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TECHNICAL MANUAL ON PARTICIPATORY APPROACH

Technical Manual Series on the Feasibility Study on the Forest Management Plan in the Central Highland in Socialist Republic of Viet Nam

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1 Introduction

This manual describes how participatory approaches, with special reference to Rapid Rural Appraisal (RRA), is used to enhance and facilitate the effective design and implementation of development projects, and how it is practically being applied into surveys and researches.

Although, in principle, RRA is effectual for a variety of projects, this manual is designed to suit particularly for forestry and rural resource management related projects or programmes. According to the purpose of this manual, it is challenged to cover all necessary information for practitioners, however, of course, as the purpose and goal of RRA practice is different from situation to situation, users of this manual are encouraged to revise or refine the contents of the manual so that it will be more efficient and effective for the purposes.

The expansion in interest and application of participatory methods has led to a growing demand for handbooks or manuals but those might carry special dangers. The participatory methods described in this manual are not necessarily techniques, tools or instruments. They do not guarantee an output but the success of the use of the methods depends on the individuals involved, on the quality of facilitation, and the context in which they are applied. It is only the underlying philosophy and aspects of process that can be transferred from context to context. All other elements of the methods and methodology must be individually adapted by facilitators and practitioners.

2 What is RRA?

This chapter provides basic ideas and concepts of the participatory approaches, particularly focusing on the origin, definitions and attributes including some precautions, strengths and weaknesses for the use the approaches.

2.1 Evolution

The philosophy, approaches and methods known as Rapid Rural Appraisal (RRA) began to emerge in the late 1970s (Chambers, 1997). Chambers (1997), and Pratt and Loizos (1992) point out three main origins of RRA.

(1) Dissatisfaction with the biases, especially the anti-poverty biases, of rural development tourism, the phenomenon of the brief rural visit by the urban-based professional. These biases were recognised as:

- *Spatial*: visits near cities, on roadsides and to the centres of villages, to the neglect of peripheries
- *Project*: where projects were being undertaken, often with special official attention and support
- *Person*: meeting men more than women, élites more than the poor, the users more than the non-users of services
- *Seasonal*: going in the dry and cool rather than hot and wet seasons which are often worse for poor rural people
- *Diplomatic*: where the outsider does not wish to cause offence by asking to meet poor people or see bad conditions

All these could combine to hide the worst poverty and deprivation.

(2) Disillusion with the normal processes of questionnaire surveys and their results. Over many years and in many places, the experience had been that questionnaire surveys tended to be long-winded, tedious, a headache to administer, a nightmare to process and write up, inaccurate and unreliable in data obtained, leading to reports, if any, which were long, late, boring, misleading, difficult to use, and ignored.

(3) More cost-effective methods of learning were sought. This was helped by the growing recognition by development professionals of the painfully obvious fact that rural people were themselves knowledgeable on many subjects which touched their lives. What became known as indigenous technical knowledge (ITK) was then increasingly seen to have

richness and value for practical purposed. One major question, as it seemed then, was how more effectively to tap ITK as a source of information for analysis and use by outsider professionals.

2.2 Definition and attributes

There are a variety of definitions for RRA as follows:

- '*Rapid Rural Appraisal is a qualitative, participatory research methodology, most often used to gather and analyse information in rural communities* (Freudenberger, 1995)'.
- '*Rapid Rural Appraisal or Assessment (RRA) is a method of grassroots research used to identify the problems, goals and strategies of households, groups and communities. It is a fairly new arrival on the research scene, devised to meet the special needs of development-oriented research when decisions have to be made in a time-frame of months rather than years. It is a relatively low-cost approach to collecting information quickly, which came into existence precisely because the slower time-frame of apprentice anthropologists, and their reluctance to give priority to 'applied' questions at the expense of their own interests, meant there was an information-gap in development project research* (Pratt and Loizos, 1992).'
- '*Rapid Rural Appraisal or RRA is a way of organizing people for collecting and analysing information within a short time span. It can be defined as any systematic process of investigation to acquire new information in order to draw and validate inferences, hypotheses, observations and conclusions in a limited period of time* (Mukherjee, 1993)'.

With regard to the attributes of RRA, it stresses cost-effective trade-offs between the quantity, accuracy, relevance and timeliness of information. It combines a range of methods for rapid and cumulative data collection. Other key features include: multi-disciplinarity, a semi-structured and flexible sequence that is regularly reviewed and refined, and exploring local categories, classifications and perceptions (Cornwall *et al*., 1994).

In RRA, multidisciplinary teams of researchers from different backgrounds conduct studies of carefully defined issues, generally in short, intensive field studies.

RRA uses a variety of tools and techniques to gather information. All its tools are designed to promote the participation of local people in both the collection and the analysis of information. The tools approach questions from different angles, however. Some are particularly helpful in addressing spatial issues, some gather more temporal information, and others help local people to analyse their situation by ranking issues or problems. Just as care is needed when matching a

research methodology to the kind of study being done, so within RRA the most appropriate tool is selected for each type of information needed to meet the study's objectives.

RRA insists that diverse perspectives should be explored within the community studied. Villages, like other communities, represent many diverse interests depending on gender, social and economic standing, sources of livelihood, etc. It is important that the views of different groups and interests be explored in order to fully understand issues as complex as resource use patterns in a community.

In short, the RRA method requires that a *diverse group of researchers* use a *diverse set of tools* to explore the *diverse views and experiences* of a community. This diversification of perspectives at the level of the researcher, the informant and the means of communication which links them together is called 'triangulation' (Figure 2.1). Triangulation is a core principle of RRA because, on the one hand, it is the primary strategy used to avoid bias in the research results and, on the other hand, it considerably enriches the quality of the data collected.

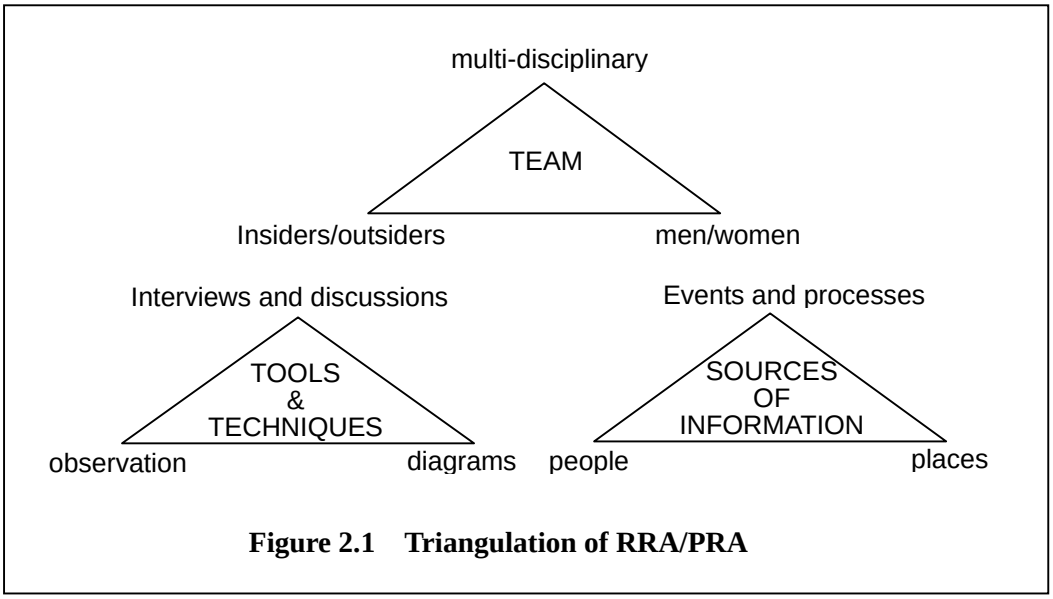


Figure 2.1 Triangulation of RRA/PRA

From the viewpoint of objectives, RRA can be used for a variety of purposes including:

- to explore rural situations, problems or issues
- to design, implement, monitor and evaluate projects/programmes
- to help develop, extend, and transfer technology
- to assist in policy formulation and decision making
- to respond to emergencies and disasters
- to improve, supplement, or complement other types of research (Gilling and Cropley, 1993).

