5.5 INFLUENCE OF INDEPENDENT VARIABLES ON PRACTICE ADOPTION OF DAIRY FARMERS

Production technologies incorporated in the dairy production package include breeding, housing, feeding and medical practices. As in the case of maize Chi-square analyses were used to test the significance of the relationships between variables. Cramer's V and Phi statistics (for 1 degree of freedom) for nominal variables and Gamma for ordinal variables were also used to specify the strength of the association between variables.

Unlike maize where most of the independent factors have an influence on the adoption behavior of respondent farmers, the independent variables have little or no significant association with the adoption behavior of dairy farmers as will be shown and discussed subsequently.

5.5.1 Age

Except for the two practices, ownership of cross breeds and more than 50 percent exotic blood cross breeds, age of the respondent is not found to be associated with the adoption behavior of dairy farmers in all of the thirteen practices included in dairy package (Appendix 5.20). Regarding the association between age and the adoption behavior of dairy farmers concerning ownership of cross breed animals having more than 50 percent exotic blood, for example, there is a significant and positive relationship (Gamma = 0.286, p = 0.036). This relationship is also evident from the fact that 28.3 percent of the farmers in the youngest age category (12 to 38 years) own a herd with less than 75 percent of the animals having more than 50 percent exotic blood while amongst the farmers in the oldest age category (58 to 80 years) ownership of the type of animals declines to 15.4 percent. The opposite tendency is evident regarding ownership of more than 75 percent animals within a herd having more than 50 percent exotic blood. In the youngest age category only 71.7 percent own the type of animals. This percentage increases slow but significantly with increasing age to 84.6 percent in the oldest age

category (Fig. 5.15). Contrary to expectations, all remaining practices show no significant relationship.

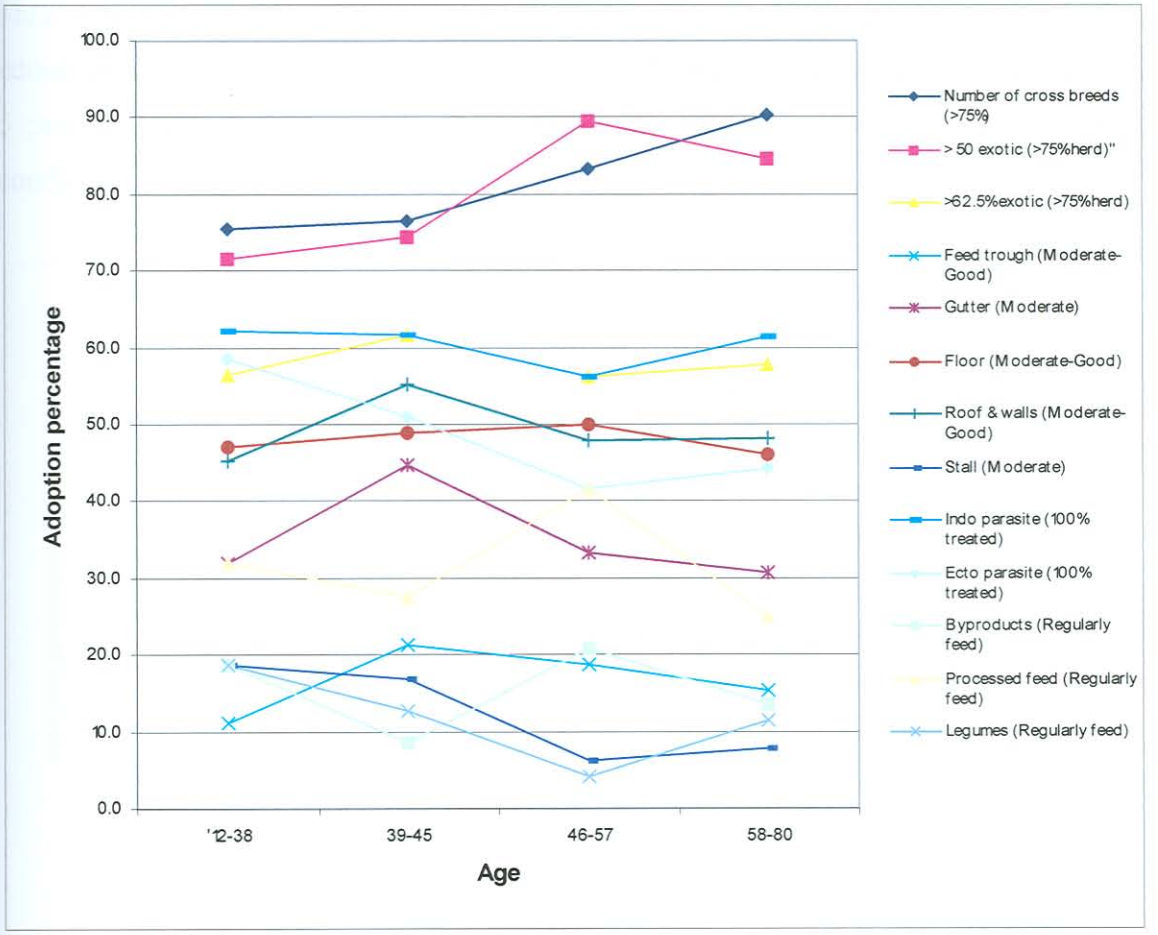

Fig. 5.15 Graphical illustration of the relationships between age and the percentage of farmers adopting the recommended rate of technology

