

Understanding farmers' decision-making¹

In the handout on *Decision Analysis Techniques*, we described some concepts and frameworks that can help us gain an understanding of how pest management decisions are made. Many of the frameworks require interview and survey techniques. In this chapter, we focus on techniques used to understand farmers' decision-making. These include both techniques used by anthropologists (ethnoscience, folk taxonomy and emic-etic framework) and sociologists (surveys). Further details on ethnoscience and survey research may be found in standard social science research textbooks (Frankfort-Nachmias and Nachmias 1996, Kerlinger 1986).

3.1 Ethnoscience techniques

Ethnoscience is the study of perceptions, knowledge, and classification of the world as reflected in their use of language. Ethnoscience has been used by many different disciplines; thus there are studies in ethnobotany, ethnopedology, ethnoforestry, ethnoveterinary medicine, and ethnoecology. Most ethnoscience research has dealt with specific domains, such as folk medicine; classifications of plants, fish, and birds; and pest management (Bentley and Rodriguez 2001).

In the field of economics, the use of local taxonomic categories has been applied to analyze the effects of different types of soil on the adoption of new maize seed varieties. Bellon and Taylor (1993) asked farmers about the various soil types on their land, what characteristics they attributed to each type, and how they ranked those soils in terms of their suitability for maize production. Their hypothesis was that farmers' perceptions of the soil qualities on their farms significantly affect their decision on whether to adopt new technology. Their results showed that the perceptions of land qualities did indeed affect the adoption of new seed varieties. It was suggested that this type of analysis can be taken one step further by examining local classifications of such economic terms as benefits, costs, insurance, interest, security, and risk, in order to determine whether these are locally meaningful concepts.

For information to be applied, it has to be presented in appropriate perspectives and classifications. Farmers will need to remember the information and become motivated to use it to guide decisions of behavior. Often information may be delivered

¹ M.M. Escalada and K.L. Heong. 2009. *Training Manual for the Workshop/Training on Decision Making, Sociological Tools and Impact Assessment in Pest Management*. IRRI-ADB RETA 6849. Reducing Vulnerability of Crops to Pre-Harvest Losses Caused by Planthopper Pest Outbreaks.

and received but not utilized in decisions. This is especially the case for information dealing with new opinions, attitudes and behavior. The new information needs to be integrated into existing knowledge systems for it to be utilized. According to Anderson's (1980) information integration theory, a new opinion is adapted through formation of a general impression, which is based on many information bits. How new information is processed will also depend on how it fits into an individual farmers' existing cognitive structure. To obtain some insights into farmers' cognitive structures, we found two ethno-science tools (Bentley 1999) very useful.

3.1.1 Folk taxonomy

Folk taxonomy is considered an important indicator of diversity relating to how crop populations may be treated differently. Eyzaguirre (2003) noted that by developing many names for crop types, farmers are effectively segregating populations and often treating them differently. Local knowledge about a crop variety helps to transmit plant knowledge around the community such as knowledge of associated pests and diseases. Folk taxonomies have hierarchical levels similar to formal biological classifications of kingdom, phylum, class, order, family, genus, and species (Berlin 1992). In folk taxonomy, the common levels are:

- **Life-form** - a high level of plants or animals that share some general shape or characteristic in morphology. Examples: tree, vine, bush, fish, snake, bird, mammal.
- **Generic** - the most common basic level. Examples are dog, grass, and rice ant. Folk genera often do not correspond to scientific genera but sometimes to Linnaean species or family. For instance, "dog" is a folk genus and a Linnaean species; "ant" is a folk genus and belongs to Linnaean family formicidae.
- **Specific** - usually separated from each other by a few characteristics. In some languages, such as Spanish, Bahasa Indonesia, and Malaysia, the generic name comes first, as in a Linnaean name. In English, Filipino, Chinese, Vietnamese and Thai, it is the other way around. Specific names tend to be a mnemonic device -- like color, shape, and utility -- that makes the names easy to remember. Figure 3.1 shows farmers' classification of leaf-feeding insects in Leyte, Philippines

Besides being hierarchical, folk taxonomy may be applied in naming parts of an object or stages of the crop (partonomy). Farmers may have names that fuse groups of parts that biologists differentiate or they may have finer definitions of parts than what biologists describe. For instance, Figure 3.2 illustrates stages of the rice crop named by Filipino farmers.

3.1.2 Emic-Etic framework

Etic and emic are terms coined by linguistic anthropologist Kenneth Pike (see Franklin 1996), which were derived from an analogy with the terms "phonemic" and "phonetic".

Etic categories involve a classification according to some external system of analysis considered as appropriate by science. This is the approach of biology where the Linnaean classification system is used to define new species. It assumes that ultimately, there is an objective reality that is seen to be more important than cultural perceptions of it. In contrast, *emic* categories involve a classification according to the way in which members of a society perceive and classify their own world.

Thus *emic-etic* roughly means local versus scientific knowledge and this framework provides a convenient tool for researchers to obtain accurate descriptions of farmers' knowledge or concepts and compare it with scientific knowledge or concepts on the same topic (Fig. 3.3).

3.1.4 Eliciting frames: how to ask questions

- **What:** What is _____?
- **Kind:** What kind of _____ is it?
What are the kinds of X?
What is the difference between X and Y?
Show a person an example of an organism and ask, "What is this?" or "What is its name?"
- **Part:** What are the parts of X?
What (separated) part of _____ is it?
- **Use:** What is _____ used for?
- **Source:** Where does _____ come from?
-

3.2 Semi-structured methods

Informal methods such as diagnostic surveys, focus group discussions, and key informant interviews have been employed in some of the more innovative and cost-effective farmer surveys. In most cases, diagnostic surveys and key information interviews often precede a formal baseline survey (Fujisaka 1991). These methods can be used to structure the formal survey and ensure that it is focused and appropriate in the local context. Issues that may emerge during a key information interview can be probed in the focus group discussion. While the key informant interview can provide leads, the focus group discussion can be used to clarify points raised and explore whether there is a consensus on the concerns voiced by key informants. The research areas can be probed in focus groups to help generate ideas and develop hypotheses that will then be fully assessed in the formal study. For example, in planning a major national survey on farmers' knowledge, attitudes, and practices related to beliefs on weedy rice and its management, separate focus groups may be conducted with farmers to identify key issues. Focus groups could help researchers generate hypotheses and develop the wording for specific questions to be used in a formal survey.