Amalgamating the above-mentioned attributes of RRA, the comparison with conventional approach can be summarised below (Table 2.1):

Table 2.1 Conventional research and RRA compared

Techniques employed	Conventional research	RRA
Statistical analysis	Often a major part	Little or none, use of triangulation
Formal questionnaires	Often included	Avoided
Interviews with local farmers and key informants	Through formal questionnaires if at all	A major component, semi-structured interviewing
Qualitative descriptions and diagrams	Not as important as the 'hard data'	Considered at least as important as statistical data
Sampling	Statistically acceptable sample regarded as necessary. Usually random sampling	Often small sample size, selecting 'key (areas, farms, households, etc. 'Statistical' requirements not always adhered to
Consulting of secondary data	Yes	Yes
Measurements	Detailed, accurate	Qualitative indicators used
Group discussion	Informal unstructured sessions	Via semi-structured workshops and brain-storming

Source: Shallon, 1993

2.3 RRA and other participatory approaches

Participatory development and the related issues of Participatory Rural Appraisal (PRA) have recently received considerable attention in the third world development (O'Reilly, 1996) (Box 1). The participatory approaches in use today have evolved from several sources and traditions. Five of these have been particularly important (Box 2).

Box 1 A list of terms for participatory approaches to learning and action

- Agroecosystem Analysis (AEA)
- Beneficiary Assessment (BA)
- Development Education Leadership Teams (DELTA)
- Diagnosis and Design (D&D)
- Diagnóstico Rural Participativo (DRP)
- Farmer Participatory Research (FPR)
- Farming Systems Research/Extension (FSR/E)
- Groupe de Recherche et d'Appui pour l'Auto-promotion Paysanne (GRAAP)
- Méthode Active de Recherche et de Planification Participative (Méthode Accéléré de Recherche Participative) (MARP)
- Participatory Analysis and Learning Methods (PALM)
- Participatory Action Research (PAR)
- Participatory Research Methodology/Methods (PRM)
- Participatory Rural Appraisal (PRA)
- Participatory Rural Appraisal and Planning (PRAP)
- Participatory Technology Development (PTD)
- Participatory Urban Appraisal (PUA)
- Planning for Real
- Process Documentation (PD)
- Rapid Appraisal (RA)
- Rapid Assessment of Agricultural Knowledge Systems (RAAKS)
- Rapid Assessment Procedures (RAP)
- Rapid Assessment Techniques (RAT)
- Rapid Catchment Analysis (RCA)
- Rapid Ethnographic Assessment (REA)
- Rapid Food Security Assessment (RFSA)
- Rapid Multi-perspective Appraisal (RMA)
- Rapid Organisational Assessment (ROA)
- Rapid Rural Appraisal (RRA)
- Samuhik Brahman (Joint trek)
- Soft Systems Methodology (SSM)
- Theatre for Development (TFD)
- Training for Transformation (TFT)
- Visualisation in Participatory Programmes (VIPP)

Source: Cornwall *et al*., 1994; Scoones and Thompson, 1994; Pretty *et al*., 1995

Box 2 Participatory approaches: some origins

- **Action-reflection research (activist participatory research)**

  This approach uses dialogue and joint research to enhance people's awareness and confidence and to empower them to take action. Although its special focus on the underprivileged and on political action has limited its spread, its key contributions to the current approaches lie in its recognition that poor people are creative and capable and should be empowered, while outsiders have a role as catalysts and facilitators.

- **Agro-ecosystem analysis**

  This approach draws on systems and ecological thinking, combining the analysis of systems (productivity, stability, sustainability, equity) with pattern analysis of space, time, flows and relationships, relative values and decisions. Among its major contributions to current approaches are its use of transects, informal mapping and diagramming and the use of scoring and ranking to assess innovations.

- **Applied anthropology**

  Although conventional social anthropology has been mainly concerned with understanding rather than changing, applied anthropology became more recognised in the 1980s as a legitimate and useful activity, especially in its ability to help development professionals to appreciate better the richness and validity of rural people's knowledge. It also emphasises the benefits of unhurried participant observation and conversations and the importance of attitudes, behaviour and rapport.

- **Field research on farming systems**

  Two branches of this discipline simultaneously revealed on the one hand the rationality of small and poor farmers and on the other their activities as experimenters. Farmers' participation in agricultural research therefore became a focus, especially in the context of complex, diverse and risk-prone farming systems.

- **Rapid rural appraisal (RRA)**

  Omitted

Source: Chambers, 1992; Pretty *et al*., 1995; Chambers, 1997

RRA and PRA have been distinguished as approaches rather than methods, although many practitioners consider that the term RRA should be used for data-collecting activities, while PRA should be reserved for an on-going empowering process. RRA should not be considered a second-best, but simply a different activity with different objectives and justifications (Chambers, 1997). Table 2.2 outlines differences in attributes between RRA and PRA.

Table 2.2 RRA and PRA compared

	RRA	PRA
Major development	Late 1970s, 1980s	Late 1980s, 1990s
Major innovators in	Universities	NGOs
Main users	Aid agencies, universities	NGOs, government field organizations
Key resource earlier overlooked	Local people's knowledge	Local people's capabilities
Main innovation	Methods	Behaviour
Outsider's mode	Eliciting	Facilitating
Objectives	Data collection	Empowerment
Main actors	Outsiders	Local people
Longer-term outcomes	Plans, projects, publications	Sustainable local action and institutions

Source: Chambers, 1992; 1994b; 1997

In the meantime, some basic principles that RRA and PRA share are identified (Table 2.3).

