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Project Papers

NO. 38 JUNE 1991

**SUBJECTIVE ESTIMATION ON THE
PROBABILITY OF RESEARCH SUCCESS
FOR SELECTED COMMODITIES**

Madelyn P Catli*

Philippine Country Study

Collaborating Institutions:

Department of Agriculture (Bureau of Agricultural Research,
Bureau of Agricultural Statistics and the Planning and Monitoring Service)
Philippine Council for Agriculture, Forestry and Natural
Resources Research and Development
University of Philippines at Los Baños
Australian National University

* * * * *



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1. INTRODUCTION

The Research Prioritisation for Philippine Agriculture Project (RPPAP) research team, in a continuing effort to develop a sound agricultural research decision support system, identified that one of the methods of estimating the relative research strengths and level of priorities of agricultural commodities is the elicitation of opinion on the Probability of Research Success (PRS). It is based on the premise that the availability of information gathered from capable researchers and scientists would contribute valuable inputs as bases in research prioritisation.

Essential to the analysis of survey results is the development of an efficient computer-based data management information system which could provide fast and accurate results with reduced manpower. Of equal importance is the careful selection of respondents to ensure the integrity and reliability of information if the findings of the survey are not to be questioned. Validation of results is another critical consideration. It is imperative that adjustments and methodological changes be made to accommodate unique features of the country taking into account theoretical issues vital in the estimation procedures. Furthermore, the need to document any information system or activity is vital to ensure the continuity of the project after financial and technical support from the donor agency has ended.

This paper has the following objectives:

- (i) present the methods and techniques in the elicitation and estimation of the Probability of Research Success;
- (ii) present survey and validation results; and
- (iii) integrate and partially analyse results.

2. METHODOLOGY OF DATA COLLECTION AND PROCESSING

2.1 Survey Results

A series of meetings and consultations spearheaded by the RPPAP Project Leaders was conducted giving rise to a Survey Questionnaire. The initial design was piloted with the Presidents of the State Universities and Colleges (SUCs) providing an invaluable tool in fine-tuning the design of the questionnaire (Attachment A).

Respondents were selected based on their commodity expertise, experience, competence and knowledge of research and development activities in the country. Respondents were composed mainly of agricultural administrators, researchers, socio-economists and farming system experts from research institutions and State Universities and Colleges (SUCs). They were asked to rate, using a range of 0 to 10, (0 for not at all successful and 10 for 100% successful) the probability of success of research projects based on the region's manpower resources, research facilities and infrastructure, support services, credit institutions, input dealers, etc. The 24 commodities were rated under two time periods of research lag, 1990-1994 for the medium-term and 1995-1999 for the long-term, with the objective of attaining a 5% increase in yield considering the component technologies listed in Table 1.

Table 1. Specific Commodities and Component Technologies

PARAMETER	CROPS	LIVESTOCK	FISHERY	TOTAL
No. of Respondents	98	25	27	150
Specific Commodity	Rice Corn Coconut Banana Pineapple Coffee Tomato Sugarcane Cassava Sweet Potato Cocoa Tobacco Soybean Cotton Garlic	Cattle Swine Chicken Carabao	Milkfish Tuna Roundscad Prawn Tilapia	
Component Technology	Variety Fertiliser Chemical Cultural MGMT a. Water MGMT b. Pltng Dist. c. Pltng Time d. Seedling Rate e. Fert. Rep. f. Green Manuring	Breeding Nutrition Feeds/Pasture MGMT Practices a. Housing b. Feeding c. Stacking Rate d. Disease Prevention Control Processing/Preservation Marketing	Marine 1. Improvement of Fishing Gear 2. Conservation of MGMT Scheme 3. Handling and Storage 4. Processing Aquaculture 1. Broodstock D 2. Seed Production Cultural Mgmt a. Pond Culture T b. Management I c. Management P d. Post Harvest	

Questionnaires were sent by mail or hand-carried with a two page attachment describing the objectives of the study and the method of answering the forms.

Among the respondents, 150 answered the questionnaires. A Lotus-based data management information system was designed and intended to generate statistical parameters such as mean, median, mode and standard deviation.

Figure 1 illustrates the flow of data processing activities:

- (i) BAR staff to manually log-in incoming documents and assign a RESPONDENT NUMBER for a unique identification of each of the questionnaires.
- (ii) Code/identify the region where the questionnaire came from. Likewise, inspect the field of expertise. If there are errors, refer to concerned individuals, otherwise create a data file structure for each of the questionnaire forms similar across commodities.
- (iii) Encode data creating a DATA MASTER FILE and the initial prooflist.
- (iv) Validate/proofread data to produce the UPDATED DATA FILE and the updated data list. This process is repeated until a CLEAN DATA FILE is obtained.
- (v) Build template tables for the generation of frequencies, macros to facilitate processing and computation statistical parameters.
- (vi) Generate the frequency tables of the different component technologies by commodity, by region, by time components. Invoke macros to obtain statistical parameters.
- (vii) Validate tables. If there are errors, check the accuracy of the macros and formula.
- (viii) Determine the weights of the component technologies to be multiplied by their respective median to get the Average Weighted Median.
- (ix) Extract weighted median by commodity and by region to obtain the SUMMARY TABLES.

2.2 Weighting System

Initially, it was assumed that the different component technologies have equal weights. However, a further review of the questionnaire suggested otherwise. Thus, a personal interview with selected scientists was conducted regarding the relative weights of each of these components (Table 2).

Mr. Rolly Labious, Chief of the BAR Research Coordination Division (RCD) and a farming systems expert was interviewed for the relative weights of the different component technologies for crops. "Variety" was given the highest weight of 0.4 because of the

FIG.1 PROCEDURE FLOW

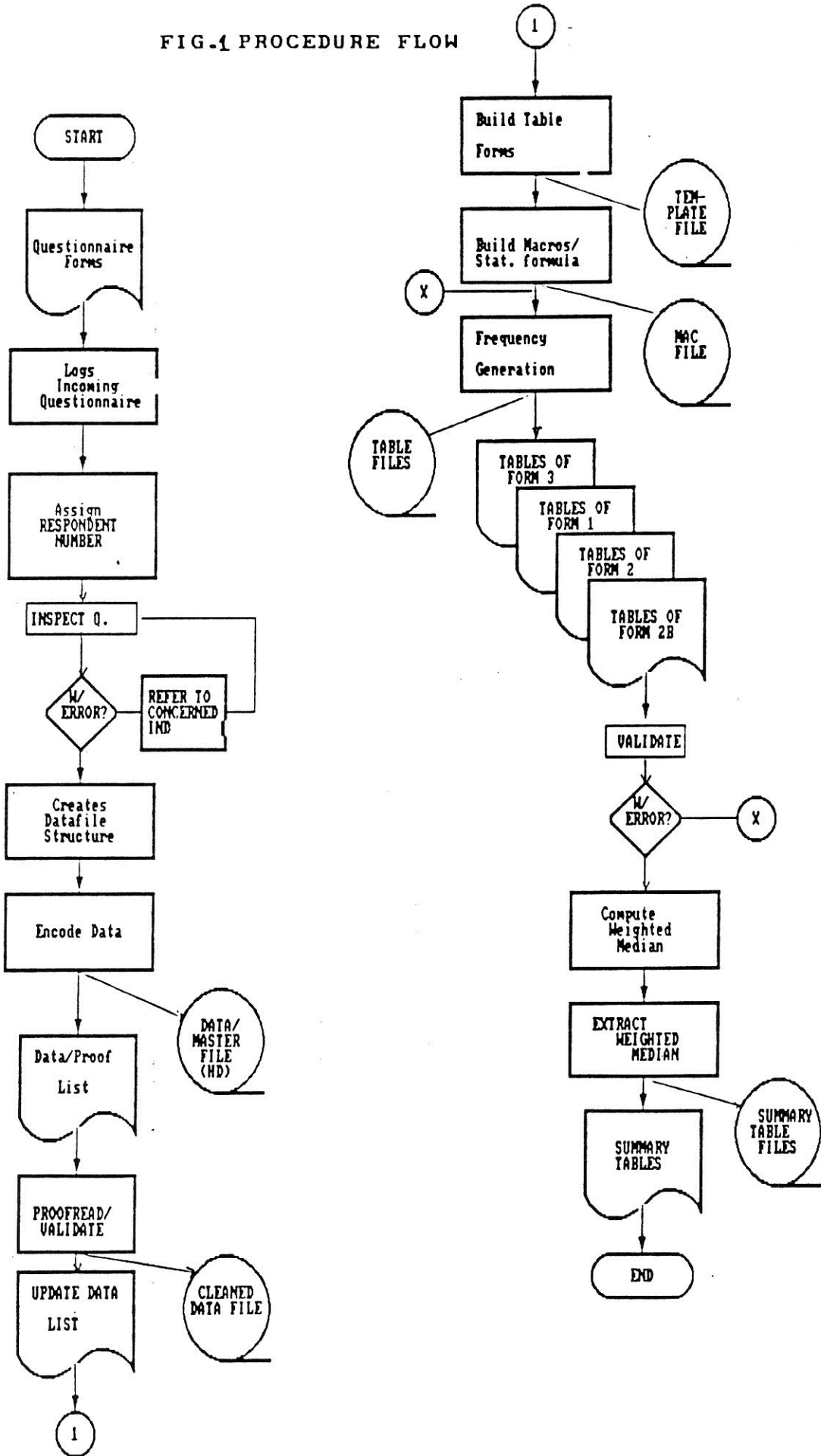


Table 2. Weighting System

CROPS	WEIGHTS
VARIETY	0.4
FERTILISER	0.2
CHEMICAL	0.1
CULTURAL PRACTICES	0.3
Water Management	0.03
Planting Distance	0.06
Planting Time	0.05
Seedling Rate	0.08
Fertiliser Replacement	0.04
Green Manuring	0.04
LIVESTOCK	
BREEDING	0.167
NUTRITION	0.167
FEEDS/PASTURE	0.167
MANAGEMENT PRACTICES	0.167
Housing	0.042
Feeding	0.042
Stocking Rate	0.042
Disease Prevention/Control	0.042
PROCESSING	0.167
MARKETING	0.167

availability of technical expertise and research facilities and infrastructure in the case of the Philippines. Furthermore, the concept is acceptable to most researchers and it has already an organised system of information flow from variety trials to information dissemination. The "chemical", on the other hand, has the least weight of 0.1 because of the complexity and extra knowledge of the processes involved in research development and research adoption. "Cultural practices" with a weight of 0.3 is very much dependent on the location's socio-cultural practices.