3.2.1 Key informant interviews

Used as a tool to explore related issues and problems associated with a given topic, a key informant interview involves talking to persons such as extension workers, key farmers, local government officials, traders, and community leaders who know the area or certain aspects of the problem (Jimenez 1985). Taking an unstructured interview approach, this type of interview enables the researcher to gain new insights, raise questions, and examine phenomena from different perspectives (Bogdan and Taylor 1975, Okamura 1985). These informal interviews are useful for providing background information for defining the issues to be addressed by a formal survey and as a guide for developing a more structured questionnaire (Bryman 1988, Siebert 1973).

What is key informant interview?

The key informant interview refers to getting information from an individual who is considered to be particularly knowledgeable about the topic of interest. This person is called "key informant". The semi-structured interview is usually conducted in a face to face setting which permits the researcher to seek new insights, ask questions, and assess phenomena in different perspectives. The KII is used when written records or published documents are limited or do not exist, when information different perspectives is needed, and when there are key informants who are accessible and have in-depth knowledge about a topic.

Who are the key informants?

Key informants are a select group of people who are especially knowledgeable or experienced about certain issues or problems and are willing to share their knowledge. For example, for information on production of certain crops in the district, key informants at this level may comprise of the following: the district officer, the extension officer, agronomist or subject matter specialist. On the other hand, if the problem is on localized pest infestation in certain areas in the district, then the key informants may be identified from among farmers, farm leader, extension technicians and the plant protection officer.

In a key informant interview, one is looking for provocative ideas and useful insights, not just for statistics. Thus, the respondents must be chosen based on their knowledge and expertise to provide the needed information. With this purpose in mind, it is necessary to:

- Interview people with competence on the subject under study.
- Seek the views and opinions of those who have relevant experience.
- Enlist those who have the ability to communicate their experiences effectively.
- Find an informant who can give reliable information.

How are key informants selected?

The informant should be someone who understands the situation and can analyze it. Perhaps the most direct method of selecting key informants is to consult strategically

placed experts working in the area under study who should be able to recommend the most informative, experienced, and analytical individuals. To increase the likelihood that the informants will be useful, it may be necessary to select those informants who have been recommended by several sources, especially if the different sources are known to have dissimilar points of view.

How many informants should be selected?

The interview should be conducted with enough informants to ensure adequate representation of different types of experiences. The interview should be carried out to a point when researchers will find that additional interviews do not provide new insights and the answers fall into a pattern with which they are already familiar. At this stage, further interviewing may not be necessary.

Preparing the key informant interview guide

The key informant interview guide should contain questions to solicit information critical to a certain problem or issue. For example, on issues related to pest problems, the following questions should be contained in the guide.

- Major pest problems
- Perception of the causes of the pest problems
- Steps taken by farmers to overcome the pest problems
- Resources required to overcome the problems
- KAP on usage of pesticides: method, dosage, frequency
- Relationship between pest control and water management.
- Pest control and labor utilization
- Pest control and post-harvest activities
- Institutional support to overcome the problems
- Costs involved

How questions should be asked

In formulating the questions for the key informant interview guide, it is generally useful to orient questions around these aspects: 1) 'what is happening', 2) 'what is being done' and 3) 'what is the outcome'. For example, in a certain behavioral outcome of farmers (reducing insecticide use in the early crop stage), what action, influence or methods will be able to produce it based on your experiences? When asking the above questions, the researcher should ask for illustrations, the informants' experiences with regard to the topic, and tentative conclusion and generalization.

How to get information from key informants

To obtain the information needed from a key informant, a researcher can talk with them informally, use formal techniques such as written questionnaires, telephone interviews, personal interviews, group interviews or community forums and public hearings (McKillip 1987).

Interview guidelines

Although there are no clear-cut rules for conducting key informant interview (KII), these guidelines are suggested:

- **Establish rapport** - Remember that the respondent is doing you a favor and you are seeking information. In order to break the 'psychological barrier' of trust, you need to develop a sense of 'closeness' to him. Reassure your respondent that you are genuinely interested in the information and respect what is said. Always be pleasant, receptive, and patient and do not interrupt when he is talking.
- **Be neutral and objective** - Never express that you approve or disapprove of what the informant says. If he says what you think, tell him what he thinks is more important, or that you'll discuss your views when the interview is over. Do not let him divert you from the subject. Remember that you're after information; rapport is a means to an end. When he digresses from the main point, gently get the informant back on the subject. If he is not responsive to a question, try saying nothing yourself. Many respondents will start talking just to 'fill up' a long silence.
- **Probe** - To encourage informants to elaborate on a certain response, the researcher needs to probe.. Here are some examples of probing:
 - That's very interesting. Can you tell me more about that?*
 - You say that I would love to hear more about what you have in mind.*
 - How do you figure that out?*
 - Can you think of anything else?*

The interviewer can often encourage the informant to give additional information by making encouraging remarks or gestures, e.g., nodding your head, saying 'yes' or 'ugh, huh'. Or just repeat or summarize what he had said. This gives him a chance to amend and add information. You still remain agreeable toward what he says, but you point out inconsistencies or suggest that perhaps you didn't get it right. 'Check' questions or similar questions with slightly different wording at different points in the interview will also help clarify inconsistent or incomplete responses. If he gives a polite generic answer, probe for a more realistic statement (e.g., 'Tell me more about how you feel about this.'). Thank the respondent for his cooperation when you finish the interview.

Analytical procedure and techniques

- **Keep track of what was said** - There are several ways to analyze the information received. Essentially, the KII information can be analyzed using the following:

- **Summarizing the data** - Ensure that they can be understood, interpreted or related to some decisions to be made. Emerging patterns or trends, strongly held opinions and frequently held opinions should be noted.
- **Reviewing notes** - Sections of the notes that relate to each question should be highlighted. Participant comments that may be worthy of future quotation should be marked.
- **Examining questions** – Questions are examined one at a time. After all responses to a question have been examined, a brief summary statement that describes the discussion is prepared. Attention is placed on identifying the themes or patterns across the groups as well as themes that relate to respondents with similar demographic characteristics.

