the chances of falling below the poverty line were linked to household and geographical characteristics, which may at the same

time, be poverty generating factors. Greene (1993) presumed that the cumulative distribution of u_i is Logistic; a logistic model was developed to depict the results. In this case, the probability of being poor is given as:

$$\text{Prob}(Yi = 1) = \frac{\exp(X\,i\,\beta)}{1 + \exp(X\,i\,\beta)}$$

Then, the marginal effect of a particular independent variable X, on the probability of the occurrence of the response is given by (Maddala, 1993).

$$\frac{\partial P(Y=1)}{\partial Xi} = \frac{\exp(XiB)}{[1+\exp(Xib]}\beta\kappa$$

RESULTS AND DISCUSSIONS

The data presented in Table 1 show that the majority (69%) of the farmers in the district T. T. Singh were getting income through crops and livestock enterprise combination. The second source of income was vegetable along with crops and livestock. However, the proportion of vegetables area was very small in the cropping pattern and income from traditional vegetables growing was not adequate. A good deal of research has been made on the joint economics of livestock and crop for very limited farming community dealt with only livestock as a farming enterprise except some marginal landless farmers. Singh & Saini (1988) investigated the optimal level of interaction of crop enterprises and milk production for farms in Indian Punjab. They found that dairying is a feasible, labor intensive enterprise which could be incorporated into existing production systems.

Table 1. Sources of Income of poor and non-poor farmers in different Tehsils of T. T. Singh (Percent)

Sources of income	Tehsil Kamalia	Tehsil Gojra	Tehsil T. T. Singh	Total District T.T. Singh
Crops alone	2	7	4	4.33
Crops + Livestock	70	67	69	68.67
Crops +Livestock + Vegetables	12	10	13	11.67
Crops + Livestock + Vegetables + Orchards	2	3	6	3.67
Livestock alone	14	13	8	11.67
Total	100	100	100	100.00

Table 2. Milk productivity of poor and non poor farmers in district T.T.Singh

Description	Poor	Non Poor
Buff Milk/day (liters)	8.15	16.90
Cow Milk/day (liters)	3.85	6.68
Buff Lactation (days)	185.00	225.25
Cow Lactation (days)	223.64	236.47
Total Milk Productivity	1184.38	2693.17

The information presented in Table 2 reveal that milk productivity of animals depends upon factors like, breed, feed, housing and health coverage. Milk productivity of poor livestock farmers was low because they can not manage the said factors in proper way. Reason being milk productivity of poor respondents was lesser as compared to non-poor respondents. When we calculated milk productivity of poor farmers, it was around 1184 liters per lactation. This milk productivity was in line with the Pakistan milk productivity, which is 1250 liters per lactation. Milk productivity of non-poor respondents was on higher side i.e. about 2700 liters per lactation due to better breeds, proper feeding, good housing and coverage of animal health facilities etc. Kumar et al. (2004) conducted a study on small scale farmers for economics of milk production. It was showed that the feed and fodder cost was the most important item of the total maintenance cost. The milk yields per lactation per milk animal were higher in large size group followed by small and medium size groups.

Logistic Model: Men Roles in livestock management and poverty reduction

In order to estimate the effect of some important variables on the income level of the respondents, a binary logistic model was applied. The results given in the Table 3 elucidate the effect of the independent variables on the dependent variable.

The first independent variable represents probability of the effects of high yielding buffaloes on income of the farmers. The coefficient for this variable was positive and significant at 10 percent level of significance. Thus the results revealed that high yielding buffaloes if maintained by small livestock farmers could improve their income and hence reduce poverty of the farmers.

Logistic model further indicated that keeping high yielding cow also had good effect on the income of the farmers as the coefficient value was positive and significant at 10 percent level of significance.

The information in Table 3 on the high yielding buffaloes and cows (HYBC) revealed that the

coefficient for the variable (0.074) was highly significant. It indicates that farmers strongly perceived that if both high yielding buffaloes and cows are maintained, it will enhance their income up to maximum limits.

The milk rate accounts for village rates for milk sold at farms. Logistic model results revealed that its coefficient was positive showing that as the rate for their milk increased their income would have also been increased. Statistically, it was significant at 5 percent and 1 percent level of significance.

village level. The results revealed that the effect of this variable was highly significant at 5 percent level of significance. The reason may be found in the fact that having a proper animal sheds and other infrastructure can have positive impact in the maintenance of animals and protecting them from weather/ season's implications

The information presented in Table 3 also revealed a positive significant relationship between the both explanatory variable i.e. 'CONTANT' and the criterion variable i.e. 'poverty reduction'. It shows as the

Table 3. Men roles in livestock management and poverty reduction

Variables in Equation	β	SE	t - value
High Yielding Buffaloes	0.082**	0.0345	2.377
High Yield Cow	0.087**	0.044	1.977
High Yielding Buffalo and Cow	0.074**	0.057	2.143
Rate of Milk per Liter	0.024*	0.058	0.138
Health Care Cost	0.245	0.048	5.104
Technical Awareness about Latest Dairy Technologies	0.0498*	0.058	0.859
Availability of Credit for Livestock	0.248	0.047	5.277
Infrastructure Availability	0.0258*	0.034	0.759
CONTANT	0.054*	0.004	13.5
R^2	68		
Observations	600		

* = Indicates 5 percent level of significance
** = Indicates 10 percent level of significance

The important variable on health care was introduced in the model to see the effect of animal health on the income of the farmers. The coefficient for this variable was showing that farmers did not respond positively for this factor. It may be due to the reason that either farmers were not aware about health care services for the animals or they don't care for it. That is why most of the respondents could not answer about this factor satisfactory. Hence significance level for this variable was non significant. But positive sign shows that if health coverage of the animals is maintained it could improve their income.