Dr. Manny Rocha, Assistant Director of the Bureau of Animal Industry was interviewed regarding the relative weights of the component technologies for livestock. Dr. Rocha gave an equal weight because according to him these technologies are of equal importance. The weights were multiplied by the different statistical parameters after which the best measure was determined.

2.3 Validation Results

During the Experts' Validation Workshop, 2 sets of questionnaires were distributed (Attachments B1 and B2). The first set aims to validate the survey result based on 5 and 10 years research lag assuming a 5% increase in yield. The second set aims to elicit scientists' opinion without being guided by the results of the survey and indicating the most convenient number of years for research on a particular crop to be successful using certain measures of research success. Examples of these measures are reduced unit cost, increased pest resistance, and increase in weight, among others. It also elicits opinion separately for innovative and adaptive research. Innovative research refers to basic or applied research undertaken with the notion to acquire new knowledge directed primarily toward a specific aim or objective. Adaptive research is a systematic work that draws on knowledge and output gained from applied research purposely to adopt such technology output to specific circumstances.

Each group started with a critical examination and careful study of the questionnaires ensuring that each member has the same kind of understanding. It is also worth mentioning at this point that some of those who came to the validation workshop were respondents to the survey. The scientists based their estimates on what they perceived as the level of research strength in terms of manpower and technical support, availability of facilities/institutions and access to infrastructure like roads, markets, credit institutions and cooperatives. They also partly based their opinion on the topographic characteristics and prevailing type of climate in the areas as well as the political events.

3. RESULTS AND DISCUSSION

This section presents the different results arising from the survey and the output of the Experts' Validation Workshop. The research objective is expressed in percent and research lag is expressed in years as key identifiers. Attachment C is a Glossary of the Abbreviations used.

3.1 Survey Results

Table S3.1 and Table S3.2 present the survey results based on the median with the objective of 5% increase in yield considering a period of 5 and 10 years research lag, respectively.

Generally, the survey results reveal that there are regions with no answers as represented by the blanks. The reason is three-fold:

- (i) no capable researchers in the area, aggravated by the lack of research stations, centres or laboratories with infrastructures, and equipment that could allow scientists to work efficiently;
- (ii) there are respondents, however, who feel their knowledge of regional research activities is inadequate to make even an educated guess; and
- (iii) the particular crop does not thrive in the area which means the probability of conducting research is equal to zero. As you will note, the questionnaire was designed so that it incorporates all component technologies of commodity groups allowing the scientist to make his choice.

Among the major research crops common in all regions are rice, corn, coconut, banana, pineapple, coffee and tomato. The rating of the crop commodities across regions reveals that rice research would mostly succeed for Luzon and some areas in Mindanao. Corn predominates in the Visayas. There is no observed consistency of answers as these are purely subjective estimates. An additional period of 5 years maintaining the research objective constant would definitely increase the probability of research success. This is based on the premise that it is easier to conduct adaptive research than basic or innovative.

3.2 Validation Results

Among the common issues raised during the Experts' Validation Workshop are the following:

- (i) questionnaire too broad ;
- (ii) difficulty in expressing the research objective in terms of yield;
- (iii) unfamiliarity with the regional research and development activities; and
- (iv) research lag is dependent on the technology being considered.

Table V1.1 and Table V1.2 show the validated survey results elicited from experts with the same research objective and research lag. The dash (-) represents 0 probability.

A close examination of the results in these tables reveals that coconut, coffee, sugarcane, cocoa, tobacco, hog, poultry and carabao experts have conformed to the results of the survey. On the other hand, there are significant changes made for some commodities. The scientists felt that the survey results are underestimated or overestimated.

TABLE S3.1 SUMMARY OF PROBABILITY OF RESEARCH SUCCESS : SURVEY RESULTS
 BASED ON MEDIAN
 RESEARCH LAG : 5 YEARS

COMMODITY	RESEARC; LAG (YEARS)	RES. OB; (% INC. IN YIELD)	REGIONS													
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	NO REG.
CROPS	RICE	5	0.77	0.78	0.75	0.79	0.74	0.58	0.82	0.75	0.33	0.73	0.75	0.85	0.82	0.79
	CORN	5	0.67	0.68	0.74	0.69	0.74	0.47	0.71	0.76	0.28	0.67	0.70	0.83	0.83	0.47
	COCONUT	5	0.71	0.30	0.39	0.34	0.57	0.32	0.58	0.74	0.21	0.71	0.79	0.60	0.38	0.73
	BANANA	5	0.64	0.58	0.36	0.42	0.61	0.34	0.60	0.53	0.14	0.57	0.64	0.60	0.49	0.77
	PINEAPPLE	5	0.52	0.54	0.42	0.29	0.72	0.41	0.62	0.57	0.23	0.59	0.66	0.63	0.40	0.63
	COFFEE	5	0.77	0.63	0.51		0.60	0.44	0.63	0.70	0.17	0.68	0.65	0.64	0.71	0.77
	TOMATO	5	0.72	0.72	0.60	0.42	0.71	0.55	0.72	0.76	0.25	0.65	0.71	0.81	0.57	0.78
	SUGARCANE	5				0.67	0.65									
	CASSAVA	5			0.18	0.32	0.65	0.29			0.41	0.59			0.86	
	SWEET POTATO	5		0.59	0.20	0.38	0.65	0.30			0.41				0.84	
	COCOA	5			0.29		0.59				0.20			0.60	0.78	
	TOBACCO	5		0.69	0.34		0.58								0.64	
	SOYBEAN	5			0.26	0.44	0.67				0.20				0.52	
	COTTON	5		0.59	0.32		0.61							0.66		
	GARLIC	5		0.68	0.37	0.25	0.65							0.40		
LIVESTOCK	CATTLE	5		0.20		0.62	0.55	0.40	0.44	0.68	0.41		0.79		0.38	
	HOG	5		0.31		0.72	0.77	0.48		0.71	0.38		0.90			
	CHICKEN	5		0.24		0.74	0.76	0.48		0.80	0.47		0.83			
	CARABAO	5		0.26		0.58	0.56	0.45	0.74	0.69	0.47		0.69		0.40	
FISHERIES	MILKFISH	5	0.37	0.19	0.70	0.35	0.35	0.61	0.77	0.80	0.60		0.79	0.49	0.43	
	TUNA	5			0.63	0.70	0.30	0.47	0.70	0.63	0.60		0.67	0.32	0.11	
	ROUNDSCAD	5	0.35		0.58	0.54	0.20	0.49	0.70	0.65			0.66	0.32	0.10	
	PRAWN	5		0.20	0.59	0.71	0.65	0.57	0.76	0.75	0.53		0.82	0.53	0.44	
	TILAPIA	5	0.94	0.20		1.00	0.78	0.76	0.10		0.60			0.33		

TABLE S3.2 SUMMARY OF PROBABILITY OF RESEARCH SUCCESS : SURVEY RESULTS
 BASED ON MEDIAN
 RESEARCH LAG : 10 YEARS

COMMODITY	REGIONS														
	RESEAR; RES. OB; LAG : (% INC. (YEARS); IN YIELD	CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	MO REG.
CROPS	10	0.84	0.84	0.76	0.76	0.78	0.70	0.82	0.75	0.54	0.79	0.80	0.88	0.80	0.79
	5	0.79	0.76	0.75	0.71	0.79	0.68	0.73	0.75	0.60	0.74	0.75	0.83	0.86	0.79
	10	0.86	0.38	0.39	0.50	0.69	0.39	0.63	0.74	0.29	0.72	0.79	0.73	0.43	0.73
	5	0.66	0.64	0.45	0.27	0.73	0.36	0.67	0.53	0.29	0.63	0.65	0.57	0.50	0.77
	10	0.62	0.62	0.46	0.25	0.80	0.54	0.72	0.57	0.41	0.66	0.66	0.74	0.48	0.63
	5	0.86	0.67	0.55	0.74	0.74	0.52	0.76	0.71	0.41	0.76	0.75	0.75	0.81	0.77
	10	0.79	0.72	0.65	0.52	0.80	0.73	0.79	0.78	0.48	0.74	0.78	0.74	0.62	0.78
	5				0.83	0.65									
	10			0.21	0.62	0.65	0.29			0.61	0.70				0.79
	5		0.69	0.25	0.74	0.65	0.29			0.61					0.79
	10			0.33		0.59				0.20			0.67	0.74	0.58
	5		0.78	0.36		0.52									0.47
	10			0.29	0.74	0.67				0.20					0.67
	5		0.68	0.47		0.61									0.67
	10		0.78	0.40	0.64	0.65				0.60					
LIVESTOCK	10														
	5		0.36	0.60	0.73	0.22	0.44	0.78	0.81	0.49			0.90		0.51
	10		0.44	0.72	0.89	0.48		0.81	0.58				1.00		
	5		0.41	0.72	0.89	0.48		0.90	0.67				0.93		
10		0.39	0.60	0.70	0.50	0.74	0.79	0.67				0.79		0.58	
FISHERIES	10														
	5		0.50	0.29	0.94	0.76	0.60	0.79	0.87	0.93	0.80		0.89	0.92	0.38
	10		0.88	0.88	0.82	0.20	0.61	0.70	0.90	0.80			0.74	0.51	0.24
	5		0.40	0.70	0.71	0.25	0.67	0.70	0.90				0.71	0.52	0.20
	10		0.30	0.67	0.88	0.62	0.76	0.81	0.89	0.73			0.92	0.93	0.39
5		0.93	0.30	1.00	0.98	0.91	0.20								