Write the report

Reflect back to the objectives of the study and the information needed by the research. The type and scope of the final report will guide the analysis process. For example, KII reports typically fall into three categories: (a) brief oral reports that highlight key findings, (b) descriptive reports that summarize comments or observation of participants, and (c) analytical reports that highlight key trends or findings and also include selected comments as examples.

3.2.2 Focus group discussions

The focus group discussion (FGD) is a rapid assessment, semi-structured data gathering method in which a purposively selected set of participants gather to discuss issues and concerns based on a list of key themes drawn up by the researcher/facilitator (Kumar 1987). This qualitative research technique was originally developed to give marketing researchers a better understanding of the data from quantitative consumer surveys. As an indispensable tool for marketing researchers (Krueger 1988), the focus group discussion has become extremely popular because it provides a fast way to learn from the target audience (Debus 1988; US Department of Health and Human Services 1980). Marketing and media studies have shown that the focus group discussion is a cost-effective technique for eliciting views and opinions of prospective clients, customers and end-users. In agriculture, focus groups have been used to obtain insights into target audience perceptions, needs, problems, beliefs, and reasons for certain practices.

Focus group discussion guide

To keep the session on track while allowing respondents to talk freely and spontaneously, the facilitator uses a discussion guide that lists the main topics or themes to be covered in the session. It serves as a road map that guides the facilitator in covering the list of topics and keeping the discussion on track. The number of items in the guide is generally kept to a minimum to leave enough time for in-depth discussion. It should focus only on relevant research issues. The sequence of topics in the guide usually moves from general to specific (see Box 3.1 for sample FGD guide).

The following steps are suggested for developing the focus group discussion guide:

1. Specify the objectives and information needs of the focus group discussion.

Example

To determine farmers' perceptions and knowledge on the link between pest and disease problems and intra-specific diversity.

2. Break down the major topics into discussion points or themes.

Example

- a) Farmers' perceptions on the importance of pest/disease problems in their crops
- b) Farmers' assessment of their likelihood of effectively managing these pests/diseases
- c) Farmers' knowledge on the link between pests/diseases and the lack of crop diversity and related factors
- d) Extent to which farmers use the available intra-specific diversity to manage pests/diseases
- e) Farmers' awareness and understanding of movement and transmission of pests/disease within communities
- f) Ways through which farmers access intra-specific materials

3. Prepare probe questions.

Example

- a) Let's talk about the local varieties of _____ (rice, maize, faba bean, banana) grown in your community. What are their key characteristics?
- b) How many varieties of _____ do you grow? How long have you been growing those varieties? What are your reasons for maintaining them?
- c) Where do you get the planting materials for those varieties?
- d) What are the major pest and disease problems of your crop?
- e) What are the major factors that give rise to pests/diseases? *If crop diversity is not mentioned:* Would you say that the lack of crop diversity contributes to the incidence of pest and diseases?
- f) How do you manage the pests/diseases in your crop?

4. Review the guide and eliminate any irrelevant questions.

Asking questions during focus groups. The quality of questions asked in a focus group can make a large difference in the kind of information obtained. Krueger (1988) gives some tips on how to handle open-ended and dichotomous questions in these discussions:

Open-ended questions are most appropriate at the start of the discussion because they allow participants to answer from different angles. As the possible responses are not preconceived, open-ended questions give the participants opportunities to express their thoughts and feelings based on their specific situations. Krueger warns that some questions may appear to be open-ended but are really closed-ended because they include phrases such as “satisfied”, “to what extent”, or “how much”.

Dichotomous questions are ones that can be answered by a “yes” or “no” or other similar two-alternative items. As yes-no questions are dead-ends, they usually do not trigger the desired group discussion. They also tend to elicit vague responses that do not lead to an understanding of the key issues being discussed (Moulton and Roberts 1993).

How to conduct a focus group discussion

Facilitator. In selecting a person to moderate a focus group, it is important that this person have these qualities:

- familiarity with the discussion topic
- ability to speak the language spoken of the area
- cultural sensitivity, including not acting as a judge, a teacher, does not looking down on respondents, not agreeing or disagreeing with what is said, and not putting words in the participants’ mouths.
- genuine interest in people
- sensitivity to men and women
- politeness
- empathy
- respect for participants

Steps in conducting the session

Before the focus group discussion begins, the facilitator should obtain the background information of participants such as their age, crops grown, farm size, and other pertinent information. The type of information to collect depends on the FGD topic. Once this is done, this sequence of steps is carried out:

1. After a brief introduction, the purpose and scope of the discussion are explained.
2. Participants are asked to give their names and short background information about themselves.
4. The discussion is structured around the key themes using the probe questions prepared in advance.
5. During the discussion, all participants are given the opportunity to participate.
5. Use a variety of moderating tactics to facilitate the group. Among these tactics that the moderator can use include:

- Stimulate the participants to talk to each other, not necessarily to the moderator.
- Encourage shy participants to speak.
- Discourage dominant participants through verbal and nonverbal cues. The following may be used when the situation permits:
 - Call on other participants
 - Politely intervene by saying, "Maybe we can discuss that in another occasion..."
 - Look in another direction
 - Take advantage of a pause and suggest that the subject can be discussed in detail in another session
- Pay close attention to what is said in order to encourage that behavior in other participants.
- Use in-depth probing without leading the participant.

Guidelines in conducting focus group discussion (FGD)

1. The FGD is an opportunity for the research team to listen and learn, and not to lecture or provide team members' interpretation of the local biophysical and social system.
2. The team members agree on various task assignments including: a) facilitator/interpreter, b) rapporteur, c) logistics in-charge.
3. Each team member must have a copy of the FGD guide. The list of themes to be discussed may be written on the board to serve as guide for FGD participants on the scope and progress of the discussion.
4. Familiarize yourself with local terminologies/names to avoid misunderstanding of what farmers say.
5. Keep an open mind and listen more. Do not push your own agenda (e.g. a new variety you have developed which you think will solve farmers' problems).
6. Avoid questions that yield Yes or No answers.
7. Avoid leading questions. Examples: Don't you think that variety X is an excellent variety?
8. Be sensitive to local norms and customs.

9. Remember that farmers' time is valuable to them. Strive to complete the FGD within the time period that you mentioned to participants.
10. Don't forget to thank participants and local leaders after the conduct of the FGD.