Table 2.3 Basic principles of RRA and PRA

■ ***Offsetting biases*** Spatial, project, person (gender, élite), seasonal, professional, courtesy
■ ***Rapid progressive learning*** Flexible, exploratory, interactive, inventive
■ ***Reversal of roles*** Learning from, with and by local people; eliciting and using their criteria and categories; and finding, understanding and appreciating local people's knowledge
■ ***Optimal ignorance and appropriate imprecision*** Not finding out more than is needed and not measuring when comparing is enough. We are trained to make absolute measurements but often trends, scores or ranking are all that are required.
■ ***Triangulation*** Using different methods, sources and disciplines, and a range of informants in a range of places, and cross-checking to get closer to the truth through successive approximations.
■ ***Principal investigators' direct learning from and with local people***
■ ***Seeking diversity and differences***

Source: Chambers and Guijt, 1995

2.4 Application of RRA and PRA

Application of RRA and PRA approaches and methods have proliferated and continue to multiply. Most of the applications have one of three purposes: (i) topic investigations and research (mainly RRA); (ii) training and orientation for outsiders and local people; and (iii) PRA proper, as an empowering process of appraisal, analysis, planning, action, monitoring and evaluation (Chambers, 1997).

Applications include agroecosystems; natural resources, including forestry, fisheries and the environment; irrigation; technology and innovation; farming systems research and extension; pastoralism; marketing; disaster relief; organisational assessment; social, cultural and economic conditions; and many other special topics (Chambers, 1992). Those can sometimes be categorised in five main sectors: i.e. (i) natural resource management; (ii) agriculture; (iii) people, poverty and livelihood; (iv) health and nutrition; and (v) urban. In this category, forestry belongs to the sector of natural resource management and so far RRA/PRA has been practised in various categories of activities; e.g. social and community forestry; degraded forest assessment; protection; nurseries and planting; identification of tree uses; and uses and marketing of forest and woodland products (Chambers, 1992; 1994a; 1997).

2.5 Strength and weakness of the RRA/PRA approach

In general, there are some strengths and weaknesses identified for the RRA/PRA approach as described in Table 2.4.

Table 2.4 Strength and weakness of the RRA/PRA approach compared

Strengths	Weaknesses
■ It gives a good understanding of a community and its capacities and problems to all the people involved in the assessment. People involved in the assessment can include community members, local government officials, NGO staff, etc. ■ It gives community members more influence over development work that affects them. ■ It ensures that community members understand the project objectives and activities and so are more committed to the project. ■ You find out what local people think. It ensures that local priorities and	■ The results only apply to the communities visited and do not allow you to make generalisations about a whole population in the same way that a large survey may do. ■ Bias may creep into the results and so give a false picture of the situation. For example, if the team is not aware of gender issues they may never find out about women's concerns. ■ It is difficult for people outside the team to verify the results because statistical methods are riot used. ■ Direct observation limits you to what you see before you - there may be things you are not seeing.

perceptions of different problems, opportunities and constraints are taken into account. ■ Results are produced rapidly and in a form available to the local community. ■ It is useful for identifying indicators for qualitative change which are locally relevant. ■ You learn as you go, rather than waiting to analyse the data at the end. ■ Qualitative research can be quicker and cheaper than a more formal quantitative survey of the same scale (although this is not always true). ■ PRA and related methods often produce unexpected information. ■ They are less intrusive than formal interviews using questionnaires. ■ There is no need for accurate population estimates.	■ If not done systematically, the results can be impressionistic. ■ The findings may not carry the same weight with decision-makers as quantitative data.

Source: Gosling and Edwards, 1995

The following list of difficulties and possible dangers show how a PRA can be weakened: (NB: some of these can apply to other approaches too) (Gosling and Edwards, 1995).

- difficulties in finding the right team;
- going too quickly might lead to superficiality;
- the desire for the security of a fixed questionnaire;
- difficulties in finding the right questions to ask;
- difficulties in finding the poorest and least educated community members, especially women;
- failure to involve community members properly and fully;
- lack of rapport with the community;
- failure to listen and luck of respect;
- seeing only part of a situation or problem and not getting the full picture;
- making value judgements about others;
- being misled by myth or gossip;
- generalising based on too little information or too few informants;
- overlooking the invisible;
- lecturing instead of listening and learning;
- raising expectations in the community where the PRA is carried out;
- unconsciously imposing ideas, categories and values;
- male teams and neglect lot women;
- language: what people say and the way they say it can be lost in translating from one language to another.

The fact that there are more potential weaknesses than strengths in these lists does not mean that PRA is a doubtful approach to assessment. In the right circumstances it can be the most effective approach of all.

2.6 Danger of RRA and PRA

In spite of the advantages of the RRA approach, there are problems with its application. There are five dangers for RRA and PRA recognised (Table 2.5).

Table 2.5 Dangers for RRA and PRA

Faddism	Like farming systems research, RRA and PRA could be discredited by over-rapid adoption and misuse, and by sticking on labels without substance. The warning signs are there: demand for training which exceeds by far the tiny cadre of competent trainers; requirements that consultant 'use RRA' or now 'use PRA' and then consultants who say they will do so, when they do not know what RRA or PRA entail or are the wrong sort of people to be able to do them well; and the belief that good RRA or PRA are simple and easy, quick fixes when they are not.
Rushing	The word 'rapid' has been used to legitimise brash and biased rural development tourism. Much of the rationale for RRA / PRA has been to make time to find the poorest, to learn from them, and to empower them. Hurry and lack of commitment compound errors, and mean that the poorest are, once again, neither seen, listened to, nor learnt from. The R of RRA stands better for 'relaxed' allowing plenty of time.
Formalism	With any innovation, there is an urge to standardise and codify, often in the name of quality. Manuals are called for and composed. They can indeed be useful as compilations of experience, as cookbooks that widen the choice of recipes, as sources of ideas, especially for trainers. But manuals can also harm. With any new approach or method, manuals start short but grow fast. Paragraphs proliferate as intelligent authors seek to cater for every condition and contingency. Some farming systems research gave rise to manuals the weight and volume of which was itself a problem. The dangers are evident. Training is based on the text, and takes danger. More time is spent in the classroom teaching the theory and less in the field learning the practice. Spontaneity is inhibited and spread slowed, stopped or revised.
Ruts	Practitioners and trainers fall into habits and routines. There are many different ways of doing participatory activities. But practitioners in any organisation, or even region, show signs of slipping into unvarying standard practices, overlooking other options. Of course, some routinisation and repetition are inevitable, even desirable. But experimenting, inventing, testing, adapting and constantly trying to improve are part of the potential strength of participatory approaches. To nurture and keep that spirit, one means is exchanges of trainers between organisations, countries and continents, to share approaches, methods and experiences in the field.
Rejection	Some of the many pioneers who contributed to the participatory streams may feel that they have not received due recognition, when what they should really feel is pleasure and pride; and others, especially academics, may feel excluded, bypassed or threatened, by the developments described in this paper, and so reject them. At worst this will mean that students in colleges and universities, and staff in field organisations, are denied access to and the opportunity to use participatory approaches and methods. At best, it will mean a positive contribution through constructive criticism which will sharpen the rigour and add to the repertoire of the participatory approaches. It can only be hoped that the spirit of sharing will encourage and allow all professionals to own, use and develop participatory approaches and methods. For it is the monopoly of no person or group. As it grows, participatory approach is, and should remain, an open access resource.

Source: adapted from Chambers, 1992; Pratt and Loizos, 1992

2.7 Prerequisites for success of RRA/PRA approach

As the final preparation for RRA/PRA, the items and aspects described in Table 2.6 would be required to be verified before the practice.