TABLE VI.1 SUMMARY OF PROBABILITY OF RESEARCH SUCCESS : SURVEY VALIDATION
RESEARCH LAG : 5 YEARS

COMMODITY	R E G I O N S												EXPERTS			
	RESARC; LAG : (YEARS):	RES. OB: (* INC.)	CAR	I	II	III	IV	V	VI	VII	VIII	IX		X	XI	XII
CROPS	5	5	0.20	0.40	0.40	0.50	0.60	0.45	0.40	0.30	0.40	0.30	0.40	0.30	0.40	PHILRICK, UPLB
	5	5	0.67	0.68	0.74	0.69	0.74	0.47	0.71	0.76	0.28	0.67	0.75	0.79	0.79	USMARC, UPLB
	5	5	0.71	0.30	0.39	0.34	0.57	0.32	0.58	0.74	0.21	0.71	0.79	0.60	0.38	PCA, UPLB
	5	5	0.80	0.80	0.80	0.70	0.85	0.70	0.80	0.75	0.70	0.80	0.85	0.85	0.80	UPLB, DA-BPI
	5	5	0.70	0.70	0.70	0.70	0.85	0.75	0.70	0.70	0.69	0.74	0.75	0.80	0.70	UPLB, DA-BPI
	5	5	0.77	0.63	0.51	0.35	0.60	0.44	0.63	0.70	0.17	0.68	0.65	0.64	0.71	UPLB, USM, PCARRD
	5	5	0.75	0.80	0.30	0.60	0.65	0.55	0.30	0.20	0.18	0.10	0.80	0.15	0.10	DA-RI, DA-RIO, HMSU
	5	5	-	0.10	0.10	0.67	0.65	0.30	0.90	-	0.20	-	0.20	-	0.30	SRA, BAR
	5	5	-	0.50	0.30	0.32	0.37	0.25	0.27	0.59	0.61	0.37	0.37	0.38	0.59	PRCRTC, BBEC
	5	5	-	0.47	0.27	0.37	0.32	0.45	0.37	0.27	0.60	0.27	0.40	0.27	0.27	PRCRTC, BBEC
	5	5	0.80	0.35	0.29	0.35	0.59	0.35	0.35	0.35	0.20	0.35	0.80	0.60	0.78	UPLB, USM, PCARRD
	5	5	-	0.69	0.34	-	0.58	-	-	-	-	-	-	-	0.64	NTA, UPLB
	5	5	0.20	0.30	0.26	0.42	0.68	0.35	0.40	0.30	0.20	0.20	0.20	0.40	0.51	DA-BPI, PCARRD
	5	5	-	1.00	1.00	1.00	1.00	-	1.00	1.00	-	1.00	1.00	1.00	1.00	CRDI
5	5	0.25	0.85	0.25	0.30	0.45	0.20	0.10	0.12	0.05	0.08	0.25	0.10	0.20	PRCRTC, BBEC	
LIVESTOCK	5	5	-	0.40	0.50	0.60	0.70	0.40	0.44	0.68	0.50	-	0.45	0.35	-	UPLB-IAS
	5	5	-	0.31	0.48	0.72	0.77	0.48	0.4	0.71	0.38	-	0.35	0.90	0.3	UPLB-IAS
	5	5	-	0.24	0.5	0.74	0.76	0.48	0.9	0.80	0.47	-	-	0.83	0.5	UPLB-IAS
	5	5	-	0.26	0.4	0.58	0.56	0.45	0.74	0.69	0.47	-	0.5	0.69	0.4	UPLB-IAS
FISHERIES	5	5	0.37	0.50	0.70	0.50	0.70	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	SEAFDEC, BFAR, PCARRD
	5	5	-	0.60	0.60	0.60	1.00	0.60	1.00	0.60	0.60	1.00	1.00	1.00	0.60	SEAFDEC, BFAR, PCARRD
	5	5	-	0.60	0.60	0.60	1.00	0.60	1.00	0.60	0.60	0.60	0.60	0.60	0.60	SEAFDEC, BFAR, PCARRD
	5	5	-	0.50	0.60	0.40	0.40	0.60	1.00	0.70	0.40	0.50	1.00	0.50	0.50	SEAFDEC, BFAR, PCARRD
	5	5	0.50	0.60	0.60	1.00	0.80	0.70	1.00	0.40	0.50	0.60	0.60	0.50	0.50	SEAFDEC, BFAR, PCARRD

TABLE VI.2 SUMMARY OF PROBABILITY OF RESEARCH SUCCESS : SURVEY VALIDATION
RESEARCH LAG : 10 YEARS

COMMODITY	REGIONS												EXPRSTS			
	RESEARC; LAG (YRS)	RES. OB; (% INC.)	CAR	I	II	III	IV	V	VI	VII	VIII	IX		X	XI	XII
CROPS	10	5	0.45	0.70	0.70	0.85	0.90	0.70	0.70	0.65	0.65	0.60	0.65	0.65	0.70	PHILRICE, UPLB
	10	5	0.79	0.76	0.75	0.71	0.79	0.68	0.73	0.75	0.60	0.74	0.78	0.77	0.79	USMARC, UPLB
	10	5	0.86	0.38	0.39	0.50	0.69	0.39	0.63	0.74	0.29	0.72	0.79	0.73	0.43	PCA, UPLB
	10	5	0.90	0.90	0.90	0.85	0.95	0.80	0.90	0.88	0.80	0.90	0.95	0.95	0.90	UPLB, DA-BPI
	10	5	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.95	0.95	0.95	0.90	UPLB, DA-BPI
	10	5	0.86	0.67	0.55	0.35	0.74	0.52	0.76	0.71	0.41	0.76	0.75	0.75	0.81	UPLB, USM, PCARRD
	10	5	0.85	0.85	0.40	0.65	0.75	0.73	0.60	0.55	0.50	0.63	0.85	0.70	0.30	DA-R1, DA-R10, MRSU
	10	5	-	0.20	0.20	0.83	0.65	0.30	0.95	-	0.40	-	0.40	-	0.30	SRA, BAR
	10	5	0.90	0.5	0.21	0.62	0.65	0.29	0.50	0.50	0.61	0.70	0.80	0.50	0.79	PRCRTC, BBEC
	10	5	0.90	0.69	0.25	0.74	0.65	0.29	0.50	0.80	0.61	0.50	0.80	0.50	0.79	PRCRTC, BBEC
	10	5	0.80	0.35	0.33	0.35	0.59	0.35	0.35	0.35	0.20	0.35	0.80	0.67	0.74	UPLB, USM, PCARRD
	10	5	-	0.78	0.36	-	0.52	-	-	-	-	-	-	-	0.58	NTA, UPLB
	10	5	0.15	0.20	0.29	0.67	0.68	0.20	0.42	0.30	0.20	0.15	0.20	0.48	0.50	DA-BPI, PCARRD
	10	5	-	1.00	1.00	1.00	1.00	-	1.00	1.00	-	1.00	1.00	1.00	1.00	CRDI
	10	5	0.30	0.87	0.30	0.40	0.55	0.25	0.15	0.17	0.10	0.12	0.30	0.20	0.25	PRCRTC, BBEC
LIVESTOCK	10	5	-	0.65	0.65	0.75	0.85	-	-	-	0.75	-	0.55	0.45	-	-
	10	5	-	0.44	0.48	0.72	0.89	0.48	0.4	0.81	0.58	-	0.35	1.00	-	UPLB-IAS
	10	5	-	0.41	0.3	0.72	0.89	0.48	0.5	0.90	0.67	-	-	0.93	0.5	UPLB-IAS
	10	5	-	0.39	0.4	0.60	0.70	0.50	0.74	0.79	0.67	-	0.5	0.79	0.4	UPLB-IAS
FISHERIES	10	5	-	0.60	0.80	0.60	0.80	0.60	1.00	0.60	0.60	0.60	0.60	0.60	0.60	SEAFDEC, BRAR, PCARRD
	10	5	-	0.70	0.70	0.70	1.00	0.70	1.00	0.70	0.70	1.00	1.00	1.00	0.70	SEAFDEC, BRAR, PCARRD
	10	5	-	0.70	0.70	0.70	1.00	0.70	1.00	0.70	0.70	0.70	0.70	0.70	0.70	SEAFDEC, BRAR, PCARRD
	10	5	-	0.60	0.70	0.50	0.50	0.70	1.00	0.80	0.50	0.60	1.00	0.60	0.60	SEAFDEC, BRAR, PCARRD
	10	5	0.60	0.70	0.70	1.00	0.90	0.80	1.00	0.50	0.60	0.70	0.70	0.60	0.60	SEAFDEC, BRAR, PCARRD

The estimates are partly based on the production data and level of research budgets.

3.3 Final Values

Table V2.1 to Table V2.4 list the estimated probability of innovative and adaptive research without being guided by the survey results.

The scientists, given the flexibility in terms of research objectives and research lag would be most comfortable with answers on Table V3.1 and Table V3.2.

Table V4.1 and Table V4.2 summarise the final values for the PRS given a flexibility in terms of research lag and expressing the research objective in Tables V3.1 and V3.2 in terms of increase in yield. Some scientists mentioned that it is extremely difficult to measure the research objective in terms of yield, hence some commodities have no equivalent increase in yield.