Logistical arrangements for FGD

- **Invitations** - Participants are contacted in advance, at least one to two weeks before the session. A letter of invitation may be sent to each participant, taking into consideration the prevailing practices in the area. Participants are also reminded about the focus group discussion one day before the session.
- **Group composition** - The choice of participants depends on the topic of the focus group. Often, the people who are included are those knowledgeable about the topic but at the same time, it is also wise to gather the views of certain groups in the target population. The optimal number of participants is 8 -10. If a group is too small, one person in the group may dominate it; if it is too big, then it may be difficult to control. Group members should be representative of the intended target population.
- **Transportation** - To ensure attendance, transportation is usually arranged for the participants from their residence to the focus group venue. In rural areas where farm families may reside in distant villages, participants could be asked to converge at a central location to facilitate pick-up.
- **Venue** - Focus group discussions can be conducted in a place where 8 - 10 persons can be seated and assured of some privacy. In the rural areas, the most readily available sites are school buildings, health and community centers and churches. An appropriate venue is a neutral place that is free from distractions and where participants can talk openly.
- **Seating arrangements** - A semicircular seating arrangement facilitates interaction among participants because it allows them to freely see and hear each other.
- **Timing** - The timing of the meeting should be convenient to all participants. While waiting for other participants to arrive, the focus group discussion team can use the time to break the ice by getting information about their backgrounds. To minimize boredom, focus group discussions are generally not stretched beyond two hours.
- **Name tags** - It is best to remember the names of the participants. Often, a seating arrangement will facilitate identifying each one. If the culture permits, providing

nametags to participants is useful because it enables facilitators to call on those who may be too shy to express their opinions.

- **Recording** - A trained rapporteur should be asked to capture the discussion in writing and note the participants' nonverbal expressions. Situations may occur where the discussion needs to be tape-recorded, but facilitators should weigh the advantages and disadvantages.
- **Refreshments** - **When** resources permit, serving refreshments after the session is a small gesture of appreciation to the participants for having taken time off their work to participate.

Writing the FGD report

After conducting the focus group discussion, the key findings are described, analyzed and written up in a report (see Box 3.2 for sample FGD report). . Debus (1988) suggests some useful guidelines for analyzing data:

1. Develop a plan for analysis consisting of:
 - background of the research
 - objectives
 - methods
 - discussion details
 - focus group discussion guide
2. Analyze the content of the group discussion by
 - reviewing the notes from the focus group
 - listening again to the cassettes from the session (if tape recorded)
 - grouping research findings according to key themes
 - identifying the different positions that emerged under each key theme
 - summarizing each of the different positions and assess the extent to which each position was held by participants
 - pulling out verbatim phrases that represent each position.
2. Synthesize the group discussion by:
 - reviewing the notes of each discussion made by the moderator
 - identifying the recurrent ideas that came out during the discussion
 - interpreting these recurrent ideas based upon other findings that emerged in the groups

Box 3.1 Sample FGD Guide

Environmental Radio Soap Opera

Focus Group Discussion

Can Tho, Vietnam

24 April 2007

Date and Location: _____

No. of participants: _____

1. Listenership to “Que Minh Xanh Mai”

- Listenership patterns – frequency, timing
- Number of episodes listened to

2. Farmer awareness of environmental practices taught in “Que Minh Xanh Mai”

- Disposal of plastic packages – Do you burn, bury, sell, or reuse plastic packages or containers?
- Straw management – what do you do with rice straw?
- Fertilizer use – amount of NPK used, timing or use according to “Ba Giam, Ba Tang” recommendation?
- Pesticide use – use according to “Ba Giam, Ba Tang” recommendation?
- Washing sprayers – Where do you usually wash your pesticide sprayers?
- Raising fish in rice paddy – do you raise fish in the paddy? If yes, how do you ensure that the fish you catch in the rice paddy is safe to eat? How much pesticide do you apply?
- Pre-harvest interval of pesticide spraying - how many days before harvesting did you apply your last spray?
- Storage of pesticides – where in the house do you keep pesticides?
- What is your cropping pattern? With what crops (beans, watermelon, etc.) do you intercrop rice? Or growing rice continuously?
- Other environmental practices heard on *Que Minh Xanh Mai*?

Box 3.2 Sample FGD Report

FGD facilitator/rapporteur: Pham Van Quynh, K.L. Heong, M. Escalada

On 24 April 2007, three focus groups were conducted composed of two listeners' groups in Vinh Thanh district and one control group in Phong Dien district in Can Tho province, 70 km from Can Tho City. The first FGD, conducted in village E, Thanh An commune in Vinh Thanh district had 11 farmers, while the second focus group in Qui Lan 6 hamlet, Thanh Quoi village, in Vinh Thanh district had 9 farmers. The third focus group carried out in Thoi An A hamlet, Giai Xuan village in Phong Dien district, had 14 farmers.

2. Listenership to "Que Minh Xanh Mai"

- As the first two focus groups involved "Que Minh Xanh Mai" listeners groups, all farmers we engaged in discussion regularly listened to the radio soap opera. The control group in Phong Dien had no access to the drama because they did not own radio sets. Although the dramas were broadcast on the village public speaker system, Phong Dien farmers found the quality of tower broadcasts to be poor. In addition, the extension technician did not encourage them to pay attention to the drama.

2. Farmer awareness of environmental practices taught in "Que Minh Xanh Mai"

- Climate change

Nearly all farmers in Thanh An commune and Thanh Quoi village focus groups found the temperature to have become hotter compared to 20 years ago. Although farmers did not know the cause of climate change, they thought that straw burning may be the cause of temperature rise. When temperature is high, farmers thought that rice plants would not develop fully and the irrigation water gets hot which affects the plant, especially when fertilizer had been applied. A hot climate, they said, could also lead to an increase in insect pest and disease populations. An adaptation strategy suggested by farmers is for the government to grow more trees around their houses but not close to their rice paddy.

- Disposal of plastic packages

In Thanh An commune, farmers sold used plastic containers and packages while a few farmers burned them. In Thanh Quoi village, plastic containers are likewise burned, while some buried them.

- Straw management

"Que Minh Xanh Mai" taught farmers that rice straw should not be burned in the field but allowed to decompose. However, farmers in Thanh An commune said that since they practice intensive rice cultivation, they need to move the straw to another field immediately after harvest in the rainy season. In the dry season, they burn the straw right in the field. After straw burning, the first application of fertilizer can be reduced because the ash can make the soil fertile. Farmers explained that this practice can help them reduce their fertilizer costs.