5.5.2 Education

The only practices where education and the adoption behavior of dairy farmers is positively associated at the less than 1 percent level of significance are treatment against internal parasites, ownership of cross breed animals, gutter (outlet of animal waste) and use of processed feeds and at the 5 percent level of significance, industrial byproducts (Appendix 5.20). The relationship between education and the adoption behavior of dairy farmers regarding the practice, treatment against internal parasites, for example, is also evident from the fact that 86.5 percent of the farmers having a tertiary level of education have treated their entire herd against internal parasites while amongst the illiterate

farmers, only 43.6 percent have treated their entire animals (Fig. 5.16). Conversely, 41 percent of illiterate farmers do not have treated their herd against internal parasites at all. This percentage declines with increasing education to 13.5 percent in the highest education category (tertiary level). In some cases there are, although not significant at the 5 percent level, indications of relationships with education like in the case of floor condition.

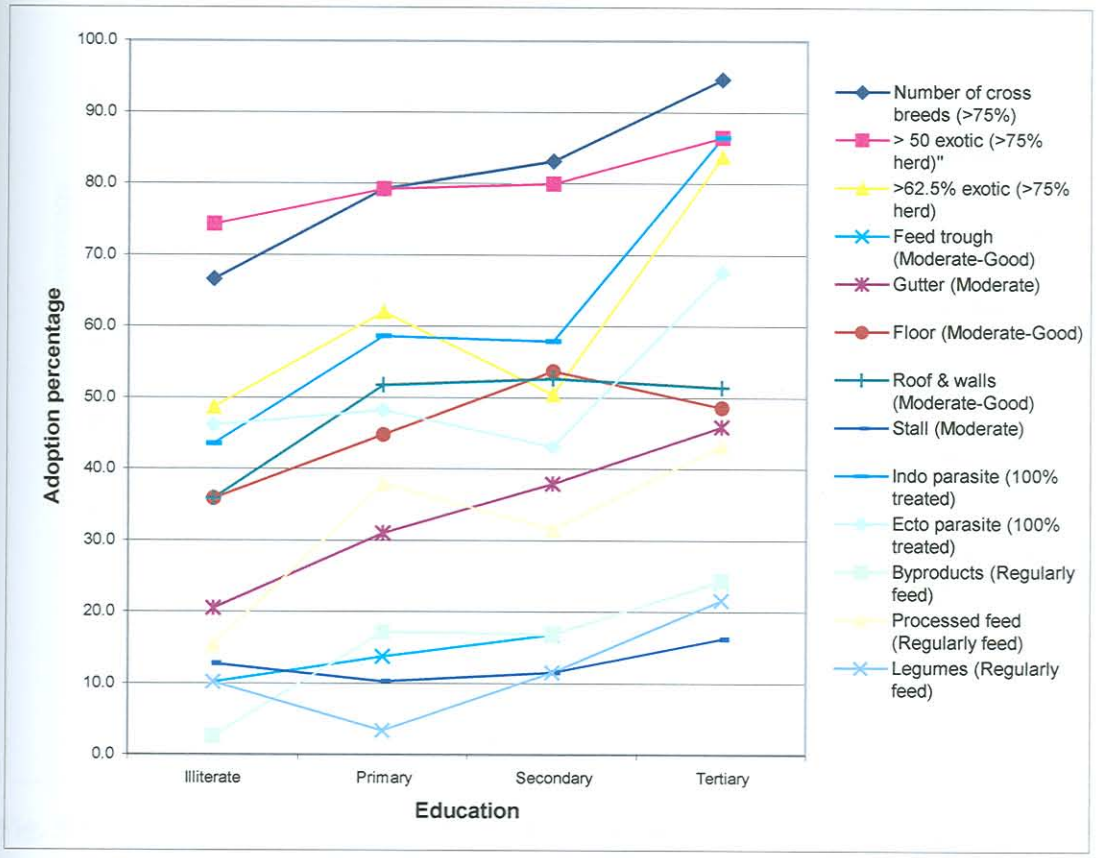

Fig. 5.16 Graphical illustration of the relationships between education and the percentage of farmers adopting the recommended rate of technology

5.5.3 Gender

The association between gender and the adoption behavior of dairy farmers is found to be significant regarding only two practices, namely, use of forage legumes and condition of stall (Appendix 5.20). Regarding the adoption of forage legumes for example, 12.7 percent of male farmers regularly feed their animals with forage legumes while only 8.8

percent of female farmers feed their animals with forage legumes regularly (Fig. 17). The relationship, as shown in Appendix 5.20, is significant at the 1 percent level of probability (χ^2 = 11.09, df = 2, p= 0.004; Cramer's V = 0.235, p = 0.004). In general it does not appear as if gender is an important factor in dairy production.