Some of the answers for given research lag in Table V3.1 and Table V3.2 are either too short or too long to justify the stated objectives, hence the team consulted other experts and agreed to make some adjustments. They based their estimates in Table V2.1 to Table V2.4, Table V1.1 and Table V1.2 (survey validation) and partly from the level of research budgets and production data. To maintain some degree of uniformity, almost all commodities carried over the probability of the 5 years research lag. For some commodities it is a case-to-case basis. Take for example rice. The range of years for research to attain a 5% increase in yield is 6 to 10 years. The average year would be $(6 + 10)/2$ or 8 years. Therefore, take the average of the 5 and 10 years in the innovative research. Another is banana. The probabilities are too high compared to other commodities, thus the values were consistently lowered by 0.2. For corn, the average number of years is 5.5, therefore, the values for 5 years were carried over.

A careful examination of the final values reveals that region IV would attain a high probability of success for almost all commodities because of the presence of highly established agri-based research institutions in the area such as the UPLB, IRRI, BPI, IPB, etc and all other research support combined. Obviously those regions that are frequently visited by typhoons like regions II, V and VIII are the least successful. Region VI was ranked number one in sugarcane primarily due to the presence of the La Granja Agricultural Research Complex. Region XI has a high probability for coconut research because of the co-existence of the BPI, PCA - ZRC and CRI. CAR and Region I do have coconut research because of the high elevation and very hot climate in CAR and Region I, respectively. Research for fisheries is concentrated in Region VI because of the high technology research facilities of SEAFDEC and UP Visayas. The presence of the CRDI and the PTRTC and NTA in Region I make it excellent for cotton and tobacco production and likewise research. The high probability of corn research in regions X, XI and XII can be attributed to the presence of the USMARC and SMC. Mindanao in general is excellent for fruits because of the existence of private firms such as Del Monte, Phils, and the Dole Phils. Generally, success of research in the Philippines has partly contributed to the presence of DA research stations and centres strategically located throughout the country.

The adaptive research in Table V4.2 has either maintained, significantly increased, or in some slightly decreased compared to the innovative research in Table V4.1.

TABLE V2.1 SUMMARY OF PROBABILITY OF INNOVATIVE RESEARCH SUCCESS ELICITED FROM EXPERTS
RESEARCH LAG : 5 YEARS

COMMODITY	RESEARCH LAG (YEARS)	RES. OBJ. (% INC. IN YIELD)	REGIONS												EXPERTS		
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		XII	
CROPS	5	5	0.10	0.25	0.25	0.30	0.40	0.25	0.25	0.25	0.25	0.25	0.20	0.25	0.15	0.25	PHILRICE, UPLB
	5	11	0.70	0.80	0.70	0.70	0.90	0.70	0.70	0.80	0.70	0.80	0.70	0.80	0.85	0.90	USHARC, UPLB
	5	100	-	0.20	0.20	0.20	0.60	0.68	0.35	0.35	0.50	0.70	0.70	0.45	0.80	0.40	PCA, UPLB
	5	10	0.70	0.75	0.70	0.75	0.90	0.85	0.65	0.65	0.85	0.60	0.60	0.80	0.90	0.60	UPLB, DA-BPI
	5	5	0.40	0.45	0.40	0.55	0.75	0.65	0.55	0.30	0.55	0.25	0.25	0.70	0.70	0.25	UPLB, DA-BPI
	5	10	0.30	-	-	-	0.50	-	-	-	-	-	-	0.30	0.30	0.50	UPLB, USH, PCARRD
	5	20	0.65	0.80	0.20	0.75	0.78	0.50	0.45	0.40	0.20	0.50	0.50	0.85	0.85	0.10	DA-R1, DA-R10, MMSU
	5	-	-	-	-	0.50	0.90	0.30	0.90	-	-	-	-	-	-	0.30	SRA, BAR
	5	10-20	0.80	0.30	0.30	0.30	0.50	0.30	0.30	0.70	0.90	0.30	0.30	0.70	0.30	0.30	PRCRTC, BBEC
	5	10-20	0.80	0.30	0.30	0.30	0.50	0.30	0.30	0.70	0.90	0.30	0.30	0.70	0.30	0.30	PRCRTC, BBEC
	5	10	0.30	-	-	-	0.50	-	-	-	-	-	-	0.30	0.30	0.50	UPLB, USH, PCARRD
	5	30	-	1.00	1.00	-	1.00	-	-	-	-	-	-	-	-	-	NTA, UPLB
	5	35	-	0.20	0.20	0.20	0.50	0.10	0.40	0.25	-	-	-	0.30	0.30	0.45	DA-BPI, PCARRD
	5	-	-	NO ANSWER	-	-	-	-	-	-	-	-	-	-	-	-	CRDI
	5	15	0.65	0.90	0.25	0.70	0.90	0.30	0.10	0.12	0.05	0.08	0.08	0.60	0.15	0.20	PRCRTC, BBEC
LIVESTOCK	5	5	-	0.40	0.50	0.60	0.70	-	-	-	0.50	-	-	0.45	0.30	-	UPLB-IAS
	5	-	-	NO ANSWER	-	-	-	-	-	-	-	-	-	-	-	-	UPLB-IAS
	5	-	-	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.10	-	-	-	-	-	UPLB-IAS
	5	-	0.20	0.30	0.80	0.80	0.20	0.20	0.20	0.40	-	-	0.40	-	0.30	-	UPLB-IAS
FISHERIES	5	BD	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	SEAFDEC, BFAR, PCARRD
	5	NA	-	-	-	1.00	-	1.00	-	1.00	-	1.00	1.00	1.00	1.00	-	SEAFDEC, BFAR, PCARRD
	5	NA	-	0.50	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	SEAFDEC, BFAR, PCARRD
	5	10	-	-	-	-	-	-	1.00	-	-	-	-	0.60	-	-	SEAFDEC, BFAR, PCARRD
	5	10	-	-	-	1.00	0.30	-	1.00	-	-	-	-	-	-	-	SEAFDEC, BFAR, PCARRD

TABLE V2.2 SUMMARY OF PROBABILITY OF INNOVATIVE RESEARCH SUCCESS ELICITED FROM EXPERTS
RESEARCH LAG : 10 YEARS

COMMODITY	RESEARC LAG (YEARS)	RES. OBJ. (% INC. IN YIELD)	REGIONS												EXPERTS		
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		XII	
CROPS	10	5	0.30	0.75	0.75	1.00	1.00	0.75	0.75	0.75	0.75	0.75	0.60	0.75	0.50	0.75	PHILRICE, UPLB
	10	11	-	0.70	-	0.80	-	0.80	-	-	-	0.70	0.75	0.90	0.85	0.75	USMARC, UPLB
	10	100	-	-	0.15	0.15	0.55	0.55	0.30	0.30	0.45	0.45	0.65	0.40	0.75	0.35	PCA, UPLB
	10	10	0.92	0.92	0.92	0.92	1.00	0.95	0.90	0.95	0.90	0.95	0.85	0.92	1.00	0.85	UPLB, DA-BFI
	10	5	0.85	0.85	0.85	0.90	0.98	0.95	0.85	0.85	0.65	0.85	0.60	0.95	0.98	0.60	UPLB, DA-BFI
	10	10	0.80	-	-	-	1.00	-	-	-	-	-	-	0.80	0.80	1.00	UPLB, USM, PCARD
	10	20	0.75	0.85	0.28	0.80	0.85	0.55	0.50	0.45	0.25	0.55	0.55	0.85	0.55	0.15	DA-R1, DA-R10, HMSU
	10	-	-	-	-	0.50	0.95	0.30	0.95	-	-	-	-	-	-	0.30	SRA, BAR
	10	10-20	0.90	0.50	0.50	0.50	0.60	0.50	0.50	0.80	0.90	0.80	0.90	0.80	0.50	0.50	PRCRTC, BBEC
	10	10-20	0.90	0.50	0.50	0.50	0.60	0.50	0.50	0.80	0.90	0.80	0.90	0.80	0.50	0.50	PRCRTC, BBEC
	10	10	0.80	-	-	-	1.00	-	-	-	-	-	-	0.80	0.80	1.00	UPLB, USM, PCARD
	10	30	-	1.00	1.00	-	1.00	-	-	-	-	-	-	-	-	-	NTA, UPLB
	10	35	-	0.35	0.35	0.35	0.90	0.20	0.65	0.45	-	-	-	0.45	0.50	0.70	DA-BPI, PCARD
	10	-	-	1.00	-	-	1.00	-	-	-	-	-	-	-	-	-	CRDI
	10	15	0.70	0.95	0.35	0.75	0.95	0.40	0.15	0.17	0.10	0.12	0.65	0.65	0.20	0.25	PRCRTC, BBEC
LIVESTOCK	10	-	-	0.45	0.55	0.65	0.80	-	-	-	-	0.55	-	0.50	0.35	-	UPLB-IAS
	10	5	-	NO ANSWER	-	-	-	-	-	-	-	-	-	-	-	-	UPLB-IAS
	10	-	-	0.30	0.20	0.50	0.50	0.30	0.50	0.20	-	-	-	-	-	-	UPLB-IAS
	10	-	-	0.30	0.40	0.90	0.90	0.30	0.30	0.30	0.50	-	0.50	-	0.40	-	UPLB-IAS
FISHERIES	10	BD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SEAFDEC, BFAR, FCARD
	10	NA	-	-	-	1.00	-	1.00	-	-	-	-	1.00	1.00	1.00	-	SEAFDEC, BFAR, FCARD
	10	NA	-	0.70	0.70	0.70	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	SEAFDEC, BFAR, FCARD
	10	10	-	-	-	-	-	-	-	-	-	-	-	0.60	-	-	SEAFDEC, BFAR, FCARD
	10	10	-	-	-	1.00	0.30	-	-	-	-	-	-	-	-	-	SEAFDEC, BFAR, FCARD
	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SEAFDEC, BFAR, FCARD