Table 2.6 Prerequisites for RRA/PRA approach

Positive attitudes

- A self-critical awareness by members of the team, a readiness to recognise, discuss and challenge preconceptions and bias and change behaviour. Also a willingness to admit mistakes.
- A readiness to deal with conflicts that may arise when sensitive issues are discussed in the open.
- It is essential to be open about the different agendas of agencies and groups involved, to develop trust and avoid raising unrealistic expectations.

The right team

- A research co-ordinator to bring together the work of each team member and give direction.
- Team effort. All members must work together contributing their stills, knowledge and understanding. It may be best to assign different members of the team to tasks they do best. For example, some people may be better at interviewing, others may be better at recording results.
- The following ten qualifications are preferably considered when formulating team members:
  - Interdisciplinary expertise
  - Disciplinary specification
  - Social science expertise
  - Agricultural science expertise
  - Practical experience in rural areas
  - Experience and expertise in RRA methodology
  - Language abilities
  - Right attitude (*further described in 4.2*)
  - Gender and other factors
  - Participatory concepts

Skills

- The availability of people with appropriate skills and the right approach to conduct the study. If the approach is wrong PRA will not work. The right attitudes and behaviour are the key to the success of a PRA.
- Interviewing skills are vital. It takes time to learn how to look, listen and encourage others to speak, especially when people come from a variety of backgrounds.

Good preparation

- Training and thorough preparation are essential. Training should concentrate on the importance of PRA as a process which gives more power to community members. Training methods should strengthen the skills and attitudes required to promote this reversal of power relations between outsiders and community members. It should not just teach the assessment team how to use the different techniques.
- Training should also be given in gender awareness, working with children, awareness of issues concerning disability and less powerful minority groups, and community development.
- All those involved, including senior managers, need to understand and support the principles and methods of participatory assessment. If possible they should be involved in planning the PRA.

- A long-term relationship with the communities is essential for participatory assessment to lead on to greater community participation in programme implementation: to develop sufficient trust between the different stakeholders involved, to deal with conflicts, and to provide continuous support for institutional development within local groups and communities.

Appropriate methods

- The methods used need to be appropriate to the participants in terms of culture, experience, educational level, etc. It is important to be flexible, if a technique is causing problems or not enjoyed it many be better to use another one.
- The techniques must be used in combination.
- Analysis must be continuous and involve community members. If it is left to the end the original information and the PRA experience itself may be lost through over-analysis, over-interpretation, or by being ignored.
- The organisational structure and decision-making must be sufficiently flexible to make use of new information gathered in this way.
- There needs to be enough time for the assessment to allow it to evolve and respond to findings as they emerge, including unexpected ones.

Source: Gosling and Edwards, 1995; Messerschmidt, 1995

3 RRA methods and approaches

RRA and PRA methods have been classified as visualized analyses; methods for interviewing and sampling; and methods for group and team dynamics (Cornwall *et al*., 1994). Here they will be separated into those which are more typical of an RRA mode and those more typical of a PRA mode, remembering that all can be used in either mode (Chambers, 1997).

RRA has tended to stress the use of secondary sources, observation and verbal interaction. Semi-structured interviewing and focus groups have been stressed. These, then, can be described as typically 'RRA methods and approaches' (Table 3.1). PRA, on the other hand, has been distinguished especially by shared visual representations and analysis by local people, such as: mapping or modelling on the ground or paper; listing, sequencing and card sorting; estimating, comparing, scoring and ranking with seeds, stones, sticks or shapes; Venn diagramming; linkage diagramming; and group and community presentations for checking and validation. These are often what are described as PRA methods and approaches. The list is indicative not comprehensive (Chambers, 1997).

Table 3.1 Some originally RRA and typical PRA methods and approaches

Originally RRA	Typical PRA
Secondary data collection	Handing over the stick
Offsetting biases	Do-it-yourself
Direct observation (see for yourself)	Local analysis of secondary sources
Semi-structured interview	Mapping and modelling
Seeking out the experts	**Village history** (Community history or Time lines and trend and change analysis
Key probes	Seasonal calendars
Case studies and stories	Daily time-use analysis
Transect walks	**Venn diagram (institutional diagram)**
	Linkage diagrams
	Well-being (wealth) diagram
	Analysis of difference
	Matrix scoring and ranking
	Team contracts and interactions
	Shared presentations and analysis
	Participatory planning, budgeting, implementation and monitoring
	Drama and participatory video-making
	Short standard schedules or protocols
	Immediate report writing

Source: Chambers, 1992; 1997
Note: Methods or approaches with bold letters are described in 4.3.

Table 3.2 Participatory methods for alternative systems of learning and action

Group and team dynamics	Sampling	Interviewing and dialogue	Visualisation and diagramming
● Team contracts ● Team reviews and discussions ● Interview guides and checklists ● Rapid report writing ● Energisers ● Work sharing (taking part in local activities) ● Villager and shared presentations ● Process notes and personal diaries	● Transect walks ● Wealth ranking and well-being ranking ● Social maps ● Interview maps	● Semi-structured interviewing ● Direct observation ● Focus groups ● Key informants ● Ethnohistories and biographies ● Oral histories ● Local histories, portraits and case studies	● Mapping and modelling ● Social maps and wealth rankings ● Transects ● Mobility maps ● Seasonal calendars ● Daily routines and activity profiles ● Historical profiles ● Trend analyses and time lines ● Matrix scoring ● Preference or pairwise ranking ● Venn diagrams ● Network diagrams ● Systems diagrams ● Flow diagrams ● Pie diagrams

Source: Scoones and Thompson, 1994; Pretty, 1995

On the other hand, the table below indicates which RRA tool can be used to collect the information required by forestry framework.

Table 3.3 RRA tools and profiles

Profile / Tool	Context	Activity	Resources	Action
Mapping and modeling	X		X	
Transect walks	X		X	
Seasonal calendars		X	X	
Trend diagramming	X			
Matrix ranking		X	X	X
Well-being ranking			X	
Venn diagram	X		X	
SWOL				X

4 Practical applications of RRA

RRA practice can be sorted into two stages; i.e. preparation for field research and practice of field research (Figure 4.1). The practical process of the RRA practice is described below.