3.2.3 Scoping study

The scoping study has been regarded as a type of literature review used to map relevant literature in the field of interest (Arksey and O'Malley 2005). A scoping study examines broader dimensions of a problem often undertaken as a pre-project preliminary exercise. The scoping study has superseded the rapid rural appraisal or participatory rural appraisal (PRA) where a multidisciplinary team is commissioned to do a "quick and dirty" review of the situation.

What is a scoping study?

A scoping study is often done to focus on identifying the extent, nature, and range of research and implementation issues related to a problem, to map the key concepts relevant to a research area and the main sources and types of evidence available. A review of available literature will help determine research gaps which a future larger study can address. A scoping study can be conducted as a stand-alone project where an area is complex or has not been reviewed comprehensively before' (Mays et al. 2001).

As applied in development projects, the intent of a scoping study is to assess the magnitude, seriousness and intensity of the problem and the actions taken by the people concerned and affected by it. This is done by reviewing the literature, historical data, and reports, and collecting preliminary data to scope for research and implementation issues, to provide some understanding of the problem, and develop an integrated strategy or a set of recommendations to deal with the problem. Various tools are available that can be used in a scoping study. Historical profiles, problem tree, seasonal charts, discrimination profiles, and strengths-weaknesses-and threats (SWOT) analysis are some examples.

Collecting preliminary data will involve field visits, key informant interviews and a series of focus group discussions with stakeholders.

Analytical framework

In a recent scoping study we conducted for the Australian Centre for International Agricultural Research (ACIAR), these were the steps that we followed:

1. Identify the research problem - Our research question was: *What are the research and implementation issues related to management of the BPH/virus problem in the Mekong Delta?*
2. Determine the dimensions of the problem – The relevant dimensions that the project team considered essential to develop an integrated management of the BPH/virus problems and prevent its spread and communicate management strategies to farmers were: *What are the biology of the viruses,*

vector-virus relationships, vector migrations, vector ecology and farmers' perceptions of the vector and viral diseases?

3. Review existing research literature – historical data and reports. We analyzed and reviewed literature, information, monitoring data, results of pilot projects and field trials conducted and documents available from the Ministry of Agriculture Vietnam. We reviewed occurrence and variability of virus diseases (Rice Yellow Syndrome) transmitted by BPH in whole of Vietnam, BPH population variability, and identified migratory patterns for developing a monitoring scheme and scoping for natural biological control possibilities.
4. Conduct field visits to observe research and implementation activities – In addition, we observed “Escape strategy” demonstration plots and community light traps to understand their assumptions and mechanisms. Fields suspected to be affected by rice grassy stunt (RGSV) and rice ragged stunt (RRSV) viruses and plants with leaf yellowing/bronzing, and those with typical symptoms of RGSV infection (profuse tillering and stunting) RRSV infection such as the ragged/serrated leaves and twisting of the leaf tip were also observed.
5. Conduct focus group discussions and key informant interviews with stakeholders. We conducted field visits and a series of focus group discussions (FGDs) with rice farmers in Tien Giang, Long An, Vinh Long, and Nha Trang provinces to identify major perception constraints of farmers to the viral diseases and their management and scope for opportunities for communication to farmers..
6. Collate, summarize and present reports in a consultation workshop with stakeholders to validate the findings. A one day consultation workshop of 70 participants from research, extension, policy making and mass media from Vietnam, Cambodia, China, Philippines, Indonesia, Korea and FAO was held to develop plans for next steps. Using SWOT analysis, the following next steps were developed:
 - 1) The “Escape Strategy” lacks robustness and more research efforts to improve knowledge of the ecological bases and monitoring methods and decision protocols are needed.
 - 2) Planthopper outbreaks are due to sudden abnormal explosive increases in populations. An analytical framework has been developed and there is

now a need to develop a research program to validate the cause-effect relationships between various factors.

- 3) Biological control services are foundation to sustainable pest management. There is a need to develop a research program to assess these ecosystem services, develop strategies to enhance, and sustain them through cultural practices, like increasing habitat biodiversity.
- 4) Insecticide resistance to recently introduced insecticides seems to have appeared in some areas. There is a need to establish an insecticide resistance monitoring network and to use standard protocols.
- 5) The increasing importance of the white back planthopper (WBPH), especially in the north, due to the growing of popular hybrid rice varieties, raised the need to conduct research to understand ecological and vector-virus relationship.
- 6) The causal viral agents of “yellowing syndrome” need to be further characterized. A simple diagnostic kit needs to be developed for use in research and extension.
- 7) Further understanding of the genetic variability of the pest using microsatellite markers needs to be investigated.
- 8) Vietnam has a well staffed and widely distributed plant protection network. In addition, farmers have wide access to mass media. There is a need to develop a strategic communication plan to maximize rapid dissemination of essential and accurate information that will promote sustainable practices which will reduce vulnerability to pest outbreaks.

Farmer-level, community, or policy impacts

The SRA project identified some gaps and opportunities to strengthen research and implementation of sustainable management of the BPH/virus problem, which was endorsed by the vice minister and director general of the Plant Protection Department. The next step is to use the initial results of the SWOT analysis to conduct a more thorough (probably 1 whole day) SWOT analysis to develop details. The result of the second SWOT will be used to develop a full proposal for donor funding. The interim “escape” technique developed by the local extension has potential and the government has adopted it for full scale implementation. The main concern is about its reliability. There is immediate need for research to perform a reliability analysis and conduct research to improve the technique. Without this research support, the adoption of the “escape” technique will lack credibility and reliability, and might eventually suffer

discontinuance. A full research proposal will certainly contribute towards sustaining the adoption of this SRA's initial outputs. This finding had raised questions on the popularly prompted "escape" technique which might have immediate negative impact on government's implementation plans.

3.3 Farmer surveys

To enhance implementation of integrated pest management (IPM), trainers and extension workers must thoroughly understand the context in which farmers make IPM decisions. This includes their perceptions and attitudes toward recommended pest management measures. Adequate information on what farmers know, how they perceive pest problems and what their current practices are can be obtained through farm surveys and focus group interviews.