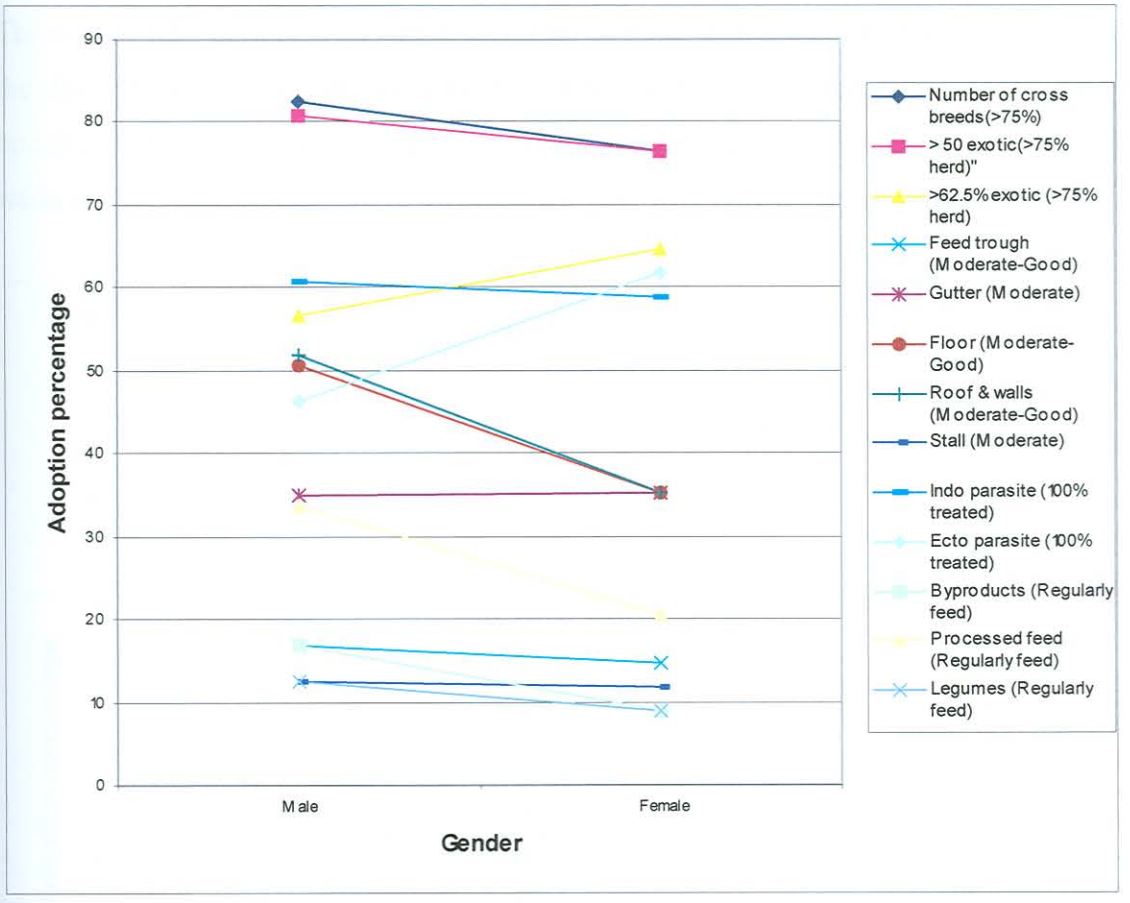

Fig. 5.17 Graphical illustration of the relationships between gender and the percentage of farmers adopting the recommended rate of technology

5.5.4 Farm size

Farm size is positively related with the adoption behavior of dairy farmers in all of the practices included in the dairy package and (Appendix 5.20). The association is, however, significant only regarding five of these practices, of which four are housing practices, namely, conditions of feed trough, gutter, floor, and roof and sidewall. The relationships between farm size and the adoption behavior of dairy farmers regarding these four housing practices are significant at the 1percent level of probability. Considering

adoption of feed trough for example, while 65.7 percent of bigger farmers had a moderate to good condition feed trough, this percentage decreases to 28.4 percent in the small farmers category (Fig. 5.18). The relationship, as shown in appendix 5.20, is highly significant ($\chi^2 = 23.65$, df = 6, p = 0.001; Gamma = 0.406, p = 0.000).

The reason why farm size had more effect on housing than the other practices included in the dairy package could probably be associated with costs. Constructing costly modern housing with all facilities including a gutter, stall, good condition floor, roof and side walls is obviously less attractive for small farmers with only a very few animals.