The data given in Table 3 also show the effect of the technological awareness of the farmers on their income. Model results revealed that technological awareness of the farmers regarding maintenance and feed pattern had positive effect on their income. More was the technological awareness of the farmers; higher was their income. The result was highly significant at 5 percent level of significance.

Infrastructure availability was the variable introduced to have the knowledge about the effect of the infrastructure availability to the livestock farmers at

knowledge of respondents' increases about the CONTANT their family income also increases which has a direct impact on poverty reduction. Furthermore, the table shows the correlation of coefficient (0.054) is significant at 5 percent level of significance which reflects a positive and significant association between two variables.

Logistic Model: Women roles in livestock management and poverty reduction

The same logistic model was run for the part of the sample showing significant participation of women in farming activities. Thus the probability of increase or decrease in farm income was associated with the same independent binary variables as in the previous model. A separate regression arrangements were aimed at visualizing the difference of impact on poverty (income) due to livestock rearing, milking and trends in the determinants of demand and supply.

Results revealed that high yielding buffaloes if maintained by women farmers, the level of income would be likely high than the overall results. The coefficient for this variable was found to be highly

positive with significant at 10 percent level of significance.

The effect of high yielding cow keeping was also found to be significantly (at 10 percent level of significance) positive and the beta coefficient is relatively higher.

Women were found to be more conscious about the health of the animals. With such an attitude of the women, the probability of diseases was found to be low while the probability of income was high. The coefficient of this variable was highly significant at 5 percent level of significance and it has a positive impact on poverty reduction with particular effect of women's involvement in livestock management.

Another introduced variable 'INFRASTRUCTURE' in logistic model showed a positive and highly significant association (0.026 at 5 percent level of significance) with the criterion variable and has a significant impact on poverty reduction. It can be said as the women's knowledge about the available infrastructure and its utility regarding livestock management increases their income level also increases which has a direct impact on poverty reduction. Furthermore, the data presented in table-4 also show a positive and significant association between the explanatory variable i.e. 'knowledge of the women about content' in livestock management and dependent variable i.e. 'poverty reduction'. The value of coefficient (0.059) is positively significant at 5 percent level of significance which clearly reflects that as 'the knowledge about contents' of those women who involved in livestock management increases their family income level also increases which has a direct impact on poverty reduction.

From the above discussion it can be concluded that amongst the nine explanatory variables (shown in Table 4) only five variables showed a significant impact on the criterion variable i.e. poverty reduction. Furthermore, t can also be extracted from the discussion that Infrastructure Availability (0.026), CONTANT (0.05) and Health Care Cost (0.055) amongst those five variables were the major contributing factors in poverty reduction of those females who were involved in livestock management.

RECOMMENDATIONS

Following recommendations were drawn from the study

- Latest tools and techniques (transfer of technology) for increasing productivity of animals should be introduced in the rural areas of the country particularly among the women as dairy women consortium. To increase the income of small farmers' dairy farming along with crop production is recommended in rural areas of Pakistan.
- The one window credit facility should be available to landless and small farmers for raising of livestock and recovery of credit, feed and other service charges should be made from the income of milk on weekly basis. For credit recovery milk processing companies should be involved as third partner with farmers to repay credit to bank, as they are major buyers of milk in the rural areas.

Table 4. Logistic Regression: Women roles in livestock management and poverty impact

Variables in Equation	β	SE	t- value
High Yielding Buffaloes	0.088**	0.0341	1.779
High Yielding Cow	0.097**	0.043	1.277
High Yielding Buffalo and Cow	0.78	0.151	3.293
Rate of Milk per Liter	0.150	0.068	1.835
Health Care Cost	0.055*	0.053	0.795
Technical Awareness about Latest Dairy Technologies	0.275	0.038	4.400
Availability of Credit for Livestock	0.250	0.033	4.774
Infrastructure Availability	0.026*	0.062	1.234
CONTANT	0.059*	0.003	12.44
R^2	0.61		
Observations	387		

*=Indicates 5 percent level of significance

**=Indicates 10 percent level of significance

- The role of middleman "Dodhi" should be minimized and a better marketing system should be devised for small farmers.
- The modern artificial insemination techniques should be introduced to increase the quality animals in areas.
- Government should introduce milk collection facilities like milk cooling tanks in each milk producing village free of cost.

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