Role of Experience and Knowledge on Perception of Risk

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Introduction

Farmer's perception of risk about new technology may change with changes in their knowledge and experience of it. In early stages of techonology diffusion farmers are ignorant of new technology, therefore, their perception 'of risk may become very high because of the uncertainty about yields and returns. But as they gain knowledge and experience, the new technology and its outcome may become more certain to them. Therefore, their perception of risk may decrease. Such relationship has been observed by *Hiebert (1974)*.

Research Methods

In this study new technology is defined as one which uses recommended amounts of HYV seed and mineral fertilizer, whereas perception of risk is measured by the variance of expected gross margin of paddy production with new technology, subsidised credit and 44 kg per hectare of nitrogen.

Sixty small Nepalese paddy farmers of central Tarai were interviewed by Hamal (1981) to collect informations on their subjective beliefs and farming circumstances. While eliciting farmers' subjective beliefs, the triangular distribution method followed by judgemental fractile method was used. The triangular CDFs were compared to judgemental CDFs to examine the validity of the assumption of triangularity in the elicited triangular PDF (*Anderson et al. 1977*). Further, the gross margins of paddy production at three different points of triangular PDF were estimated and further used to calculate variance.

Results

The farmers' experience question is examined by regressing farmer's risk perception of new technology on their years of experience of it. The results are as follows:

$$(1) \quad V\,(GM) = 3.32 \quad - \quad 0.357\ K \qquad n = 60$$
$$(t = 23.3) \qquad (t = -5.90) \qquad \bar{R}^2 = 0.36$$

$$(2) \quad V\,(GM) = 3.31 \quad - \quad 0.354\ K \qquad n = 54$$
$$(t = 16.5) \qquad (t = -4.39) \qquad R^2 = 0.26$$

Where, $V(GM) = $ variance of gross margin in Rs. '000/ha, and $K = $ experience in number of years that a farmer has adopted new technology. In equation (1), all farmers including farmers with zero experience were included, whereas in equation (2) farmers with zero experience were excluded for a separate analysis of any impact on the relationship between farmers' experience and their perception of risk.

From equations (1) and (2), it is concluded that farmers' perception of risk in new technology decreases with increasing experience gained in using the technology. It might be due to the fact that, as a farmer acquires more experience, he is more likely to become better acquainted with the associated problems and solutions which help him to obtain higher confidence in the outcome of new technology which, in turn, yields less variability in gross margin.

Regarding the relationship between farmers' knowledge and perception of risk, it was found almost impossible to run a regression because of scaling problems with respect to knowledge. Therefore, the relationship is tested by categorising farmers into four different groups with different levels of knowledge about the new technology. Group I knows nothing about the recommended doses of either HYV seed or mineral fertilizer (nitrogen). Group II knows the recommended doses of either HYV seed or mineral fertilizer (Nitrogen). Group III is aware of the recommended doses of both HYV seed and mineral fertilizer (nitrogen) but has failed to achieve expected level of yield, and Group IV knows the recommended doses of both HYV seed and mineral fertilizer (nitrogen) and succeeded in achieving expected level of yield. Then a multiple comparison test (*Bancroft: 1968*) was conducted to measure any significant differences in perception of risk, V(GM), among the groups. Appendix I represents risk perception of the different groups of farmers.

Before conducting the multiple comparison, with the Barlett's test of homogeneity of variance (*Snedecor and Cochran: 1967*) it was concluded that variances among the groups are homogeneous at the 0.01 level of significance. Conclusion was reconfirmed when the test was repeated on standard deviation of gross margin instead of variance.

Regarding the multiple comparison test, Scheff'e method and the Least Significant Difference (LSD) methods were used to compare results of each method. According to the results of the test summarised in Table 1, there appear to be significant differences in means of risk perception for different groups of farmers with only the exception of the first two. It seems that knowing about only one input of the new technology does not make any difference to a farmer's knowledge, as new technology is considered to be 'indivisible'. However, when each of these two groups was compared to other groups, it was observed that farmers' risk perception decreases with increase in their knowledge of new technology.