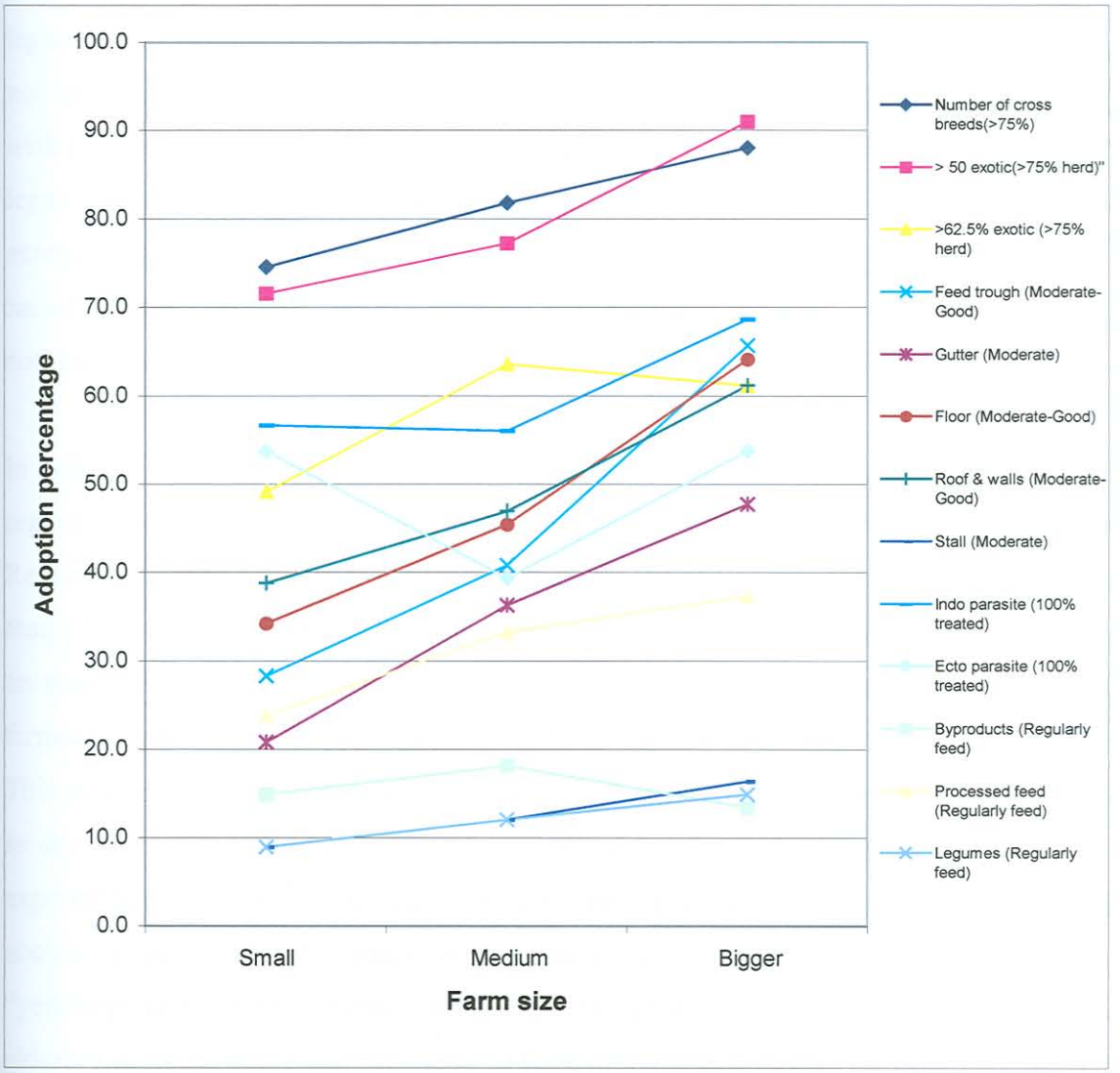

Fig. 5.18 Graphical illustration of the relationships between farm size and the percentage of farmers adopting the recommended rate of technology

5.5.5 Farming experience

Farming experience is positively associated with the adoption behavior of dairy farmers regarding almost all of the dairy practices as expected except for the use of forage legumes, conditions of gutter and stall and treatment against external parasites in which the relationships are negative though not significant (Appendix 5.21).

One interesting question that can be raised here is that when older dairy farmers with most experience had better adopted most of the practices incorporated in the package, why the associations become negative in the case of some of the practices such as forage legumes and external parasites? This phenomenon did not happen by coincidence, it is not uncommon for elderly people in Ethiopia to adopt a culture of feeding their animals with teff (type of cereal) straw and hay and are not so much motivated to seek for forage legumes, which they don't know it traditionally. They are also highly familiar with external parasites such as ticks, fleas and lice and therefore, may not count them as harmful to their animals than the younger ones with low experience where the tradition is not deep rooted.