TABLE V2.3 SUMMARY OF PROBABILITY OF ADAPTIVE RESEARCH SUCCESS ELICITED FROM EXPERTS
RESEARCH LAG : 5 YEARS

COMMODITY	RESEARCH LAG (YEARS)	RES. OBJ. (% INC. IN YIELD)	REGIONS												EXPERTS		
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		XII	
CROPS	5	5	0.30	0.70	0.70	0.80	1.00	0.70	0.70	0.70	0.70	0.60	1.00	0.50	0.30	0.70	PHILRICE, UPLB
	5	11	0.70	0.70	0.80	0.70	0.90	0.70	0.70	0.70	0.70	0.80	0.75	0.90	0.85	0.90	USHARC, UPLB
	5	100	0.20	-	0.15	0.20	0.60	0.60	0.35	0.30	0.30	0.50	0.70	0.40	0.80	0.45	PCA, UPLB
	5	10	0.85	0.80	0.85	0.75	0.95	0.90	0.85	0.80	0.80	0.90	0.75	0.85	0.95	0.75	UPLB, DA-BPI
	5	5	0.60	0.60	0.60	0.60	0.80	0.75	0.75	0.60	0.60	0.60	0.60	0.75	0.75	0.60	UPLB, DA-BPI
	5	10	0.30	0.20	0.20	-	0.50	-	0.20	0.20	0.20	0.20	0.30	0.50	0.50	0.50	UPLB, USM, PCARRD
	5	20	0.70	0.85	0.25	0.75	0.80	0.65	0.40	0.40	0.45	0.25	0.50	0.90	0.40	0.15	DA-RI, DA-RIO, MMSU
	5	-	-	-	-	0.60	0.60	0.40	0.95	-	-	-	-	-	-	0.40	SRA, BAR
	5	10-20	0.60	0.30	0.30	0.70	0.70	0.65	0.30	0.80	0.80	0.60	0.30	0.80	0.30	0.30	PRCRTC, BBEC
	5	10-20	0.60	0.30	0.30	0.70	0.70	0.65	0.30	0.80	0.80	0.60	0.30	0.80	0.30	0.30	PRCRTC, BBEC
	5	10	0.30	0.20	0.20	-	0.50	-	0.20	0.20	0.20	0.20	0.30	0.50	0.50	0.50	UPLB, USM, PCARRD
	5	30	-	1.00	0.90	0.80	0.70	-	0.80	0.70	-	-	0.60	-	0.60	0.80	NTA, UPLB
	5	35	-	0.38	0.50	0.28	0.50	0.22	0.32	0.32	0.20	0.20	0.20	0.20	0.50	0.65	DA-BPI, PCARRD
	5	-	0.30	0.20	0.20	-	0.50	-	0.20	0.20	0.20	0.20	0.20	0.30	0.50	0.50	CRDI
	5	15	0.70	0.90	0.30	0.75	0.90	0.35	0.15	0.15	0.18	0.13	0.14	0.75	0.20	0.25	PRCRTC, BBEC
LIVESTOCK	5	5	-	0.60	0.60	0.70	0.85	-	-	-	0.70	-	-	0.50	0.40	-	UPLB-IAS
	5	5	-	NO ANSWER			-	-	-	-	-	-	-	-	-	-	UPLB-IAS
	5	5	-	-	0.60	0.70	0.90	0.80	0.90	0.60	-	-	-	-	-	-	UPLB-IAS
	5	5	-	0.40	0.50	0.90	0.90	0.40	0.40	0.50	0.60	-	-	0.60	-	0.50	UPLB-IAS
FISHERIES	5	BD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SEAFDEC, BFAR, PCAHR
	5	NA	-	-	-	1.00	-	-	1.00	-	-	-	1.00	1.00	1.00	-	SEAFDEC, BFAR, PCAHR
	5	NA	-	0.50	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	SEAFDEC, BFAR, PCAHR
	5	10	-	0.70	0.70	0.70	0.70	0.70	1.00	0.70	0.70	0.70	0.70	0.90	0.70	0.70	SEAFDEC, BFAR, PCAHR
	5	10	-	0.70	0.70	0.90	0.70	-	0.70	0.70	-	-	-	0.70	0.70	-	SEAFDEC, BFAR, PCAHR

TABLE V2.4 SUMMARY OF PROBABILITY OF ADAPTIVE RESEARCH SUCCESS ELICITED FROM EXPERTS
RESEARCH LAG : 10 YEARS

COMMODITY	RESEARCH LAG (YEARS)	RES. OBJ. (% INC. IN YIELD)	REGIONS												EXPERTS				
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		XII			
CROPS	10	5	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	PHILRICE, UPLB	
	10	11	0.60	0.60	0.70	0.60	0.80	0.60	0.60	0.60	0.60	0.60	0.70	0.80	0.80	0.80	0.80	0.85	USMARC, UPLB
	10	100	0.15	-	0.10	0.15	0.55	0.55	0.55	0.30	0.30	0.25	0.45	0.65	0.35	0.75	0.40	0.40	PCA, UPLB
	10	10	0.95	0.95	0.95	0.90	1.00	1.00	1.00	0.98	0.98	0.95	1.00	0.90	0.98	1.00	0.90	0.90	UPLB, DA-BFI
	10	5	0.85	0.85	0.85	0.85	0.98	0.85	0.98	0.95	0.95	0.85	0.85	0.85	0.95	0.95	0.85	0.85	UPLB, DA-BFI
	10	10	0.80	0.60	0.60	-	1.00	-	1.00	-	0.60	0.60	0.60	0.80	1.00	1.00	1.00	1.00	UPLB, USM, FCARRD
	10	20	0.75	0.90	0.30	0.80	0.85	0.80	0.85	0.65	0.45	0.50	0.25	0.55	0.95	0.45	0.20	0.20	DA-R1, DA-R10, HMSU
	10	-	-	-	-	0.65	0.65	0.50	0.50	0.95	-	-	-	-	-	-	0.50	0.50	SRA, BAR
	10	10-20	0.70	0.50	0.50	0.80	0.80	0.80	0.75	0.75	0.50	0.90	0.70	0.50	0.90	0.50	0.50	0.50	PRCRTC, BBEC
	10	10-20	0.70	0.50	0.50	0.80	0.80	0.80	0.75	0.75	0.50	0.90	0.70	0.50	0.90	0.50	0.50	0.50	PRCRTC, BBEC
	10	10	0.80	0.60	0.60	-	1.00	-	1.00	-	0.60	0.60	0.60	0.80	1.00	1.00	1.00	1.00	UPLB, USM, FCARRD
	10	30	-	1.00	1.00	1.00	1.00	-	1.00	-	1.00	1.00	-	0.80	-	0.80	1.00	1.00	NTA, UPLB
	10	35	-	0.65	0.80	0.55	0.85	0.40	0.40	0.55	0.55	0.55	0.45	0.30	0.85	1.00	1.00	1.00	DA-BFI, FCARRD
	10	-	0.80	0.60	0.60	-	1.00	-	1.00	-	0.60	0.60	0.60	0.80	1.00	1.00	1.00	1.00	CRDI
	10	15	0.78	0.95	0.35	0.85	0.95	0.40	0.40	0.20	0.20	0.23	0.15	0.16	0.80	0.25	0.30	0.30	PRCRTC, BBEC
LIVESTOCK	10	5	-	0.65	0.65	0.75	0.85	-	-	-	-	0.75	-	0.55	0.45	-	-	-	UPLB-IAS
	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPLB-IAS
	10	-	-	0.70	0.70	0.90	0.90	0.80	0.80	0.90	0.70	-	-	-	-	-	-	-	UPLB-IAS
	10	-	0.50	0.60	0.90	0.90	0.50	0.50	0.50	0.60	0.70	-	0.70	-	0.70	-	0.70	-	UPLB-IAS
FISHERIES	10	BD	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	SEAFDEC, BEAR, FCARRD
	10	NA	-	-	-	-	1.00	-	-	-	1.00	-	-	1.00	1.00	1.00	-	-	SEAFDEC, BEAR, FCARRD
	10	NA	-	0.70	0.70	0.70	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	SEAFDEC, BEAR, FCARRD
	10	10	-	0.70	0.70	0.70	0.70	0.70	0.70	1.00	0.70	0.70	0.70	0.70	0.90	0.70	0.70	0.70	SEAFDEC, BEAR, FCARRD
	10	10	-	0.80	0.80	1.00	0.80	-	-	0.80	0.80	-	-	0.80	0.80	0.80	-	-	SEAFDEC, BEAR, FCARRD

TABLE V3.2 SUMMARY OF PROBABILITY OF ADAPTIVE RESEARCH SUCCESS ELICITED FROM EXPERTS
RESEARCH LAG (YRS) : VARIABLE

COMMODITY	NO. OF YEARS (N)	INCREAS. IN YIELD (%)	OTHER INDICATOR	REGIONS																			
				CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII							
LIVESTOCK CATTLE	20 breeding	15	5 decrease unit cost																				
	1 - 2 feeds and feeding																						
	1 - 2 mgat practices																						
	0.5 - 1 processing, mark. policy																						
SWINE	NO ANSWER	no ansu.	10 decrease import dependency																				
CHICKEN	20	no ansu.	100 % decrease dependence on o																				
CARABAO	20		10 % increase weight production																				
			50 % increase milk production																				
FISHERIES	MILKFISH (BM)	5 - refinement in broodst.	50	10 production of quality seeds																			
	MILKFISH (CM)	2 - feed dev't	50	10 % ave. prodn/unit area																			
	TUNA	2	na																				
	ROUNDSCAD	2	na																				
	PRAHN	2 broodstock dev't	10	10 % production of quality see																			
		3 - cultural mgmt		10 % ave. prodn/unit area																			
		2 seed production	10	10 % production of quality see																			
		2 seafarming		10 % ave. prodn/unit area																			

