PREDICTIVE CONFIGURATION OF THE KNOWLEDGE OF FARMERS ABOUT IMPROVED METHODS OF CASSAVA CULTIVATION

S. Ramanathan, M. Anantharaman and K.R. Lakshmi

Scientist S1 (Extn), Scientist S1 (Extn), and Scientist S1 (Statistics), Central Tuber Crops Research Institute, Sreekariyam, Trivandrum - 695 017, India.

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ABSTRACT

Ninety cassava farmers were interviewed to determine the configuration of characteristics which would differentiate the low from the high-knowledge level farmers. Results indicate that farmers with these characteristics in the corresponding variables, i.e. program participation (non-program), age (young), education (low), credit (not availed) and area under cassava (small), most probably possess low knowledge level. Moreover, the aforementioned configuration of characteristics should be used as a criterion in the selection of farmers who will undergo training on improved methods of cassava cultivation. This will greatly help in bridging the knowledge gap and in orienting the cassava training programs toward the need-based target group of farmers.

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KEY WORDS: Farmers. Cassava cultivation knowledge. Predictive configuration.

INTRODUCTION

Cassava is an important food crop of the tropics and can also be used as an industrial raw material for the production of starch and its derivatives. A further increase in area for cassava cultivation is not likely to significantly increase productivity if knowledge or improved technology on cassava cultivation is not properly disseminated. Increased productivity is greatly dependent on available technology and the socio-personal characteristics of farmers. The Central Tuber Crops Research Institute through its outreach programs like the Operational Research Project and the Lab to Land

Program* as well as the state extension agencies through their extension network has been providing suitable learning situations for cassava farmers to impart knowledge on improved methods of cassava cultivation. Information on the knowledge level of farmers in relation to their socio-personal characteristics will be helpful in the formulation of appropriate extension strategy for efficient and effective technology dissemination. With this in view, this study was conducted to find out the characteristics which differentiate farmers with low knowledge level from those with high knowledge level.

MATERIALS AND METHODS

Collection of Data. The study was conducted using 90 randomly selected cassava cultivators from nine villages (10 farmers per village) of Trivandrum taluk, Kerala. Of this, 40 farmers came from four villages where the Lab to Land Program was in operation and the remaining 50 were selected from five other villages where cassava was grown as the major crop. Data on knowledge, age, education, participation in special programs, credit availed of the cassava farmers and area under cassava cultivation were collected using a structured interview schedule.

Measurement of Knowledge. The concept of knowledge in this study included all aspects related to the package of cassava cultivation practices which the farmers need to know to increase productivity. A standard knowledge test was developed with 20 items covering various cultivation aspects. The scores '1' and '0' were assigned to correct and incorrect answers, respectively.

Predictive Configuration Analysis. The method of configuration analysis developed by Stuckert (1958) to predict a criterion with discrete categories from a set of discrete or continuous variables based on maximum probability was used. Any configuration of predictors associated with a probability of $\geq 80\%$ for high knowledge and $\geq 70\%$ for low knowledge was included in the predictive model. Whenever this requirement was not met, the one having the highest probability was taken as the predictor. According to Finlay (1968); this analysis, unlike prediction by measurement, makes no advance assumption about data. For the purpose of configuration analysis, the independent and dependent variables were dichotomised as shown in Table 1.

Five factors were considered to predict the knowledge level of farmers on improved methods of cassava cultivation. These were selected based on the following requisites: 1) each factor must have some theoretical base for inclusion in the prediction model, and 2) each factor must be easily perceived and

*A technology transfer program initiated by the Indian Council of Agricultural Research in 1979 to transfer the viable technologies generated at the research station to the farmers' fields.

Table 1. Dichotomised categories of variables.

Variable	Range	Category
Age	⩽35 years	Young
	>35 years	Old
Education	⩽8 years of formal schooling	Low
	>8 years of formal schooling	High
Program Participation	Lab to Land Program farmers	Program
	Non Lab to Land Program farmers	Non-program
Credit	Availed	Availed
	Not availed	Not availed
Area under Cassava	⩽1 acre	Small
	>1 acre	Big
Knowledge	Score⩽10	Low
	>10	High

amenable to quantification. Since all the selected variables for predicting the knowledge level in this analysis are independent in nature, they were assumed to be devoid of interaction effect. As indicated earlier, the categorization point of the variables was kept constant throughout the analysis.

RESULTS AND DISCUSSION

The frequency distribution of farmers in various categories with respective proportions of knowledge levels are shown in Table 2. Under the program participation variable, program farmers showed a maximum probability (0.92) with 40 cases having high knowledge such that this variable was selected as the first predictor of high knowledge level. This may be attributed to the exposure of the program farmers to improved cultivation methods through various extension activities included in the program. Hence, farmers participating in various extension programs related to cassava conducted by different extension agencies, might generally have high knowledge level. Since these 40 cases were predicted to possess high knowledge irrespective of other characteristics, the remaining 50 cases were subjected to further configuration analysis. The next and

Table 2. Frequency distribution of farmers in relation to knowledge of improved cassava cultivation.

Variable	Category	Frequency	Proportion of Farmers with Knowledge Level	
			Low	High
Age	Young	20	0.45	0.55
	Old	70	0.33	0.67
Education	Low	52	0.31	0.69
	High	38	0.42	0.58
Program Participation	Program	40	0.08	0.92[1]
	Non-Program	50	0.58	0.42
Area under Cassava	Small	65	0.37	0.63
	Big	25	0.32	0.68
Credit	Availed	47	0.23	0.77
	Not availed	43	0.49	0.51

[1] Selected as the first predictor.

the succeeding steps in the analysis were similar to the preceding one.