In general, the experience of farmers is significantly related to their adoption behavior regarding only the three breeding practices at the less than 10 percent level of probability. Regarding the use of more than 50 percent exotic breed animals, for example, while more than 75 percent of the herd of 84.6 percent of the farmers with the most experience have an exotic blood level of more than 50 percent, the number of farmers with the least farming experience who possess these kinds of animals is only 69.1 percent (Fig. 5.19). This relationship is significant ($\chi^2 = 7.71$, df = 2, p = 0.021; Gamma = 0.321, p = 0.030) as shown in Appendix 5.21. The reason why dairy farmers with vast years of farming experience place more value to improved breeding practices than the rest is similar to the above, i.e. exotic blood animals are traditionally highly valued and esteemed. The term "yeferenje lam", which means technology of the white man and commonly used by elderly people, conveys the value placed for exotic blood animals.

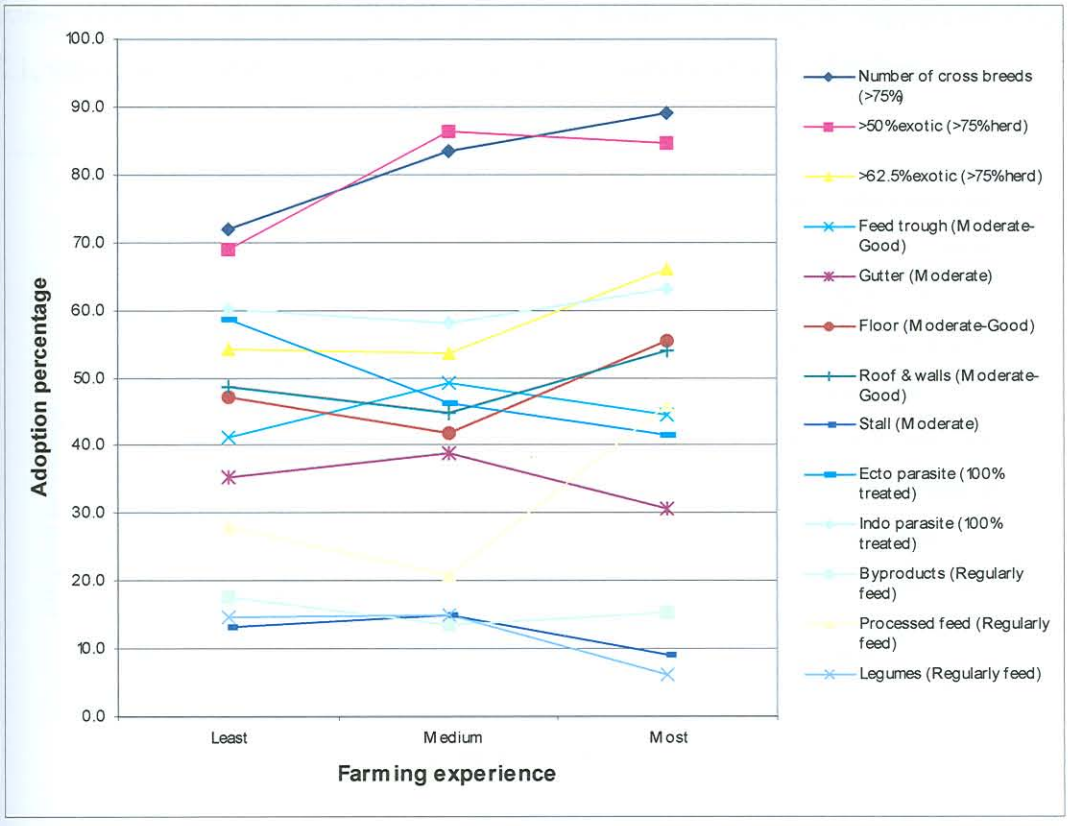

Fig. 5.19 **Graphical illustration of the relationships between farming experience and the percentage of farmers adopting the recommended rate of technology**

5.5.6 Media contact

The use of media is positively related with the adoption behavior of dairy farmers in all of the thirteen practices integrated in the dairy package as expected (Appendix 5.21). The association is significant at the 1 percent level of probability regarding four practices (ownership of more than 62.5 percent exotic blood level animal, supply of byproducts and processed feed, and treatment against internal parasites) and at the 5 percent level in two practices (cross breed animals and conditions of roof and side walls). Considering the adoption of cross breed animals, for example, while 85.8 percent of those farmers having more exposure to media possess more than 75 percent cross breed animals in their herd, this percentage declines with a decrease in exposure to 72.7 percent in the least media exposure category (Fig. 5.20). This relationship is significant (χ^2 =5.02, df = 1, p =

0.004; Gamma = 0.388, p= 0.037) providing further evidence in support of Hypothesis 3.1, which states that high exposure to media is correlated with adoption.