TABLE V4.1 SUMMARY OF PROBABILITY OF INNOVATIVE/DIRECT RESEARCH SUCCESS ELICITED FROM EXPERTS

FINAL VALUES

COMMODITY	RESEARCH LAG (YEARS)	RES. OBJ. (% INC. IN YIELD)	REGIONS												EXPERTS				
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		XII			
CROPS	RICE	8	0.20	0.50	0.50	0.65	0.70	0.50	0.50	0.50	0.50	0.40	0.40	0.50	0.50	0.40	0.33	0.50	PHILRICE, UPLB
	CORN	5	0.70	0.70	0.80	0.70	0.90	0.70	0.70	0.70	0.70	0.80	0.70	0.80	0.90	0.90	0.85	0.90	USMARC, UPLB
	COCONUT	5	0.00	0.00	0.20	0.20	0.60	0.68	0.35	0.35	0.35	0.50	0.70	0.45	0.80	0.40	0.80	0.40	PCA, UPLB
	BANANA	5	0.50	0.50	0.50	0.55	0.70	0.65	0.45	0.45	0.45	0.65	0.40	0.60	0.70	0.40	0.70	0.40	UPLB, DA-BPI
	PINEAPPLE	5	0.40	0.45	0.40	0.55	0.75	0.65	0.55	0.30	0.30	0.55	0.25	0.70	0.70	0.25	0.70	0.25	UPLB, DA-BPI
	COFFEE	10	0.80	0.35	0.29	0.35	1.00	0.35	0.35	0.35	0.35	0.20	0.30	0.80	0.80	1.00	0.80	1.00	UPLB, USH, PCARRD
	TOMATO	5	0.65	0.80	0.20	0.75	0.78	0.50	0.45	0.40	0.40	0.20	0.50	0.85	0.85	0.10	0.85	0.10	DA-R1, DA-R10, MMSU
	SUGARCANE	4.5	0.00	0.10	0.10	0.50	0.90	0.30	0.90	0.00	0.00	0.20	0.00	0.20	0.00	0.30	0.00	0.30	SRA, BAR
	CASSAVA	5	0.80	0.30	0.30	0.30	0.50	0.30	0.30	0.70	0.70	0.90	0.30	0.70	0.30	0.30	0.30	0.30	PRCRTC, BBEC
	SWEET POTATO	5	0.80	0.30	0.30	0.30	0.50	0.30	0.30	0.30	0.30	0.70	0.90	0.30	0.70	0.30	0.30	0.30	PRCRTC, BBEC
	COCOA	10	0.80	0.35	0.29	0.35	1.00	0.35	0.35	0.35	0.35	0.20	0.35	0.80	0.80	1.00	0.80	1.00	UPLB, USH, PCARRD
	TOBACCO	3	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NTA, UPLB
	SOYBEAN	7	0.15	0.40	0.35	0.35	1.00	0.22	0.70	0.50	0.15	0.15	0.15	0.50	0.55	0.75	0.55	0.75	DA-BPI, PCARRD
	COTTON	3	0.00	1.00	0.00	0.60	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	CRDI
	GARLIC	5	0.65	0.90	0.25	0.70	0.90	0.30	0.10	0.12	0.05	0.08	0.08	0.60	0.15	0.20	0.60	0.15	0.20
LIVESTOCK	CATTLE	10	0.00	0.45	0.55	0.65	0.80	0.00	0.00	0.00	0.00	0.55	0.00	0.50	0.55	0.00	0.35	0.00	UPLB-IAS
	HOG		0.00	0.25	0.48	0.68	0.87	0.30	0.40	0.30	0.55	0.00	0.35	0.10	0.30	0.00	0.10	0.30	UPLB-IAS
	CHICKEN	20	0.00	0.00	0.50	0.50	0.90	0.60	0.90	0.60	0.60	0.00	0.00	0.00	0.50	0.00	0.00	0.50	UPLB-IAS
	CARABAO	10	0.00	0.30	0.40	0.90	0.90	0.30	0.30	0.30	0.50	0.00	0.50	0.00	0.40	0.00	0.00	0.40	UPLB-IAS
FISHERIES	MILKPISH	3.5	0.00	0.20	0.50	0.00	0.50	0.20	0.80	0.20	0.80	0.00	0.80	0.00	0.20	0.00	0.20	0.20	SRAFDEC, BFAR, PCARRD
	TUNA	2	0.00	0.00	0.00	0.00	0.80	0.00	0.80	0.00	0.00	0.00	0.80	0.00	0.80	0.00	0.80	0.00	SRAFDEC, BFAR, PCARRD
	ROUNDSCAD	5	0.00	0.40	0.40	0.40	0.80	0.40	0.80	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	SRAFDEC, BFAR, PCARRD
	PRAWN	2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.80	0.00	0.00	0.80	0.00	SRAFDEC, BFAR, PCARRD
	TILAPIA	2	0.00	0.00	0.00	1.00	0.30	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SRAFDEC, BFAR, PCARRD

TABLE V4.2 SUMMARY OF PROBABILITY OF ADAPTIVE RESEARCH SUCCESS ELICITED FROM EXPERTS

FINAL VALUES

COMMODITY	RESEARCH LAG (YEARS)	RES. OBJ. (% INC. IN YIELD)	REGIONS												EXPERTS	
			CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		XII
CROPS	RICE	8	0.30	0.70	0.70	0.80	1.00	0.70	0.70	0.70	0.60	1.00	0.50	0.30	0.70	PHILRICK, UPLB
	CORN	5	0.70	0.70	0.80	0.70	0.90	0.70	0.70	0.70	0.80	0.75	0.90	0.85	0.90	USMARC, UPLB
	COCONUT	5	0.20	0.00	0.15	0.20	0.60	0.60	0.35	0.30	0.50	0.70	0.40	0.80	0.45	PCA
	BAHANA	5	0.65	0.60	0.65	0.55	0.75	0.70	0.65	0.60	0.70	0.55	0.65	0.75	0.55	UPLB, DA-BPI
	PINEAPPLE	5	0.60	0.60	0.60	0.60	0.80	0.75	0.75	0.60	0.60	0.60	0.75	0.75	0.60	UPLB, DA-BPI
	COFFEE	10	0.80	0.60	0.60	0.35	1.00	0.35	0.60	0.60	0.60	0.80	1.00	1.00	1.00	UPLB, USM, PCAR
	TOMATO	5	0.70	0.85	0.25	0.75	0.80	0.65	0.40	0.45	0.25	0.50	0.90	0.40	0.15	DA-R1, DA-R10,
	SUGARCANE	4.5	0.00	0.20	0.20	0.60	0.60	0.40	0.95	0.00	0.25	0.00	0.25	0.00	0.40	SRA, BAR
	CASSAVA	5	0.60	0.30	0.30	0.70	0.70	0.65	0.30	0.80	0.60	0.30	0.80	0.30	0.30	PRCRTC, BBEC
	SWEET POTATO	5	0.60	0.30	0.30	0.70	0.70	0.65	0.30	0.80	0.60	0.30	0.80	0.30	0.30	PRCRTC, BBEC
	COCOA	10	0.80	0.60	0.60	0.35	1.00	0.35	0.60	0.60	0.60	0.80	1.00	1.00	1.00	UPLB, USM, PCAR
	TOBACCO	3	0.00	1.00	0.90	0.80	0.70	0.00	0.80	0.70	0.00	0.60	0.00	0.60	0.80	NTA
	SOYBEAN	7	0.40	0.70	1.00	0.55	0.90	0.45	0.60	0.60	0.60	0.40	0.90	1.00	1.00	DA-BPI, PCARRD
	COTTON	3	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	CRDI
	GARLIC	5	0.70	0.90	0.30	0.75	0.90	0.35	0.15	0.18	0.13	0.14	0.75	0.20	0.25	PRCRTC, BBEC
LIVESTOCK	CATTLE	5	0.00	0.60	0.60	0.70	0.85	0.00	0.00	0.00	0.70	0.00	0.50	0.40	0.00	UPLB-IAS
	HOG		0.00	0.35	0.60	0.77	0.92	0.40	0.43	0.40	0.53	0.00	0.37	0.13	0.35	UPLB-IAS
	CHICKEN	10	0.00	0.00	0.70	0.70	0.90	0.80	0.90	0.70	0.60	0.00	0.00	0.00	0.50	UPLB-IAS
	CARABAO	5	0.00	0.40	0.50	0.90	0.90	0.40	0.40	0.50	0.60	0.00	0.60	0.00	0.50	UPLB-IAS
FISHERIES	MILKFISH	3.5	0.00	0.30	0.60	0.00	0.60	0.30	0.90	0.30	0.00	0.30	0.00	0.30	0.30	SEAFDEC, BFAR
	TUNA	2	0.00	0.00	0.00	0.00	0.80	0.00	0.80	0.00	0.00	0.80	0.80	0.80	0.00	SEAFDEC, BFAR
	ROUNDSCAD	5	0.00	0.40	0.40	0.40	0.80	0.40	0.80	0.40	0.40	0.40	0.40	0.40	0.40	SEAFDEC, BFAR
	PRAWN	2.5	0.00	0.50	0.50	0.50	0.50	0.50	0.90	0.50	0.50	0.50	0.70	0.50	0.50	SEAFDEC, BFAR
	TILAPIA	2	0.00	0.50	0.50	0.70	0.50	0.00	0.50	0.50	0.00	0.00	0.50	0.50	0.00	SEAFDEC, BFAR

Based on the suggestions about the design of the questionnaire during the Workshop, Attachment D is the modified questionnaire to be considered in future activities.