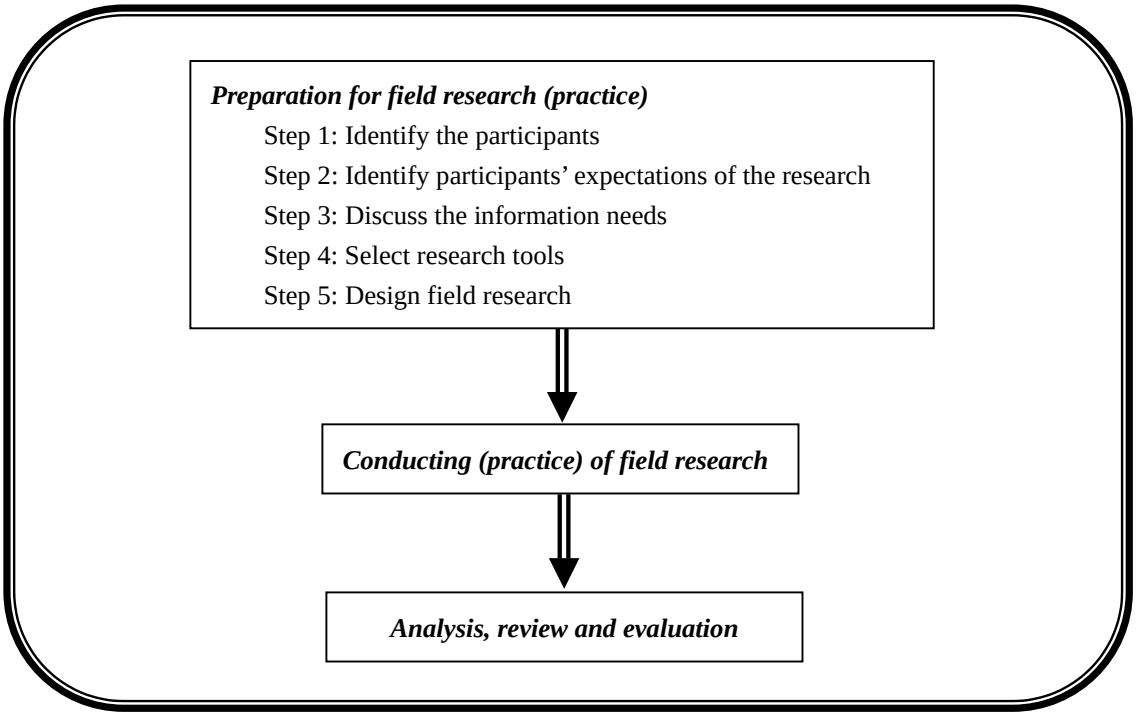


Figure 4.1 Flow chart of RRA practice

Source: adapted from Wilde and Vainio-Matilla, 1995

4.1 Preparation for field practice

Step 1: Identify the participants

The potential RRA/PRA participants include the village women and men (young and old, rich and poor, those with jobs in town, educated people, disabled people, landless people, and so forth), government staff, project staff, business owners, and so on; in short, everyone who is concerned about the development of the case study area (Box 3). The researchers/facilitators are also participants, but with special responsibility to collect, organize and present information.

Box 3 Definition of participants

The participants in the research process include:

- **Villagers** who participate as experts on living conditions in the case study area. They have most of the information.
- **People who work in the area** and who participate as sectoral managers (forestry, agriculture, etc.) or technical professionals who work for the government, private enterprise, or development agencies. They can contribute by linking micro and macro information.
- **The researchers/practitioners** who depend on the other participants for accurate information and who participate by using participatory research tools to collect or organise and present information for discussion by all participants.

Step 2: Identify participants' expectations of the research

Each person participating in the research process will expect to benefit from it in different ways. The villagers may hope that the research heralds some specific improvement in their lives (such as roads, woodlots, schools, health centres, etc.) and the project staff may hope that the research process will increase interest among the villagers to participate in project activities through a better mutual understanding.

Although RRA/PRA can result in changes, these cannot be determined in advance. Through the research process, obstacles to satisfying the concerns of different interest groups are identified, solutions are explored, and some conflicts are resolved as dialogue develops.

During the weeks and even months before the field research begins, the researchers need to speak directly to individuals and groups about their priorities and concerns. By doing so, the researchers can create opportunities for dialogue between the interest groups by inviting all of them to meetings about the research. At the meetings it is important to note who is not talking. For example, in many cultures, women are not invited to village meetings or hesitate to talk even when they are invited. A special effort may have to be made to go to women's homes, or to meet with a women's group to learn their point of view.

Step 3: Discuss the information needs

Using RRA/PRA as a methodology for case study research has implications for both content and process. It is a difficult task to reconcile the requirements of producing a case study with the concerns and priorities of all the participants. Ideally, all the participants or representatives of each group of the case study area should have opportunities to influence the research process by participating in the decision-making on priority issues, research tools, timing, location, and so forth, throughout every stage of RRA/PRA.

Step 4: Select research tools

Using RRA/PRA purposely creates opportunities for participation. Conventional research tools, such as surveys, keep control in the hands of the researchers. With RRA/PRA, in its most participatory form, all the participants share control by using RRA/PRA tools to present their perspectives. For example, when women and men draw separate maps, it is easy to see gender differences in their perceptions of resources, constraints, village organization, etc. Gender disaggregation refers not only to data on what women and men do, but also to how their perspectives differ.

To complement field research, existing information can save time and effort. Although it is sometimes overlooked, existing information provides historical perspective to research and can be helpful to verify field research. For development projects, existing information might include baseline studies, feasibility studies, monthly or annual reports and consultants' reports. For districts and divisions, researchers could use information available from district development offices, district forestry officers and so forth. Other groups such as village committees, women's groups, farmers' groups and so forth, also often keep written records which can be useful for context profile information.

Step 5: Design field research

All the information from the previous four steps must be gathered before designing the field research. The four factors will influence the degree to which it will be possible for the local community, women and men, to participate in the research process (Table 4.1).

Table 4.1 Factors influence field research design

Research team	When possible, include both male and female researchers. Even where no cultural barrier exists to interaction between women and men, women often find it easier to talk to female researchers. This improves the quality of information on differences between the way women and men perceive their lives in the case study area. If the budget allows, an additional researcher with technical or social science expertise is well worth considering. For example, a forester could be consulted if there are no foresters on the training team.
Timing	Schedule the case study research at a time which allows for full participation of the community members. In all rural areas, the life of a community is intimately linked to seasons and the agricultural cycles. For example, there are peaks in labour demand when every capable person is expected to be working in the fields.
Location	The site selection criteria include environmental, social, political and economic factors. If the case study area is large, select small research sites which are representative. The trainees and people who live in the area can help select sites, but a personal visit is best. For example, if an important feature of the case study area is that it is inhabited by three different ethnic groups, a village consisting of each ethnic group should be included in the case study research. This will highlight the interaction among the three groups and their different relationships to forest resources.
Materials	Select documentation materials which make it easier to present the findings for discussion. If maps are drawn on the ground, will they be redrawn on paper or photographed? If researchers draw in their notebooks during a transect walk, how will they share and verify that information with others? If there are recorded interviews, how will the community access the taped information?

Source: Wilde and Vainio-Matilla, 1995

4.2 Field practice

During the participatory practice, researchers/practitioners are recommended to consider the following aspects (Wilde and Vainio-Matilla, 1995; Phuyal (unpubl.)):

Researchers should:

- Give everyone a chance to speak
- Identify people who know about their village and are willing to share their knowledge
- Reach agreement with the villagers on method, time, place, materials, etc.
- Give more preference to the marginalized section
- Probe, check and encourage discussion and debate
- Be patient, not controlling
- Observe and document the information
- Get regular feedback and use the feedbacks
- Promote leadership in the local level
- Provide some incentives
- Make the process fun
- Provide lunch and have lunch together with all the participants.

Researchers should not:

- Overlook the silent participants
- Take on the role of a teacher
- Interrupt an explanation

4.3 RRA tools and how to use them

There are numerous numbers of RRA / PRA tools recognised as shown in Table 3.1 but here some significant tools for projects / programmes related to forest and natural resource management, particularly those which were applied for the JICA Study, are described.