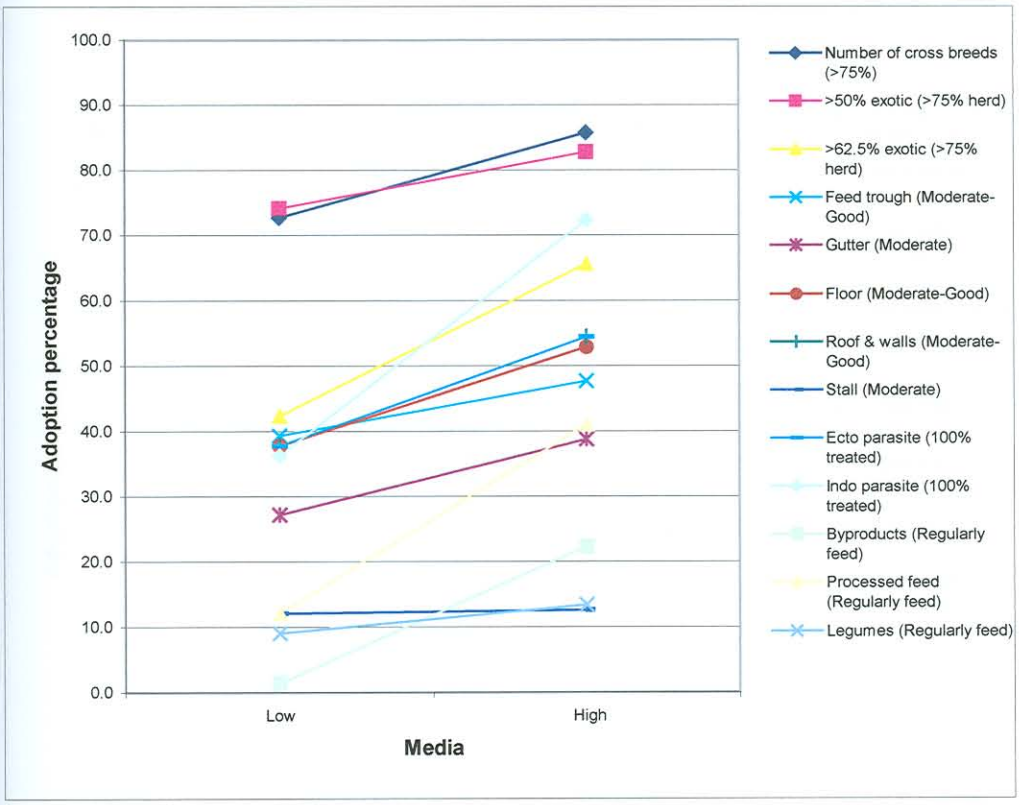

Fig. 5.20 Graphical illustration of the relationships between media exposure and the percentage of farmers adopting the recommended technology

5.5.7 Attitudinal modernity

There are again positive relationships between modern attitudes and the adoption behavior of dairy farmers regarding almost all of the dairy practices except feed trough and floor conditions. The associations are, however, not significant regarding most of the practices except the use of cross breed animals (Appendix 5. 22). Regarding this practice, while 94.4 percent of the farmers with high attitudinal modernity score have a herd with more than 75 percent cross breed animals, only 75.4 percent of the farmers with low attitudinal modernity score possess this types of animals (Fig. 5. 21). This relationship, as shown in Appendix 5.22, is significant at the 1 percent level of probability (χ^2 = 12.60, df = 2, p = 0.002; Gamma = 0.426, p = 0.001). The weak

relationships between these two variables can be attributed to the parabolic relationship (see Fig. 5.21) manifested regarding most of the practices.