3.4 Experts' Validation Workshop Output

Below are some of the issues, clarifications and observations on the PRS raised during the Experts' Validation Workshop:

GROUP I : Rice, Corn and Soybean

In accomplishing the 2nd questionnaire, the experts at first had a difficulty. The major dilemma was in yield. According to them, not all research is geared toward increasing the yield levels of the crops. They have what they call offensive and defensive research. Offensive research is aimed at increasing the yield. Defensive research, on the other hand, is aimed at maintaining yield stability. They cited the cases of research aimed at developing resistance to pests and diseases and improving the quality of the produce. These are both hardly quantifiable in terms of yield increases. Despite this, the experts proceeded in accomplishing the questionnaires. The technology that they considered was for a variety of improvement/breeding research. Another issue brought out was the difference between innovative and adaptive research. They cited the NCTs as examples of adaptive research while they defined innovative research as research aimed at producing breakthroughs or new technologies.

GROUP II : Banana, Pineapple, Garlic, Tomato, Cassava and Sweet Potato

The group expressed difficulty in validating the survey results due to their different areas of concern - breeding, cultural management, crop protection, postharvest handling and utilisation, socio-economics, etc. They also pointed out that the questionnaire should be more specific.

Among the research projects' objectives considered by each subgroup, aside from increases in yield, are decreased unit cost, increased weight and reduced post harvest losses. There is a slightly different research lag for each commodity though.

GROUP III : Sugarcane, Coconut and Tobacco

In general, the experts claim that research on these commodities involves too many risks and uncontrollable factors like drought, time, funds and political regimes.

During the first day of discussion of the theoretical framework of the system, the group members examined the questionnaires. They stated specific assumptions thinking the scope of the questionnaire was too broad. Furthermore, they feared they may either underestimate or overestimate on areas they are not familiar with.

For sugarcane, it was stated that about 65-70% of sugar is produced in Region VI (Negros). This is followed by Region IV, II, III, V, VII and VIII. Most innovative and basic research however is concentrated in Region IV and VI due to the fact that these regions host most government and private research agencies for sugarcane. They also stated that research lag depends on the technology being considered.

Tobacco experts subdivided the technology components to answer the research lag question. For varietal improvement it takes around 10-12 years for conventional techniques. This means that you have to go under conventional techniques such as crossing, stabilising process and arriving at homozygosity before yield trials could be conducted. Non-conventional breeding techniques which utilise tissue culture and haploid techniques can form a homozygous cross in one year after which one can proceed to the seedbed culture and finally to yield tests. In essence this technique can cut the breeding period in half and it could produce a variety in 5-6 years time and the produce breed is assured of its resistance to certain pests and diseases. Seedbed technology on the other hand takes two (2) years. This technology is important because tobacco cannot be grown directly on the field. The two phases of production of tobacco include the seedbed and the transplanted period. In the first year the various components of the technology such as seeding rate, fertilisation and spacing can be introduced. Results can be obtained on the farmer's field prior to recommendation. For fertilisation and irrigation it takes 3-4 years. Pest management takes about 2-3 years. Harvesting and curing takes 2-3 years.

As to research project objectives, experts are not just contented with increase in yield. They emphasise increase in quality. Potential yield targets have already been achieved. Despite the limited markets for tobacco, growers have not yet filled the need of the manufacturers because of the strict quality requirements imposed. A decrease in unit cost of 10% is also an objective. The target is low because of the prevailing inflation rate. This could be achieved through efficient cultural management and curing techniques. The reduction in cost would certainly come from the reduction in use of fuelwood especially for flue-cured tobacco which is cooked first before a finished product is produced. Other varieties could be air-cured but some capital outlay is needed before they could be properly cured. Pest and diseases are targeted to be reduced by 100%. Manufacturers are still importing high nicotine tobacco which are used for blending. Sugar content reduction is also an objective. Nevertheless, the prime objective among tobacco growers and researchers is to improve the yield.

There are three centres which are capable of innovative research. The first one is the main research centre in Batac, Ilocos Norte, second the sub-centres in Pangasinan and Isabela, and third the Industrial Research Station in Manila.

This Industrial Station also conducts innovative research in Region I. Manpower and facilities as well as innovative research are concentrated on these three centres. In terms of adaptive research the branches of NTA mainly house the operations group and the extension workers of the administration. The main adaptive research also occurs in the three centres.

Coconut research lag is about 5-15 years. This covers two (2) technologies, adoption of high yielding varieties and fertilisation technologies. The objective of coconut research is to increase yield by 100% through the application of fertilisers and the use of high yielding varieties. Another objective is the decrease in unit cost by 25% through the application of appropriate pest management strategies such as biological control of pests and diseases. The probability of achieving success in both the adaptive and innovative research is decreasing as the research lag increases because of the increasing risk associated with the possible occurrence of uncontrolled circumstances. Usually the probability of research success for coconut in Regions II, 9,8,5, and 4 is relatively higher because of the presence of coconut experimental stations and favourable climate for coconut prevailing in these regions.

On the other hand, CAR and Region I do not have research on coconut because of their high elevation and very hot climate, respectively.

GROUP IV : Plantation Crops (Coffee, Cacao and Cotton)

The experts on coffee/cacao felt that the average research lag must consider the "gestation period" or "technology generation phase" of basic research, e.g. breeding or variety improvement. Hence, ten (10) years was estimated as average research lag. For cotton a three (3) year research lag was estimated and this is an average of the length of time spent on breeding and cropping systems research, among others, before prospective technologies can be ready for piloting/verification. During the presentation of results, it was mentioned that research on cotton may take even a year to succeed or to attain a yield increase of 5%.

In terms of research objectives, cacao/coffee must be reckoned in terms of the ultimate goals of the farmers, i.e. farm profitability. Since these are permanent crops, research outputs must eventually be able to at least sustain the level of profitability of the farm through a time stream. Hence, the group felt that research objectives should translate into at least sustaining/increasing farm profit by 10% per annum. The group commented that percentage increase in nominal profit must offset prevailing inflation rates. The cotton group had a more technical approach to stating research objectives like 10% increase total production, 20% decrease cost, 2% increase recovery and 20% increase farm income per hectare. These are all translated in terms of increase in yield by 10%.

Only those with developed research facilities and strong manpower were cited for innovative research. Hence with the presence of BSU, UPLB, CMU, NGOs like Nestlé, USM and PCRI the probability of innovative research for coffee/cacao was estimated. For cotton, only those regions where CDRI facilities and research manpower are adequately present were included.

Regions cited for adaptive research include those which have substantial hectareage devoted to crop and/or the presence of significant adaptive research being conducted by the SUCs DA, NGOs and other agencies involved in TV/TA research and piloting activities.

GROUP V : Livestock (Cattle, Swine, Chicken and Carabao)

A number of issues were raised during the course of evaluating the questionnaire. Some were conceptual in nature while others refer to the level of generality which the questionnaire was designed to achieve. The group agreed on the following:

A. It is extremely difficult to provide even at least an educated guess to serve as answers to the questions asked due to:

(i) Questions too general

Questions are on commodity level. Thus, owing to the great number of research activities on each commodity, it is very difficult to answer questions with a fair level of confidence. These include questions on time required to do research, research objectives, and probabilities of innovative and adaptive research success.

(ii) Lack of knowledge about regional research strengths

Ranking the political regions in terms of capability to do innovative and adaptive research is extremely difficult to do since this necessitates that experts should be knowledgeable of the relative differences in research equipment and manpower among regions. Unfortunately, the group (except Dr. Faylon) felt that their knowledge of such is too inadequate, thus the validity of their ranking could hardly be relied upon.

(iii) Concept of research success/failure

While the concept of research success/failure has been explicitly defined in the questionnaire, the group would like to raise the issue that no research activities (except the aborted ones) could be considered entirely as failure. Although it may fall short of its initial objectives, a research activity may generate information or results (positive or negative) that contribute to the stock of knowledge in the particular research area. These results become useful to other research.

- B. The group would fill out the questionnaire but cautions the workshop organisers on the reliability of information, especially if such information would be used in operationalising a research prioritisation scheme. More reliable information can be provided by the group if the questionnaire is redesigned to address the foregoing questions/issues which the group has raised.

GROUP IV : Fisheries (Milkfish, Tuna, Roundscad, Prawn and Tilapia)

The group classified the fisheries sector into two, (1) aquaculture which includes milkfish, tilapia and prawn and (2) marine which includes tuna and roundscad. The research lag for each commodity varies for each discipline (Table V3.1). Gears used are already developed and very efficient, and this has been the product of research. Marine fisheries focus on the production, catch and effort data.

In terms of research objectives, the aquaculture experts mentioned that the research objectives are to maximise the production of quality seeds/stocks by 10% and to have an average production per unit area of 50% for milkfish and 10% for tilapia and prawn. They pointed out that there is enough supply of milkfish seeds/stock in the wild. However, in terms of ownership of these seeds, there is a shortage. For aquaculture, the target is not any more to increase the hectareage or production but to increase the production or yield of those farms in regions that are producing much less.

The objective for marine fisheries is to determine the extent of exploitation and to maintain the production at sustained yield level. No percentage was assigned since this is not applicable for marine fisheries.

Ranking the political regions in terms of capability to do innovative and adaptive research is difficult to do since the group is not too familiar with research capabilities (e.g. manpower, facilities, research activities) of each region. However, members of the group from PCAMRD

managed to determine the probabilities and ranking of some regions which they think are capable of doing innovative and adaptive research based on PCAMRD network.