In a farm survey, one collects data from a sample of a farming population to determine the important variables that influence their decisions . This not only enables us to understand the reasons for current practice but also provides a basis for predicting how farmers are likely to respond to certain factors, such as IPM training. This can provide a useful guide to action. Sample surveys focus on people and their beliefs, opinions, attitudes, motivations, and behavior. In survey research, the goal is to infer the characteristics of a given population from samples drawn from that same population.

3.3.1 Interview

The interview is a common technique used to gather sociological data. Interviews may be conducted in various ways -- talking with individuals or group or interviewing using formal questionnaires. Although the technique appears simple and straightforward, successful use depends on the kind of questions constructed and presented, the quality of answers recorded, the setting where the interviews are conducted, the kind of language used, and the characteristics of the interviewers themselves. Thus, its value as a research tool depends on the context in which it takes place, the interviewer's skills, the framing of the questions and their adaptability to local rules of conversation. For instance, interviewers need to observe unspoken rules related to cultural sensitivities to show respect of personal boundaries. The best information is obtained when good rapport and mutual trust exist between interviewer and interviewee.

For a question to be valid, it must have the same meaning to the interviewee as to the interviewer. It needs to be formulated in a culturally meaningful and appropriate manner. Questions are not legitimate when they are based on concepts or assumptions alien to the system of meaning of the culture, such as asking a farmer whether he practices integrated pest management (IPM), a concept that may be well known only to scientists. Sometimes, a term may exist in the culture but may have a different meaning. The word "grass" in many Asian languages means weeds in general, while for weed scientists, it means species of the family *Graminae*. It is thus important to find

appropriate expressions in the local context; failure to do so will result in erroneous data since they are based on answers rooted in a misunderstanding or desire to please or to save face. For instance, when asking a farmer if he is practicing IPM, he may give a positive answer to please or to save face. The use of native language is essential as language is a major cultural filter. Many concepts and categories have no semantic equivalents and inappropriate translation can easily occur. The concept of insect resistance, for instance, has been translated to mean being “immune to all insects” in many cultures. Familiarity with the way interviewees think and speak is the key to successful communication, permitting a free flow of meaningful questions and accurate interpretation of answers.

In general, questions should neither be too complicated nor too short or ambiguous. Leading questions -- questions that explicitly suggest the answer-- should be avoided. They convey to interviewees that there are expectations in their replies, like asking farmers if they have stopped spraying after learning about IPM. Interviewees will have the tendency to provide distorted answers to meet expectations. It is important that interviewers do not show signs (through unconscious facial expressions) of disapproval or disbelief to answers as these reactions will alienate the interviewee and create mistrust.

3.3.2 Types of questions

Several types of questions may be used in interviews. It is important to be able to choose the appropriate type of questions for the right situation. **Open-ended questions** allow the interviewee to give a range of answers, such as “Tell me about this pest”. **Direct questions**, on the other hand exert some control over the responses, such as “What are the causes of this problem?” **Closed questions** usually require a yes or no or a set of fixed alternative answers. In some countries, yes-no questions should be avoided as there is a tendency for interviewees to answer yes when they do not understand the question. We used closed questions to quantify farmers’ beliefs by asking each respondent to assess his/her degree of belief using descriptor phrases in a five-point Likert scale (Heong and Escalada 1997). The descriptors were “definitely not true,” “in most cases not true,” “maybe true,” “in most cases true,” and “always true”.

3.3.3 How to conduct a farmer survey

Because the cost of implementing surveys is often high, it is important that they are planned and conducted with utmost care. In conducting a farmer survey, the following steps are recommended (Escalada and Heong 1997):

1. Identifying the problem/issues

The first step in planning a farmer survey is to identify the problem and issues that need to be addressed. In pest management, the choice of pest problem to focus on would depend on the needs associated with specific research priorities or the

information needs of a given Ministry or plant protection organization. Where such priorities have not been articulated, the farmer survey could gather information of value for developing research priorities.

2. Developing survey objectives

Once a priority problem has been identified, the next step is to develop the survey objectives. For instance, the objective might be to determine the likely impact of an extension campaign or the likely adoption of a new IPM practice. Drawing up a list of variables that will help find answers to the survey objectives could put the researcher on the right track in designing the questions to ask in the survey. Specific questions that are aimed at various aspects of the problem could help clarify the research problem. It is important to remember that the choice of questions should be guided by the survey objectives.

3. Developing the survey instrument

In a farmer survey, the instrument used for data collection is a questionnaire which contains a series of questions designed to gather information from the respondents. Depending on the survey objectives, the survey questionnaire may contain knowledge, attitude and practice questions on an identified pest problem, cropping patterns, demographic and socio-economic background of respondents, among others.

4. Pretesting the questionnaire

When the farmer survey questionnaire has been compiled, it needs to be pretested before being copied and implemented in the field survey. Pretesting involves interviewing a small group of respondents who are similar to the intended target group to determine their reactions to the prototype questionnaire. This is done in order to determine –

- the clarity of the wording and translation of the technical terms used,
- whether the questions are in a logical sequence ,
- the adequacy of the response categories (e.g. where there is a multiple choice),
- the clarity of questionnaire instructions, and
- the estimated duration of the interview.

Results of the pretest are used as the basis for revisions in the questionnaire and logistical arrangements for the fieldwork.

5. Choosing sample respondents

An important concern in survey research is deciding how many and which respondents should be included. A farmer survey uses standard social science methods in selecting the sample, either through probability or nonprobability sampling methods. Probability sampling methods allow some form of random selection (Trochim and Donnelly 2006)

which means giving every element of the population an equal chance of being included in the sample. With probability sampling, one can calculate the sampling error or the degree to which the sample might differ from the population. Nonprobability sampling does not allow one to determine sampling error.

The choice of sampling technique depends primarily on the nature of the problem, the cost and time factors involved, and the desired precision or reliability of the results. When a project can afford it, a larger sample is preferred to reduce sampling error. In a survey of, say, 300 farmers, it is recommended that the sample be drawn from a cross-section of the sampling population so that this group can be said to represent the larger population. In other situations, the main objective of the survey may be to identify the range of ways in which farmers might utilize a new practice, in which case, selecting farmers from very different farming systems may be more appropriate.

How large should the sample be?

Decisions on sample size depend on the degree of accuracy required, the degree of variability in the population, and kind of data analysis being planned. Sample size can be estimated statistically or by following certain rules. The statistical method requires some assumptions about the population and use statistical equations about random sampling processes. Such procedures are found in social science research methods books (Neuman 1997; Frankfort-Nachmias and Nachmias 1996; Trochim and Donnelly 2006).