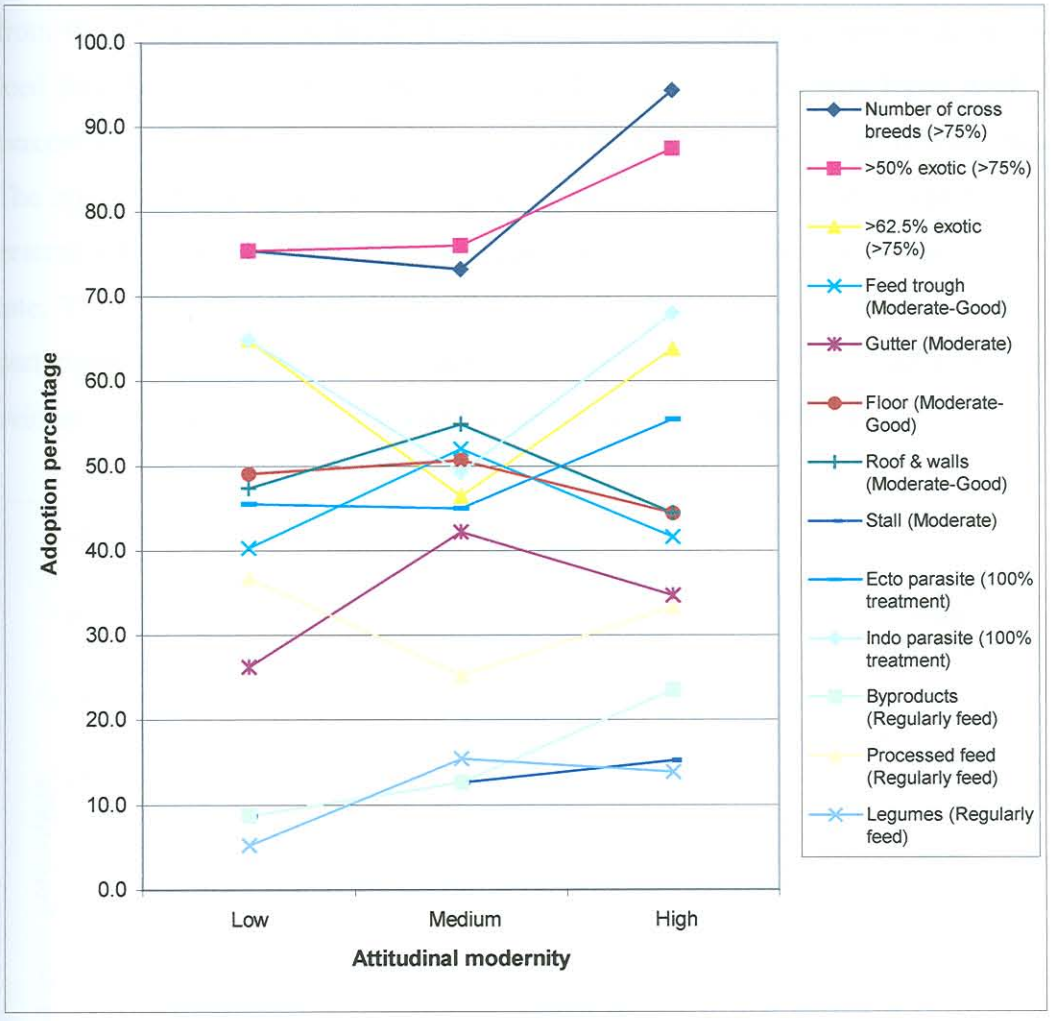

Fig. 5.21 Graphical illustration of the relationships between attitudinal modernity and the percentage of farmers adopting recommended rate of technology

5.5.8 Organizational participation

The relationship between the adoption behavior of dairy farmers of ALWDADPMA and their organizational participation is not found to be different from the other relationships found regarding the rest of the independent variables assumed to be correlated with the adoption behavior of dairy farmers. It is positively related regarding all of the practices

included in the package as expected. The relationship, however, is significant only in one practice namely the use of products of feed processing plants, which is significant at the 1 level (Gamma= 0.635, p = 0.000) (Appendix 5. 22). This relationship is also evident from the Chi square statistic. 73.4 percent of the least efficient farmers do not regularly feed their herd with most of the recommended types of processed feeds while only 37 percent of the most efficient farmers do not regularly feed their herd with these feeds. The opposite tendency is evident regarding the use of recommended type of feeds. 26.6 percent of the farmers having low organizational participation feed the recommended rate. This percentage increases to 63 percent in the category of farmers having higher participation. This difference is significant (χ^2= 15.17, df = 2, p = 0.001) lending further evidence in support of the hypothesized association (Hypothesis 3.1).