There is a low probability of research success in the Cordilleras. The only agency conducting research on these commodities in the Cordilleras is the Department of Agriculture.

3.5 Problems Encountered

There were significant results obtained from the survey and the validation workshop. However, the members of the group on the Probability of Research Success doing data processing were constrained by a number of problems. The main problem is the lack of statistical software (e.g. SAS, SPSS/PC, Graphics) and inadequate Information Technology (IT) resources (e.g. computers, printers) to smoothly run the data. The insufficient capacity of the computer hard disk prompted the disaggregation or "cut and paste process" of some tables within subdirectories and sometimes transferring these from one diskette to another. The HD is not enough to provide a three-generation backup system to allow for constant upgrading. Another problem is the insufficient time allotted for computerisation including the validation of results to key informants in the regions. Lack of frequent consultations at the start also poses a problem though minimal. This is attributed to the lack of time of one party, or both, brought about by more urgent matters that need to be prioritised.

4. RECOMMENDATIONS

The lack of statistical software and inadequate IT resources could be addressed by increasing research/study budgets. Estimation of the PRS and other parameters is very crucial and as such these should be properly handled and manipulated so as not to alter the consistency and homogeneity of the tables and to preserve the accuracy and integrity of the results. Related to this is the continuous training of the research staff to update them on the latest innovations in IT. The group could obtain a much better result if enough time and all the necessary support combined are given.

The present type of survey is better if conducted by personal interviews to enable the enumerators to elicit reasons for committing a number. Respondents should also include mid-level practitioners and farmer leaders.

QUESTIONNAIRE ON ELICITING OPINIONS ON THE PROBABILITY OF SUCCESS OF RESEARCH PROJECTS

Based on your region's 1) manpower resources, 2) research facilities and 3) research infrastructure, what is the likelihood that research on the following technologies for 15 crops will achieve at least a 5% increase in yield? Indicate the likelihood of achieving the stated research objective by using the range of 0-10 for two-time periods. If you feel that you do not have enough information on a certain commodity, please indicate DK (Don't Know).

Technology	CASSAVA : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99	SWEET POTATO : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99	COCOA : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99	TOBACCO : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99	SOYBEAN : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99	COTTON : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99	GARLIC : (w/in :10 yrs):5 yrs):10 yrs):90-94 :95-99
1. Variety							
2. Fertilizer							
3. Chemicals Pesticides							
4. Cultural Practices							
a. water management							
b. Planting distance							
c. Planting time							
d. seeding rate							
e. fert. replacement							
f. green manuring							
g. others (specify)							

Validation of Survey Results on
Probabilities of Research Success

Name of Scientist: _____

Commodity: _____

BACKGROUND: A two-phase survey on the probability of research success on the aforementioned commodity was conducted in 1988 and 1989. The summary of results of the said survey are as shown below.

OBJECTIVE: This questionnaire aims to validate the survey results by eliciting your opinion. Note that this adopts the same notion as the questionnaire earlier accomplished, except that here the following assumptions are considered.

ASSUMPTIONS: a) Research Project Objective is 5 % increase in yield
b) Research lag of 5 years; Research lag of 10 years

INSTRUCTION: Please indicate your opinion on the appropriate column.

RESEARCH LAG = 5 YEARS		
Region	Survey Results	Your Opinion
CAR		
I		
II		
III		
IV		
V		
VI		
VII		
VIII		
IX		
X		
XI		
XII		

RESEARCH LAG = 10 YEARS		
Region	Survey Results	Your Opinion
CAR		
I		
II		
III		
IV		
V		
VI		
VII		
VIII		
IX		
X		
XI		
XII		

QUESTIONNAIRE ON PROBABILITIES OF RESEARCH SUCCESS

[Please write answers on the attached answer sheet.]

1. On the average, how long does it take to do research on commodity i? _____ years

2. In what terms do researchers in commodity i express their research project objectives? by how much?

Ex. increase yield by 10 %

reduce unit cost by 5 %

3. If the research objective is not expressed in terms of yield, how would you translate it in terms of increase in yield?

_____ % increase in yield

4. Please rank the political regions in terms of capability to do **innovative** research. Allow for equal ranking.

- 4.1 Given the objective stated in (3) above, what is the probability of **innovative** research success...
 - a) in a period of 5 years for region i, region j, ...?
 - b) in a period of 10 years for region i, region j, ...?
 - c) in a period of y years for region i, region j, ...?
(where y is the research lag stated in (1) above)

5. Please rank the political regions in terms of capability to do **adaptive** research. Allow for equal ranking.

- 5.1 Given the objective stated in (3) above, what is the probability of **adaptive** research success...
 - a) in a period of 5 years for region i, region j, ...?
 - b) in a period of 10 years for region i, region j, ...?
 - c) in a period of y years for region i, region j, ...?
(where y is the research lag stated in (1) above)

ANSWER SHEET ON PROBABILITIES OF SUCCESS:

Commodity: _____

Name of Scientist: _____

1. Research Lag: _____ years

2. Research project objective:

-
- | increase yield by _____ %
-
- | decrease unit cost by _____ %
-
- | increase weight by _____ %
-
- | by _____ %
-
- | by _____ %

3. Objective in terms of yield: _____ % increase in yield

4. Probabilities of innovative research success:

5. Probabilities of adaptive research success:

Region	Rank	Pr[X % inc. in yield]		
		5 yrs.	10 yrs.	Y yrs.
CAR				
I				
II				
III				
IV				
V				
VI				
VII				
VIII				
IX				
X				
XI				
XII				

Region	Rank	Pr[X % inc. in yield]		
		5 yrs.	10 yrs.	Y yrs.
CAR				
I				
II				
III				
IV				
V				
VI				
VII				
VIII				
IX				
X				
XI				
XII				

where: X is the research objective stated in (3) above
 Y is the research lag stated in (1) above

ATTACHMENT C

GLOSSARY OF ABBREVIATIONS

PCARRD	-	Philippine Council for Agricultural Resources, Research and Development
UPLB	-	University of the Philippines at Los Banos
PHIRICE	-	Philippine Rice Research Institute
PCA	-	Philippine Coconut Authority
ZRC	-	Zamboanga Research Centre
USMARC	-	University of Southern Mindanao Agricultural Research Complex
BBEC	-	Baguio-Buguias Experiment Centre
SEARCA	-	South East Asian Research Centre for Agriculture
PCAMRD	-	Philippine Council of Marine Research and Development
IRRI	-	International Rice Research Institute
IAS	-	Institute of Animal Science
SEAFDEC	-	South East Asian Fisheries Development Council
BFAR	-	Bureau of Fisheries and Aquatic Resources
MMSU	-	Mariano Marcos State University
DA-RI	-	Department of Agriculture - Region I
IPB	-	Institute of Plant Breeding
BPI	-	Bureau of Plant Industry
NTA	-	National Tobacco Administration
CRDI	-	Cotton Research and Development Institute
CRI	-	Coconut Research Institute
CAR	-	Cordillera Administrative Region
NGO	-	Non-Government Organisation
BSU	-	Benguet State University
SRA	-	Sugar Regulatory Administration
PTRTC	-	Philippine Tobacco Research and Training Centre
ACIAR	-	Australian Centre for International Agricultural Research

GUIDELINES IN ANSWERING THE QUESTIONNAIRE ON THE PROBABILITY
OF SUCCESS OF RESEARCH PROJECTS

(refer to the attached Questionnaire)

A. GENERAL

1. Please fill-up the questionnaire properly and supply the needed information.
2. Indicate your complete name, position, agency/office and region.
3. Give at least one field of expertise.
4. Give your commodity expertise. In case you have more than one commodity expertise, please fill-up additional form for the added commodity.
5. Answer only the regions you are familiar with their research and development activities

B. SPECIFIC

1. Please indicate the project research objective given a 5 year research lag, i.e., increase in yield, reduce post harvest losses, increase in weight.

If the research objective is not expressed in terms of yield, how would you translate it in terms of yield?
2. Given the flexibility in terms of research lag (Y years) and research objective, please indicate the most convenient number of years (Y) with the corresponding research objective.

If the research objective is not expressed in terms of yield, how much would you translate it in terms of yield.
3. Given a research lag of 5 years, please indicate the probability of **innovative** research success using a range of 0 to 10, 0 for not at all successful and 10 for 100 % successful, of the various component technologies across the different regions.
4. Given a research lag of Y years, please indicate the probability of **innovative** research success using a range of 0 to 10, 0 for not at all successful and 10 for 100 % successful, of the various component technologies across the different regions.
5. Given a research lag of Y years, please indicate the probability of **adaptive** research success using a range of 0 to 10, 0 for not at all successful and 10 for 100 % successful, of the various component technologies across the different regions.
6. Given a research lag of Y years, please indicate the probability of **adaptive research** success using a range of 0 to 10, 0 for not at all successful and 10 for 100 % successful, of the various component technologies across the different regions.

QUESTIONNAIRE FOR ELICITING OPINIONS ON THE
PROBABILITY OF SUCCESS OF RESEARCH PROJECTS

NAME _____ AGENCY _____

POSITION _____ REGION _____

FIELD OF EXPERTISE (1) _____

FIELD OF EXPERTISE (2) _____

COMMODITY EXPERTISE _____

1. Research project objective(s) for 5 years research lag:

___ increase in yield by _____ %

___ decrease unit cost _____ %

___ increase in weight _____ %

___ increase pest resistance _____ %

Objectives expressed in terms of percent increase in yield:

_____ %

2. Research lag (Y) _____ years

Research project objectives(s) for Y years research lag

___ increase in yield by _____ %

___ decrease unit cost _____ %

___ increase in weight _____ %

___ increase pest resistance _____ %

Objectives expressed in terms of percent increase in yield

_____ %

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