Rules in determining sample size are based on past experience with samples that were drawn through the statistical method and are more commonly used especially in studying large populations. According to Neuman (1997), these rules are:

- A small population needs a bigger sampling ratio to have an accurate sample. For instance, a population of below 1,000 requires a sampling ratio of 30% to achieve a high level of accuracy.
- For large populations (over 150,000), smaller sampling ratios (1%) are often sufficient. In general, practical considerations, such as costs and logistics, are the more important deciding factors.
- For small samples, small increases in sample size can produce bigger gains in accuracy than for large samples.

6. Implementing the field survey

Once the questionnaire has been pretested, finalized and reproduced, the next step is to implement the field survey. Resources needed for the field work include personnel, money and time. A field survey team is often composed of a survey coordinator, a supervisor, and interviewers. The survey coordinator is responsible for all aspects of the field work - selection, training and deployment of interviewers. The supervisor assists

the survey coordinator in spot checking and monitoring the field interviews. Before they are fielded, interviewers are oriented on the purpose of the survey and trained on interviewing skills and how to conduct the interviews. Guided by the sampling plan and respondent list, the interviewers locate the respondents, conduct the interviews, and check the completed questionnaires after the interview.

Choosing a field interviewer

An interviewer is an important link in the survey chain. Because of their important role, it is important that the interviewers selected are honest and objective. Our experience has shown that college students tend to be more objective interviewers because they do not have the inherent bias that professional agency staff may have. For example, in a survey of rice farmers' pest management perceptions and practices, it was observed that plant protection officers, who had conducted the interviews, tended to interpret rather than just record farmers' responses. Although many farmers reported that "green worm" was their most important pest, this was recorded by interviewers as either army worm or rice bug based on their perception of what the term, green worm, implied. In reality, farmers can use the term Green worm to refer to a variety of leaf feeders such as rice leaf folders, cutworms, case worms, and thrips.

Box 3.3. Some guidelines for interviewers in implementing the field survey

- Selecting the respondents.* Interview only those farmers who are in the respondent or replacement lists. If the designated farmer is temporarily not available at the time of the schedule, arrange a return visit. If the person will not be available for a long time, choose another name from the list of replacements.
- *Securing survey materials.* Obtain the following before doing the field work: list of specific area of assignment, list of respondents, questionnaires, a map, and pencils.
 - *Establishing rapport with your respondent.* In approaching the respondent, introduce yourself and ask the respondent's permission for the interview. Also, inform the respondent of the purpose and benefits that can be derived from the study.
 - *Checking the responses.* After an answer is given, check to make certain that it is complete. Immediately upon completing the interview, check responses for any unclear information; if any are found, clear up the problem with the respondent before leaving. After checking the interview schedule for completeness, thank the respondent for his/her help and cooperation.
 - *Encoding and analyzing survey data.* Once the completed questionnaires have been checked, the data are encoded, processed and analyzed by hand or by using a statistical package for a computer. Translating question responses and respondent information into numerical symbols and specific categories for analysis is called encoding the data.

Probing questions

In many interview situations, some respondents tend to give vague replies such as “okay” or “good” which could mean different things. When this happens, try to have the respondents express themselves better by asking them why it is “okay” or “good” and encourage them to give more specific answers. If a respondent’s answer belongs to the “other” category of responses in the questionnaire, he should be asked to specify his response. These follow-up questions are referred to as *probes*, which are often used to elicit additional information, expand an idea already expressed by the respondent, or clarify the respondent’s response (Sedlack and Stanley, 1992).

Usually open-ended, probing questions ask for more than a “yes” or “no” answer and provide the respondent the leeway to respond to a question from his own perspective. These generic follow-up questions are suggested to elicit more precise information (Kidder, 1981; Krueger, 1988):

“Could you give an example?”

“In what way?”

“What do you mean?”

“Would you explain further?”

“Tell me a little more about it.”

“What do you mean when you said ...”

“Tell me how it is so...”

Open-ended survey questions usually provide opportunities for probing, but the sequence of probe questions to ask would depend on the respondent’s initial response (see Box 3.3).

Box 3.3. Probing Example

After establishing that farmers’ fields were attacked by BPH/virus last season, we might want to proceed to find out farmers’ perceptions of the causes of the virus problem. This can be done through a conversation using some of these questions:

- You said that your rice crop was attacked by virus last season, where did the virus come from?
- If the BPH comes to the field, how long does it take to transmit the virus? (in minutes)
- Where did you get the information about transmission time?
- If the field is sprayed with insecticide and an insect carrying a virus arrives, can the virus be transmitted before the insect dies?
- What are the symptoms of a diseased plant?
- What happens to the sick plant? Will it recover? Will it worsen?
- Should the sick plant be left in the rice field? Why?
- What happens if you leave the sick plant in the rice field?

7. Coding and analyzing survey data

Once the completed questionnaires have been checked, the data are encoded, processed and analyzed by hand or by using a statistical package for a computer. Translating question responses and respondent information into numerical symbols and specific categories for analysis is called encoding the data.

First, the responses to questions need to be coded and tabulated. Coding is the term used to describe the translation of question responses and respondent information to specific categories for analysis. *Tabulation* is the recording of the numbers of types of responses in the appropriate categories, after which statistical analysis follows: percentages, averages and appropriate tests of significance.

Then the analyzed data is interpreted and the results of this interpretative process are reported. The purpose of a survey report is to tell the readers the research problem, data collection methods used, findings, and conclusions. Like other research reports, the survey report should consist of an executive summary, introduction, description of the methods, results and discussion, and conclusions.

Because data from surveys and related methods depend on respondents' self-reports, they may contain errors that weaken their reliability and validity. Such errors may arise from the use of inappropriate variables, biased sampling procedures, inaccurate wording of questionnaires, linguistic and cultural nuances, interviewer inadequacies, and mistakes in data encoding. To minimize such sources of error, special emphasis must be placed on instrument design and implementation method. It is useful to conduct several pretests before finalizing the instruments, especially to prevent misunderstandings caused by linguistic differences. In implementation, it is useful to adopt a quality assurance procedure to minimize interviewer inadequacies and data encoding errors.