(1) Secondary data collection

An example of information required at the design stage, particularly related to forestry and/or rural resource management project/programme is presented in Table 4.2. This table was developed with an assumption that the project/programme is concerning conservation of natural forest resources by community-based management approach. Although a huge amount of items are listed in the table, it is significant to select minimum items according to objectives and purposes of the survey in terms of allowed time, budget, etc.

Table 4.2 Information required for forest related project/programme at design stage

Data required	Probable sources of information	
	Country, state, district	Project area
■ **Extent, topography and climate**		
● General description	×	×
● Altitude	×	×
● Slope	×	×
● Soil (types, nutritional status, depth)	×	×
● Geomorphology	×	×
● Rainfall (annual, distribution, intensity)	×	×
● Temperature (average, distribution)	×	×
● Water resources		×
● Ground water level		×
■ **Environmental status**		
● Areas of special interest		×
● Existing reserves:	×	
□ Area	×	×
□ Main purpose	×	×
□ Current status	×	×
□ Biodiversity	×	×
● Deforestation	×	×
● Encroachment		×
● Flood condition	×	×
● Soil erosion		×
● Pollution		×
■ **Land use and production data**		
● Past and present human use patterns and management regimes/farming systems		×
● Area of land under different crops	×	×
● Farm sizes		×
● Degree on dependence of population on land-based subsistence income		×
● Production and productivity of different crops		×
● Livestock		
□ Number by kind of animals		×
□ Consumption per livestock unit of grass and tree fodder		×
□ Availability of animal health		×
■ **Data on forest resource production**		
● Forest types	×	×
● Area of forest:		
□ Natural/ planted	×	×
□ Broadleaved/ conifers	×	×
□ Evergreen/deciduous	×	×
● Species distribution	×	×
● Yield in m^3/ha/yr for natural and planted forests by species and type of land	×	×
● Densities of natural and planted forests	×	×
● Age distribution of natural and planted forests	×	×
● Total standing volume		
□ Lumber size		×
□ Small lumber size		×
□ Other		×
● Total annual increment m^3 or ton/yr	×	×
● Other kinds and production of non-timber forest products (NTFPs)	×	×
■ **Consumption of forest products**		
● Fuelwood from:		

□ Stemwood	×	×
□ Branches		×
□ Twigs		×
● Fuelwood as share of total household energy	×	×
● Timber	×	×
● Small timber	×	×
● Poles	×	×
● Pulpwood	×	×
● Other NTFPs	×	×
● Total wood consumption in M ton or M m^3		×
● Wood-using industries	×	×
■ **Costs and prices**		
● Unit costs:		
□ Labour	×	×
□ Equipment	×	
□ Land	×	×
□ Buildings	×	×
● Unit prices:		
□ Fuelwood	×	×
□ Timber	×	×
□ Sawn timber	×	×
□ Small timber	×	×
□ Poles	×	×
□ Pulpwood	×	×
□ Other NTFPs	×	×
■ **Socio-economic status**		
● Population (total, sex ratio, distribution, density, growth rate)	×	×
● Ethnic configuration	×	×
● Culture, customs and taboos		×
● Gender		
● Tenure and rights		
□ Property regimes		×
□ Clarity of boundaries and excludability		×
□ Accessibility		×
● Land distribution		×
● Disputes/conflicts over resources		×
● Local peoples' knowledge on natural resource management		×
● Structure of local institution		×
● History and current status of collective action		×
● Labour (availability, profile)		×
● Income sources and market conditions		×
● Income distribution		×
● Accessibility to credit		×
■ **Institutional status**		
● Presence, activities and relationships with outside agencies (local, national and international donors, NGOs, etc.)	×	×
● Organisation chart of implementing agencies		×
● Staff list, with number, level and salaries		×
● Links between the implementing agency and other agencies responsible for related activities (irrigation, animal husbandry, tribal welfare, NGOs, etc.)		×
■ **Political status**		
● Land law	×	
● Forest law and policies	×	
● National level priorities	×	
● Other relevant development programmes	×	

Source: adapted from Redhead and Hall, 1992; Shepherd and Kiff, 1995; Shepherd, 1996; FAO, 1998; Fukuyama, 1999

(2) Semi-structured interview (Key informant interview)

There are several interview type and settings defined as shown in Table 4.3. Meanwhile, considerable advantages and disadvantages are pointed out between group and individual approaches of interviewing (Table 4.4). Needless to say, taking those aspects into consideration, it is important to judge which approach should be applied for the purpose.

Table 4.3 Interview types and settings

Semi-structured interviews	Open group discussions	➢ Households ➢ Neighbourhoods ➢ Communities
	Focus group or interest group sessions	➢ Resource users ➢ Market women ➢ School teachers village forestry committee ➢ District forest officers ➢ Cattle herders ➢ Wood cutters ➢ Tree farmers
	Accidental or incidental interviews	➢ Traveller passing by ➢ Farmer at the gate ➢ Water carrier at the well ➢ Customer in a tea shop ➢ Ranger on his beat ➢ Trader at the market

Source: Messerschmidt, 1995

Table 4.4 Group versus individual approaches

Group approach	Individual /Key informant approach
Advantages 1. Good for general information 2. Less time required to solicit the views of given individuals 3. Provides an immediate cross-check 4. Generates debate and consensus on village-level issues	***Advantages*** 1. Good for descriptive, specific household level information 2. Information more personal, less general 3. Encourages freer expression than if peers present. Many reveal conflicts hidden in group situation 4. Do not necessarily need an advance appointment 5. Easier for inexperienced PRA practitioner to manage
Disadvantages 1. A few individuals may dominate and exclude the views of poorer, minority or marginalized members of the community 2. Group members need to be carefully selected to avoid bias 3. Information can be too general, how 'things should be' or even misleading 4. Usually needs an advance appointment and start often very delayed 5. Management of larger groups may be difficult	***Disadvantages*** 1. More time (per individual) than group situation 2. Cross-checking of information important 3. Fewer individual's opinions can sought 4. Can be more intimidating for some individuals

Source: Natural Resources Institute, 1995

The semi-structured interview (SSI) is defined as 'Guided conversation in which only the topics are predetermined and new questions or insights arise as a result of the discussion and visualised analyses (Pretty *et al*., 1995)' and has been regarded as the core of good RRA and it can retail having a metal or written checklist, but being open-ended and following up on the unexpected. Increasingly it is using participatory visual as well as traditional verbal methods, and eliciting local people's checklists in place of those of outsiders (Chambers, 1997).

Further information on SSI include below.

