

Information, Uncertainty, Adoption and Credit use in Nepalese Agriculture

(A case study of kavre district, central hills)

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I. Introduction:

There is an ample literature supporting the assertion that raising small farm output with a corresponding increase in farm income is essential for continued economic development (11). In a situation where potential land for cultivation is not available, small farm output and income can be increased only by increasing productivity per unit land. In case of Nepal, it appears that productivity can be increased mainly through adoption of modern farming techniques by the majority of farmers, since the traditional methods of farming have resulted into a stagnant or even a declining trend in productivity during the last decade (10). On the other hand, small farmers in Nepal, who constitute the majority, have lagged behind in the adoption of new farming techniques (2,10).

Various programmes have been designed to help small farmers modernize farming and consequently increase their income. Agricultural credit is one of them. In this paper, some hypotheses relating to the use of credit in the adoption of modern farming techniques, farming

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uncertainty and stock of information about modern techniques acquired by farmers are formulated and tested. It is expected that the results would be able to clarify the posited relationships in the Nepalese context.

II. Risk, adoption, information and Credit:

—It has been established that use of credit is an important factor in the adoption of modern techniques, though credit is not the sole limiting factor. This assertion has been recognised in the concepts of small farmer's development as well as in the empirical research work (1, 8, 7). In case of small farm situation in Nepal also, use of credit has been found to be an important positive factor in adoption (4, 6). Consequently, the relationship between use of credit and the extent of adoption of techniques in an interesting aspect for study.

—The importance of credit in adoption can be even more appreciated when one looks at adoption in the face of farming uncertainty. When risk elements exist in farming, availability of co-operative credit has been found to be a significant factor in adoption (7). Schluter's study (7), has empirically shown that credit plays its most important role under conditions of uncertainty.

—Wharton (1969) rightly recognized that even the most illiterate farmers place probabilities on the outcomes of their farming decisions. Thus, if farmers believe that there is a high probability of obtaining a higher yield or/and smaller variability of yield (less risk), they are tempted to borrow credit and adopt modern techniques. Naidu (5) also came to similar conclusions. This suggests that there is a close interrelationship between credit use and farmers attitude towards risk.

—The literature seems to be devoid of studies on the link between credit use and knowledge about modern farming techniques. However, at least on a *a priori* ground, a positive relationship can be hypothesised between credit-use and level of information acquired by farmers about modern farming techniques. It is logically plausible that farmers who possess higher level of information are likely to be credit-users. This is because, without adequate information about the new techniques, there is no justification to borrow credit and adopt modern techniques.

--Based on this background review, some hypotheses are formulated and tested in this study.

III Methodology, data and Hypotheses :

A sample of 72 randomly selected farmers from five Panchayats of Kavre district of Nepal was used to test the proposed hypotheses.

Questions on whether the sampled farmers used institutional credit last year for modern wheat farming were asked. This enabled separation of farmers into credit-users and non-users.

Questions were also asked to assess farmers' level of information on various aspects of modern wheat farming. Two questions on institutional aspects and three each on economic and technical aspects were asked. By giving one point for a correct answer and zero point for an incorrect one, an index of the level of each type of information was constructed.

To elicit a farmer's attitude towards yield uncertainty, a triangular probability distribution function was used (10). By asking a farmer's expected lowest (a), highest (b), and most likely (m) yield rates in the next wheat season, the measures of expected yield (E) and the variance of the expected yield (v) were calculated for each farmer as follows :

$$\begin{aligned} E &= (a+m+b)/3 \\ V &= [(b-a)^2 + (m-a)(m-b)] / 18 \end{aligned}$$

These measures are expected to represent farmers' attitudes towards uncertainty. If a farmer perceives a higher yield than others, he is, obviously, an optimist farmer. so, optimism towards yields is represented directly by the magnitude of E. On the other hand, a confident farmer is expected to perceive a smaller variability in expected yields, So, V represents a farmer's confidence. If V is larger, a farmer is less confident and **vice versa**.

Finally, an index of the adoption of modern techniques adopted by farmers was constructed. **Nine** modern wheat farming techniques were considered, giving one point for each technique adopted by a farmer.

The means and coefficients of variation of all above variables, namely each type of information, E, V and adoption index are given in Table 1.