Policy Implications

There are several policies and programs that decrease the degree of risk perception, such as an education program and extension program. Extension and education programs

TABLE 1

Comparison of the Four Group Means Taking Them Two at
a Time and by Each of Scheff'e and the LSD Method.

Group	Scheff'e method	LSD method*
1 Vs 2	No	No
1 Vs 3	Yes	Yes
1 Vs 4	Yes	Yes
2 Vs 3	Yes	Yes
2 Vs 4	Yes	Yes
3 Vs 4	Yes	Yes

* Significant at 0.05 level.

which are likely to increase farmers' knowledge in new technology, may change farmers' risk perception. More than a decade ago, an adult education program was launched (the goverament of Nepal is still encouraging this) to make at least the household head literate. The objective is to make it easier for present farmers to accumulate knowledge about matters related to development of agricultural techniques through government booklets, advertisements, magazines etc. However, in past years, such a program has been observed by the author to be impracticable, probably due to the concept of 'fatalism'. Heads of farm households, who are generally more than 45 years old, may not like to participate in such a study, as they find more than half of their lives already gone without such skills. All this suggests that a long-run education program (that is, educating farmers' children in a school that is especially designed for increasing their knowledge in farming technique) is more likely to have some positive impact on farmers' risk perception but a short-run program, such as an adult education program (that is, educating present adult farmers within, say, five or six years), may need a thorough and careful investigation to make it more practical.

An agricultural extension program is operating in the country under the Department of Agriculture, HMG of Nepal. Under this program, each district has its own Agricultural Development officer (ADO) and each village panchayat has its own Junior Technical Assistant (JTA) whose main objective is to teach farmers about new technology in farming and to motivate farmers to adopt modern inputs.

However, the present extension program may work when there exists a perfect co-ordination between farmers and program workers. Perhaps co-ordination is easier with large farmers who do not have problems of survival but may be difficult with a small farmer whose survival is at risk. These small farmers may not like to take advice (from

Appendix — I

Farmers' Risk Perception [i. e. V (GM)] in Rs. 000/ha by Category
of Farmer Classified According to Knowledge of New Technology.

| Group I | | Group II | | Group III | | Group IV | |
F. N.*	V (GM)	F. N.	V(GM)	F. N.	V(GM)	F. N.	V (GM)
24	3009	4	4505	1	2496	2	1922
27	3034	6	2047	5	2988	3	1584
45	3024	7	3077	10	2903	9	2294
48	3932	8	3381	16	2443	12	1878
		11	3956	17	2556	14	1584
		13	2971	18	1809	19	1511
		15	2994	20	2945	34	1112
		23	2625	21	2292	36	856
		28	2954	22	2141		
		31	2322	25	2555		
		38	3010	26	2436		
		42	2641	29	2282		
		43	3011	30	2006		
		46	2707	32	2569		
		50	2994	23	2209		
		51	3011	35	2652		
		55	3073	37	2400		
		56	3419	39	2554		
		60	3022	40	2195		
				41	2203		
				44	2608		
				47	2570		
				49	2214		
				52	2565		
				53	2304		
				54	2341		
				57	2227		
				58	2587		
				59	2629		
$\bar{X}$ = 3250		$\bar{X}$ = 3039		$\bar{X}$ = 2437		$\bar{X}$ = 1593	
n = 4		n = 19		n = 29		n = 8	

*F. N. = Farmer Number.

authorities) even if the advice carries a very small probability of failure, in which case it may ruin farmers for ever. That is, there arises a question of confidence in extension workers which introduces again the time dimension. In the long run, as these small farmers become very familiar with extension workers personally, and find their advice fruitful for neighbouring farms, they are likely to become more confident in these extension workers. But, in the short run, as these small farmers are not familiar with extension workers and the outcomes of their advice (the present extension program too, like the present adult education program), may have only a small effect in reducing farmers' risk perception with respect to new technology.Nevertheless, it may possible to make the present extension program more practical by modifying some of its components, such as by recruiting local people or extension workers, providing efficient service when required etc.

Selected References

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