Description	Semi-structured interviewing appears informal and conversational. It is a well defined and systematic activity, with a set of clearly defined goals and guidelines. Unlike structured or formal interviews, SSIs concentrate not only on the questions asked, but also on the context in which the interview takes places.
Purpose	It helps collect both quantitative and qualitative data/information as well as it gives local people the important opportunity to express themselves.
Process	There are seven core components to semi-structured interviewing: 1) team preparation, 2) interview context, 3) sensitive interviewing, 4) sensitive questioning, 5) judging and cross-checking responses, 6) recording the interview, 7) self-critical review.
Information covered	◆ General features on livelihood and land use including agriculture, forestry, marketing, etc. ◆ Problems, constraints, advantages and disadvantages *(also see Table 4.2 which provide ideas on what information would be required for the survey)*

Source: adapted from Pretty *et al*., 1995

There are two important rules standing out for the SSIs (Pretty *et al*., 1995):

i) do not interrupt some one else (team member or local participant) during his/her turn at interviewing or probing for information, or answering a question, or pursuing a discussion
ii) do not assume that you know the answer or that somebody is wrong about something.

A partial list of protocols for SSI is given in Box 4.

Box 4 Suggested protocols for interviewing

Preparations

Each day's interview begins by selecting sub-topics be explored...
Each team member pursues a sub-topic, following one's own line of questioning and reasoning...

Rapport

Be sensitive to time and place (season, work activities, customs)...
When entering a site and engaging villagers, team members carefully establish rapport by keeping a low profile; begin with polite introductions, explain purpose of the visit and choice of interviewees...
In discussions, never promise any benefits or assurances...
Conclude interviews politely, exit gracefully; thank the people...

Interviewing

A facilitator (from the team) controls the interview process (be flexible and sensitive); signal start, fill gaps, know when to stop...
The order of interviewing (who starts, follows, finishes) is pre-determined; members take notes during each other's turns...
Team members do not interrupt discussions or another's questions...
Hold unanticipated questions that arise out of turn for later...
Intruders (drunks or trouble-makers) are politely diverted by a team member (as gate-keeper or guard) who temporarily loses a turn...

Field-based analysis

After each interview, the team should caucus (away from informants) to make fine notes; ie., note down details easily lost if not recorded immediately, identify missing data (go back to informant), note modifications in style/format, before moving to next interview...
After each day's sessions, team members debrief as a group, discuss findings, research style, problems, plan next day's session; thus the initial analyses accomplished in timely fashion, on regular basis...

Source: adapted from Na-Lampang, 1990; Pretty *et al*., 1995

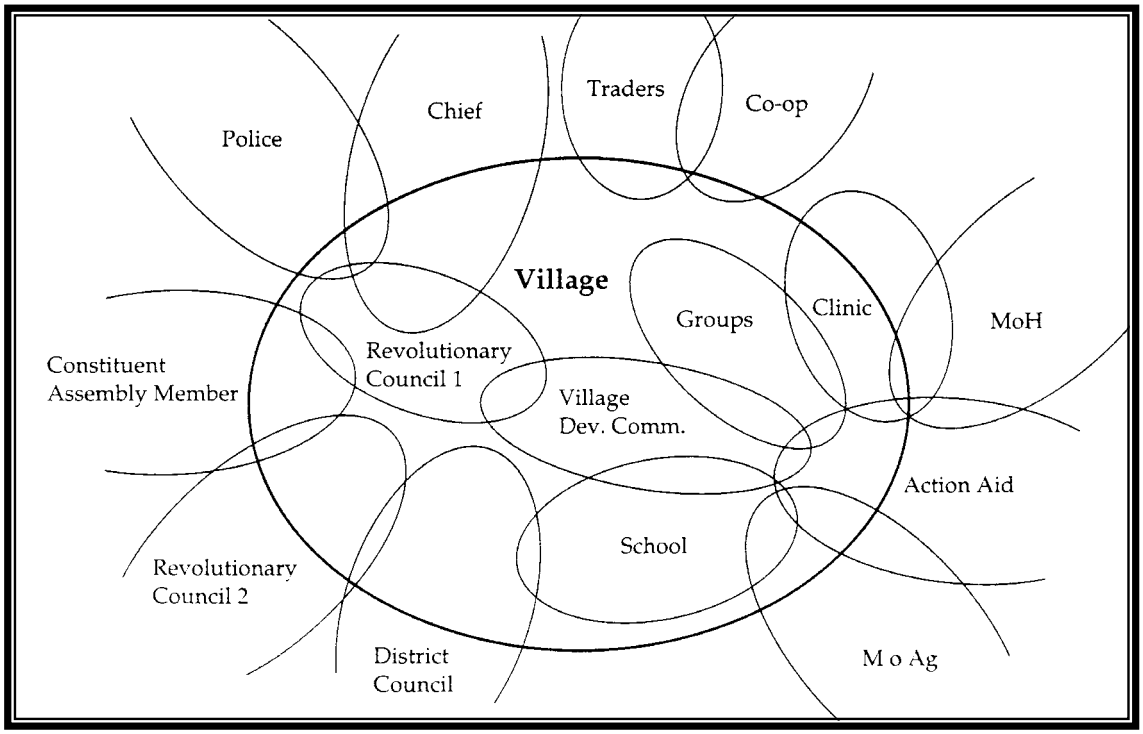
(3) Venn diagram (Institutional diagram / Chapatti diagram)

Description	A diagram which shows the presence of external organizations and individuals and how they relate to the community.
Purpose	It shows which institutions are present, work with, or are in some way related to the community. This exercise allows development workers to promote good interinstitutional coordination for a rational used of resources.
Process	**Step1:** Become acquainted in advance through key informants with the names of the community's organizations prior to using the tool, to have an idea of what exists and to know when a focus group has omitted a particular organization from its discussion. **Step 2:** Divide the group by gender, age, ethnicity, organization or by whatever other grouping in appropriate. The tool also be applied without dividing people, as for example at a local neighbourhood meeting with representatives from resident households. **Step 3:** Ask each group to determine criteria for the importance of an organization and to rank them according to these criteria. Let the participants write the name or put a symbol on the appropriate circle or square. Do not ask them to list all the organizations in the community. Rather, let them note the associations that they think of because those will be the organizations that are the most relevant to them. The size of the circle or square should correspond to the importance of the organization. Allowing the participants to decide on criteria will reveal why organizations are important to them. However, the tool can also be used to understand how people rate internal and external organizations according to predetermined criteria (e.g. an organization's contribution to community welfare; bringing material wealth; empowering women, the poor in general or a specific ethnic group; or providing opportunities). **Step 4:** Ask participants to arrange the shapes on the paper so that they overlap according to whether the organizations are linked in some way to each other. Depending on the group, the diagram can be used to represent not just linkages but the degree to which each organization is linked to another by how much the shapes overlap. Note the types of linkages. Ask how the organizations work together. Some organizations may not work together or have any type of connection. A gender disaggregated institutional diagram can clearly portray gender bias by outside institutions if, for example, a group of women show no connection whatsoever between their organizations and outsiders. Diagrams can also show a presence or an absence of linkages between men's and women's organizations. A more simple method is to place the internal organizations within a circle representing the community and the external organizations outside this circle. Ask participants to overlap the internal organizations and to draw lines of different widths to indicate interaction between internal and external organizations. Similarly, arrows of different widths or colours can be used to represent the degree of influence that each exerts on the other. This is also a way to situate oneself (as an outsider) within the diagram. If an outsider is interested in strengthening the capacity of community organizations, the diagram is useful to help the outsider to choose potential partner organizations.