The age of farmers with a maximum probability of 0.88 turned out to be the second predictor (Table 3). There were eight cases of young farmers under low knowledge level which leaves 42 cases to be predicted.* This concurs with the findings of Parshad (1980) that young farmers had low knowledge about reclamation of alkali soils. This indicates that knowledge on cultivation accumulates with experience in field cultivation.

The subsequent predictors in sequential order were credit (availed) with 0.65 probability under high knowledge level (Table 4), area under cassava (small) with a probability of 0.69 under low knowledge level (Table 5), and education

*Normally, a subsample size of 20% is prescribed for the selection of a predictor. However, a subsample size below 20% can also be selected, provided it has the highest probability (Stuckert, 1958).

Table 3. Frequency distribution of farmers in relation to knowledge of improved cassava cultivation after eliminating the program participation variable.

Variable	Category	Frequency	Proportion of Farmers with Knowledge Level	
			Low	High
Age	Young	8	0.88 [1]	0.12
	Old	42	0.52	0.48
Education	Low	25	0.56	0.44
	High	25	0.60	0.40
Area under Cassava	Small	35	0.63	0.37
	Big	15	0.47	0.53
Credit	Availed	21	0.48	0.52
	Not availed	29	0.66	0.34

[1] Selected as the second predictor.

Table 4. Frequency distribution of farmers in relation to knowledge of improved cassava cultivation after eliminating the program participation and age variables.

Variable	Category	Frequency	Proportion of Farmers with Knowledge Level	
			Low	High
Education	Low	24	0.54	0.46
	High	18	0.50	0.50
Area under Cassava	Small	29	0.59	0.41
	Big	13	0.38	0.62
Credit	Availed	17	0.35	0.65 [1]
	Not availed	25	0.64	0.36

[1] Selected as the third predictor.

Table 5. Frequency distribution of farmers in relation to knowledge of improved cassava cultivation after eliminating the program participation, age and credit variables.

Variable	Category	Frequency	Proportion of Farmers with Knowledge Level	
			Low	High
Area under Cassava	Small	16	0.69[1]	0.31
	Big	9	0.56	0.44
Education	Low	16	0.69	0.33
	High	9	0.56	0.44

[1] Selected as the fourth predictor.

Table 6. Frequency distribution of farmers in relation to knowledge of improved cassava cultivation after eliminating the program participation, age, credit and area under cassava variables.

Variable	Category	Frequency	Proportion of Farmers with Knowledge Level	
			Low	High
Education	Low	7	0.57[1]	0.43
	High	2	0.50	0.50

[1] Selected as the fifth predictor.

(low) with a probability of 0.57 under low knowledge level category (Table 6). Farmers, who avail of credit facilities, follow scientific methods of cultivation in order to augment the dividends for repayment. Hence, this category of farmers has high knowledge level. Most of the farmers with small landholdings spend more time as agricultural laborers probably because their small farm size subdued their interest in finding improved cultivation techniques. However, their employment as laborers might enable them to acquire new knowledge or expose them to various media. Since education is the major

avenue to acquire knowledge, farmers with low education level were naturally categorized under the low knowledge group.

Generally, farmers with this configuration of characteristics, i.e. program participation (non-program), age (young), credit (not availed), education (low) and area under cassava (small), have low level of knowledge (Table 7).

IMPLICATIONS

Results indicate that aside from the socio-personal attributes of the farmers, their participation in specifically designed technology transfer programs such as the Lab to Land Program would serve as an educational *cum* motivational medium towards knowledge acquisition with regard to specific innovations. The configuration method could be applied to screen the farming population for a particular training program which intends to bring about desirable changes not only in cognition but also in behavior. Because most training programs have become expenditure-oriented, configuration may help to turn the expenditure into an investment.

When operating cassava-based extension programs, adequate precaution should be taken in identifying the intended audience (farmers with low knowledge on improved cassava technologies) in order to make the program need *cum* target-oriented. Efforts and intentions are likely to be useless if the selection is not carefully made. The configuration method enables the intended participant-farmers to acquire more knowledge in areas in which they are weak.

Results further reveal that farmers with this configuration of characteristics, i.e. age (young), credit (not availed), education (low) and area under cassava (small) have low knowledge levels. In this context, configuration may be helpful to locate the need-based target group in the village social system for productive extension work. This implication is quite significant because in most cases, the farming population is inversely proportional to available infrastructural facilities and extension personnel such that it is impossible to cover the whole population. It would be desirable and less expensive to concentrate primarily on target groups and use suitable extension methods to bridge the knowledge gap. A strong extension drive with application of the most effective methods like individual contact and demonstration of technology and techniques is imperative for those who most probably have low knowledge level. Significant changes both cognitive and behavioral can effectively be accomplished by selecting the target group with the aforementioned configuration of characteristics.

Table 7. Knowledge level proportions in relation to configuration of predictors.

Subsample Characteristic	'N' in Subsample	Knowledge Level Proportion		Cumulative 'N'	Cases Predicted Correctly	Cumulative Accuracy	
		Low	High			Frequency N_1	Proportion $N_1:N$
Program participation (program)	40	0.08	0.92	40	37	37	0.925
Program participation (non-program) and age (young)	8	0.88	0.12	48	7	44	0.917
Program participation (non-program), age (old) and credit (availed)	17	0.35	0.65	65	11	55	0.846
Program participation (non-program), age (old), credit (not availed) and area under cassava (small)	16	0.69	0.31	81	11	66	0.815
Program participation (non-program), age (old), credit (not availed), area under cassava (big) and education (low)	7	0.57	0.43	88	4	70	0.795

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