Checking and editing

1. Check each questionnaire to see if it is properly filled in.
2. Code answers using numbers.
3. Code "other" and open-ended answers.

Coding is the term used to describe the translation of question responses and respondent information to specific categories for analysis. The first stage of coding involves the construction of a code book. A code book is a set of rules used to classify observations of variables into values that are transformed into numbers.

Box 1. Sample Code Book

Q No.	Column	Variable Name	Codes
1	A	ID	Enter actual number
	B	District	1 = Vi Thuy (1- 304) 2= O Mon (305- 606) 3= Chau Thanh A (607-908)
2	C	Sex	1= Male 2= Female
3	D	Source	1= Bought from seed grower 2= From own farm 3= Obtained from other farmers 4=Government extension office 5= other (specify)

Data entry

It is best to enter the data in a spreadsheet program like Microsoft Excel for its ease in editing the values entered and writing formulas to calculate certain values. To enter survey data, assign a row for each respondent and one column for each variable. The first row should have a label for each variable. Use numerical codes for all questionnaire data. Enter only one answer for each column. For multiple responses, create another column for another answer. This is illustrated by a sample data entry file below:

ID	Sex	Age	Area	Variety
1	1	23	1.2	1
2	1	26	0.3	3
3	2	35	0.5	1
4	1	54	2.1	5
5	2	63	0.2	4
6	2	49	1.7	1

Data checking

1. After the data have been entered, check the file for wild codes and extreme values.

ID	Sex	Age	Area	Variety
1	11	23	1.2	1
2	1	26	0.3	3
3	5	35	0.5	1
4	1	54	2.1	5
5	2	63	0.2	4
6	22	49	1.7	1

In the sample data above, **11**, **5**, and **22** are considered wild codes for sex which generally has only two codes: 1=male, 2=female. Some statistical packages enable one to check the data for outliers.

8. Writing the survey report

Now that you have analyzed the survey data, your next task is to organize them into a coherent report. The purpose of a survey report is to tell the readers the following:

- research problem
- data collection methods used
- results
- conclusions

Thus, like other research reports, the survey report should consist of these parts:

- executive summary
- introduction
- description of the methods
- results and discussion
- conclusions

An important part of the final report is the executive summary. Busy decision makers may not read anything else in the report. The executive summary should describe the:

- survey objectives
- summary of the results
- conclusions and recommendations

Immediately after the executive summary is the table of contents. As the term implies, this section lists the key contents of the report and their corresponding page numbers. Appendices, which may be survey tables and graphs that were not integrated into the body of the report, are included as well.

The following are the major sections of a survey report:

1. Introduction

- Overall background of the problem - describes the significance of the problem to the country. For instance, if the survey was on weed management practices of rice farmers, the introduction should deal with the importance of weed management in rice growing areas and the magnitude of yield losses due to weeds.
- General situation in the survey area - provides a description of the survey area in terms of population, geographical location, major crops grown, etc.
- Objectives of the survey - presents the survey objectives.

2. Methodology

- Survey population - describes the survey respondents, e.g., rice farmers, fruit growers, and from which province or district they come from.
- Data collection method - explains how the survey was carried out and discusses the sample size and sampling procedure.
- Survey questionnaire - presents the major sections of the research instrument.
- Pretesting - describes the pretesting process and how the pretest results were utilized to improve the questionnaire.
- Data analysis - explains the analytical tools used to describe the data.

3. **Results** - Survey results are usually organized around the major sections of the questionnaire.

4. **Conclusions and Recommendations** - The conclusions highlight your research findings.

5. Literature Cited

This section lists the sources of information and publications that you referred to or cited should be included.

Guidelines in Writing Up Survey Findings

1. Describe the data presented in tables and graphs.

Highlight important findings and provide the supporting table immediately. The general rule is to place the text just before the table or chart being described.

Describe the highest proportions in the table or chart first. As shown in the illustration below, the discussion starts with the highest proportion, i.e., "Own seed".

Farmers obtained rice seeds for sowing from a number of sources but two-thirds of them (63.9) relied on other own sources (i.e., from their previous harvests). Other farmers either obtained their seeds from the coop (24.1) or from their neighbors

(10.6%). Farmers obtained seeds from these sources because they get better seeds (58.5%), or that it is cheaper to do so (30.48%), Table 29.

Table 29. Sources of rice seeds and reasons for choosing these sources

Variable	Districts III & IV (%)
Sources	
Own seed	63.9
Coop	24.1
Neighbor	10.6
Reasons	
They are better seeds	58.5
They are cheaper	30.4

2. Rationalize the results and bring out any underlying pattern in them, especially when discussing a two-way table. Interpret the results but be careful not to go beyond the results obtained.

To illustrate, consider this table and write up from Ramli and Khor's (1990) Report on the KAP Study on the Strategic Extension Campaign on Integrated Weed Management in the Muda Irrigation Scheme, Malaysia:

Types of land tenure and size of land ownership

On the whole, the respondents were equally divided along the various tenurial categories found in the Muda region. This is to say that 37.9% of the respondents were owner-operators, 37.2% were owner-tenants (i.e., they own as well as rent the land from someone else), and 24.8% were pure tenants.

There were slightly more owner-operators and less owner-tenants in the southern districts (III & IV) compared to the northern districts (I & II) but the difference is not statistically significant (Table 5).

Among the farmers in both district clusters who own the land (operators and owner-tenants), majority of them did not own more than 10 relungs: 53.5% between 1 to 4 relungs, and 41% between 5 to 10 relungs. Only 15 farmers (5.2%) in this study owned more than 10 relungs, one of whom owned more than 20 relungs.

Among the tenants and owner-tenants from both clusters, 44.9% of them rented between 1 to 4 relungs and 47.1% between 5 to 10 relungs. Only 22 (8.1%) of the farmers in this study rented more than 10 relungs of paddy land, three of whom have more than 20 relungs.

3. Describe relationships, don't just symbolize them:

For instance, the statement below may not be easy to understand by the readers of a KAP survey report:

We found $r = 0.72$, which means that age explains about one-half of the variance ($r^2 = .49$) in scores.

Instead, it should be written up as follows:

About half of the differences in knowledge scores on weed management is accounted for by respondents' education: farmers with higher level of education were more knowledgeable than those with lower levels of education ($r^2 = .49$).

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