Table-1

Means and Coefficients of Variation of Some variables

Variables	Unit	Mean	Coefficient of Variation
1. Information-			
Institutional	Index	0.972	86
Economic	Index	1.083	94
Technical	Index	0.972	114
2. Optimism (Expected yield)	Kg	1655.5	18
3. Confidence (Expected Variance)	Kg	31515.6	34
4. Adoption	Index	3.83	61

Hypotheses

The hypotheses to be tested in this study are as follows:

1. Users of institutional credit are better informed about
 - (i) Institutional information,
 - (ii) Economic information, and
 - (iii) Technical information relating to modern Techniques of farming than the non credit users.
2. Users of institutional credit are more optimistic about yield from modern techniques than non credit users.
3. Users of institutional credit are more confident about yield from modern techniques than non credit-users.

4. Users of institutional credit adopt more modern techniques than non credit-users. These hypotheses are tested in Section IV of this paper.

Methodology:

The t-tests for the significance of the difference in means are used for hypotheses tests. The approach followed is the cross tabulation of average values of each type of information, risk perceptions (E,V), and adoption index against two groupings-credit-users and non credit-users. The data in mean, variance and sample size obtained in this way would enable one to calculate the t-values.

IV. Research Findings:

A summary of results are given in Table 2.

Table 2

Summary Table for Testing the Formulated Hypotheses

Variables	Mean Values of Variables for Institutional Credit		t-value	Significant Level (percent)
	Users (n=26)	Non-Users (n=46)		
1. Information				
Institutional	1.231	0.826	2.015	5
Economic	1.308	0.956	1.431	N.S.
Technical	1.192	0.848	1.303	N.S.
2. Optimism				
(Expected yield)	1748	1603	1.976	5
3. Confidence				
(Expected Variance)	29096	32883	1.860	5
4. Adoption	3.846	2.261	3.344	1

Hypothesis 1: Credit and Information:

As the Table shows farmers who use institutional credit in the adoption of modern farming techniques are found to acquire more knowledge about institutional type of information as compared to non-credit users. The average value of institutional information index is 1.23 and that for non-credit users is 0.83. The difference in these values is statistically significant at the 5 per cent level (t value = 2.015).

In case of economic as well as technical information also, the level of these information is higher among credit-users rather than non credit-users. However, in both the cases, the difference in the means of the information index between credit-users and non credit-users is not statistically significant at or below the 5 per cent level of t .

These results confirm hypothesis 1 only in case of institutional type of information, and not in the other two types of information.

Hypothesis 2: Credit and Risk (Optimism):

Users of credit are found to be more optimistic about expected yields in comparison to non-credit users. Credit users, on the average, assign 1748 kg/ha as the expected yield while the non-credit users perceive it to be 1603 kg/ha. The difference in these expected yields are significant statistically at the 5 per cent level (t value = 1.976). This confirms the second hypothesis that users of credit are more optimistic about yield from modern techniques than those farmers who do not use Credit.

Hypothesis 3: Credit and Risk (Confidence):

Again, users of credit appear to be more confident about the expected yield than noncredit-users, that is, the credit users perceived smaller (expected) yield variability than non credit-users. The difference in the level of confidence, as measured by the variance of the elicited triangular distribution of expected yields, is significant at the 5 percent level ($t=1.860$). This confirms the third hypothesis that users of credit are more confident about yield from modern techniques than those farmers who do not use credit.

Hypothesis 4: Credit and Adoption:

The data show that users of credit are found to be adopting, on an average, about 4 techniques, while the non credit users are adopting only about 2 techniques. This difference in adoption level is statistically significant at the 1 per cent level ($t = 3.444$). This confirms the fourth hypothesis that users of credit are more adopters of modern techniques than those farmers who do not use credit.

V. Conclusions

Some hypotheses relating to the use of insitutional credit for modern methods of farming and information acquisition, farming uncertainty and adoption were formulated and tested. Firstly, it was observed that users of credit are better informed about institutional, economic and technical aspects of farming than non credit-users. However, the relationship was significant only in case of institutional aspects of farming than non credit-users. Thus it may be inferred that the more the farmers acquire institutional type of information, the more credit-users they become. Similarly, users of credit were observed to be more optimistic and confident about yields from modern techniques than non credit users. Thus, lessening of farming uncertainty may lead to make farmers users of credit. Finally, users of credit are significantly more of modern techniques than non credit-users.

This study was limited only to the tests of the formulated hypotheses. As such, beyond the tests of hypotheses, implications for policy purpose can be drawn only with caution. Nevertheless, the paper is expected to generate further research in these complex but very significant relationships.

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