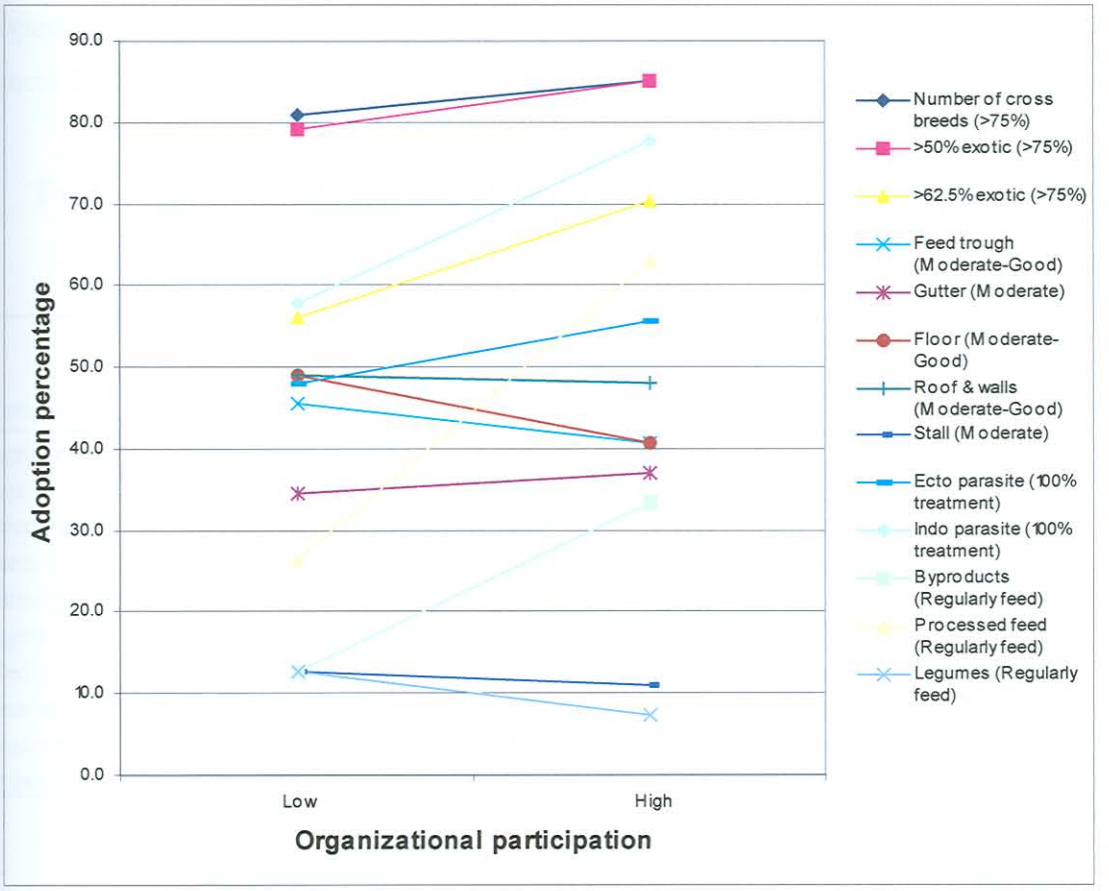

Fig. 5.22 **Graphical illustration of the relationships between organizational participation and the percentage of farmers adopting the recommended rate of technology**

5.6 INFLUENCE OF INDEPENDENT VARIABLES ON THE PACKAGE ADOPTION BEHAVIOR OF MAIZE AND DAIRY FARMERS

Having assessed the relationships between independent variables and the adoption behavior of maize and dairy farmers regarding the production practices included in the maize and dairy packages in the previous sections, the influence relationships regarding the respective packages will be evaluated here. According to Table 5.16, which shows these relationships, the variables assessed to have been significantly associated with the adoption behavior of farmers regarding the practices are also found to have similar relationships regarding the two packages. Difference between the two analyses is found regarding only change agent contact in case of maize and, farming experience in dairy, where the latter analysis does not show significant relationships.

Table 5.16 Relationship between independent variables and the package adoption behavior of maize and dairy farmers

Variable	Association			
	Maize		Dairy	
	r	p	r	p
Agro ecology	0.374	0.000	-	-
Age	-0.288	0.000	-0.068	0.335
Education	0.345	0.000	0.275	0.000
Farm size	-0.172	0.015	0.241	0.001
Farming experience	-0.267	0.000	-0.003	0.961
Agent	0.048	0.499		
Media	0.435	0.000	0.314	0.000
Gender	-	-	0.004	0.960
Modernity	0.123	0.084	0.064	0.371
Organization	-	-	0.082	0.246

5.7 CONTRIBUTIONS OF INDEPENDENT VARIABLES TO PACKAGE ADOPTION VARIANCE

In order to assess more accurately the contribution of independent variables on adoption of the maize and dairy package multiple regression analyses were used. Based on the results of the bivariate analyses presented in previous sections agro-ecology, age, education, farm size, change agent contact, media exposure, and attitudinal modernity in maize, and media exposure, farm size, farming experience, and education in dairy farming are selected for multiple regression analysis.

All the variables included in the assumed regression models have signs corresponding to their theoretical definition.

The analysis corroborates a rather limited contribution of the independent variables on the adoption behaviors of maize and dairy farmers. Only agro ecological region, education and media exposure in maize and farm size, media exposure and education in dairy are found to be the significant predictors of the adoption behavior of dairy farmers. In accordance with these limited contributions, the total variation explained by independent variables is a mere 32.4 percent ($R^2 = 0.324$) in the case of maize and 17.8 percent ($R^2 = 0.178$) in dairy farming (Table 5.17).

This is in conformity with the findings of Düvel (1975:8) and Düvel and Botha (1999:56). They reported that the correlation between independent variables and adoption (decision making) is very seldom significant and that it could be an indication for behavior to be only indirectly influenced by independent variables.

Table 5.17 Multiple regression estimates of the effects of independent variables on adoption behavior

Variable	Maize			Dairy		
	Beta	t	p	Beta	t	p
Constant		3.619	0.000	-	18.584	0.000
Agro ecology*	0.3412	4.530	0.000	-	-	-
Age	-0.039	-0.547	0.585	-	-	-
Farming experience	-	-	-	0.001	0.015	0.988
Education	0.167	2.090	0.038	.160	2.208	0.028
Farm size	0.085	1.141	0.255	0.229	3.467	0.001
Extension contact*	-0.080	-1.169	0.244	-	-	-
Media exposure*	0.356	4.547	0.000	0.251	3.546	0.000
Attitudinal modernity	-0.070	-0.927	0.355	-	-	-

$R^2 = 0.324$ (Maize) $R^2 = 0.178$ (Dairy); * Dummy variable