	Step 5: Invite discussion about the role of institutions in the community's development. Ask a representative of each local group to describe the activities of their associations. Questions to ask each representative include: ● What is the history of the organization? How and why was it founded? ● What has its relationship been with other organizations within the community? ● What relationship does it have with external organizations? ● How does the group perceive the various external organizations? ● What actions have external and internal organizations taken together? ● How do the participants perceive the services brought by external groups? ● How long have the internal organizations had relations with external groups? ● Who is involved in each organization? Who is excluded? Why? ● Who does what? Who takes responsibility for what? ● Who leads the group and makes decisions? ● How are decisions made? ● According to the members, how well does the organization function? ● Does the group have a revenue source? How is revenue used? ● Are the organization's decision-making processes and resource management methods transparent? ● How are leaders chosen? ● Have the leaders or members had any (management) training? Was it usetb1? How? ● What does it contribute to the community? ● How is information transferred? Is it done well? ● How has the institution evolved over time? ● How do the members hope it will be in the future? ● What are the strengths and weaknesses of the organization? ● What are its successes and failures? ● What specific problems has the organization had? Why? How were they overcome or how do the members plan to overcome them? ● What is the degree and range of participation of women and men in community organizations? **Step 6:** Bring the groups together and discuss the similarities and differences between the diagrams of the various groups. Ask participants to point out: ● How do the diagrams from the groups differ? ● Why are they different? ● What organizations are more important to men and women (the young, the elderly, the poor, the wealthy)?
Information covered	◆ Names of the individuals or organizations within and outside the community ◆ Prominent figures in the community ◆ Description of the relationship between / among individual leaders, organizations and others ◆ Power structures

Source: adapted from Slocum *et al.*, 1995; Wilde and Vainio-Matilla, 1995; Selener *et al.*, 1999; Phuyal (unpubl.)

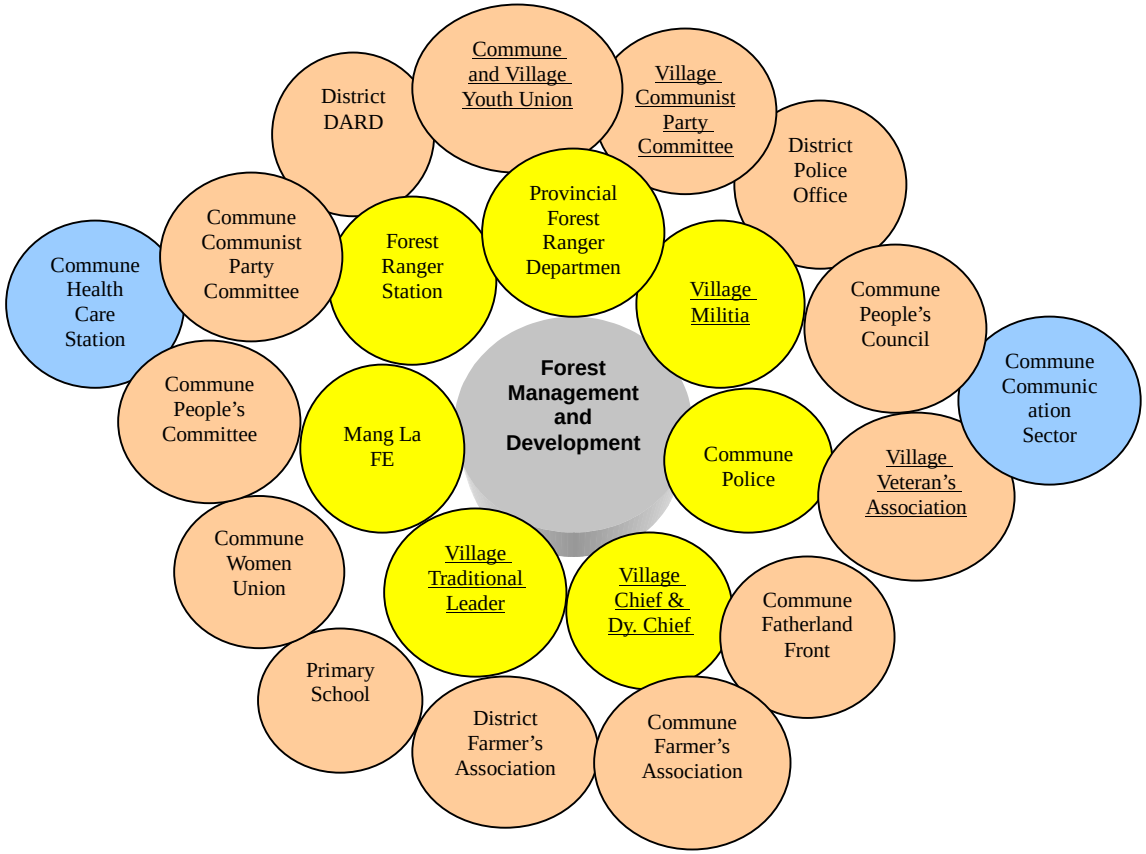
Source: RRA in Kon Plong District, Vietnam, 2002



Source: Natural Resources Institute, 1995

Venn Diagram

– Important organizations and actors concerning forest management and development in Kon K Tau Village (No. 3), Po E Commune –



More important
- Mang La FE
- Forest Ranger Station
- Provincial Forest Ranger Department
- Village Militia
- Commune Police
- Village Chief and Deputy Chief
- Village Traditional Leader
Less important
- Commune People's Committee
- Commune Communist Party Committee
- District DARD
- Commune and Village Youth Union
- Village Communist Party Committee
- District Police Office
- Commune People's Council
- Village Veteran Association
- Commune Fatherland Front
- Commune Farmer's Association
- District Farmer's Association
- Primary School
- Commune Women's Union
Least important
- Commune Health Care Station
- Commune Communication Sector

* Underline indicates the village level organizations and entities
* The order does not indicate the ranking

Source: RRA in Kon Plong District, Vietnam, 2002

(4) Village history (Community history or Time line)

Description	This helps understand major recollected events in a community with approximate dates, and discussion of which changes have occurred. This has been found to be a good icebreaker for participatory exercises.
Purpose	It reveals the most important events of the community's history and how these influenced its development.
Process	**Step 1:** A meeting is called in which groups of different backgrounds and perspectives (both young and elderly, women and men) are brought together to share the community's history. Initially the team ask oldest people about what are the main events that has occurred during over lifetime but they can start at any point. **Step 2:** Then the team prepare a list of events and the probable occurrence date and alongside the team can further probe and ask what all did and what happened. This comes up with various actions and its effectiveness. This process or format can follow to share the information with the help of timeline tool. Some questions to be asked include: ● What changes have occurred in your life in the following categories? ➢ Access to resources (land, water, information, credit, education, etc.) ➢ Control of resources ➢ Decision-making at the individual, household, community or organizational level ➢ Personal self-esteem and confidence ➢ Control of your own revenue ➢ Control of your time ➢ General workload ➢ Standards of behaviour for 'good' women and 'good' men ● Have these changes been positive or negative and why? What changes in these categories do you hope for? **Step 3:** Discuss changes that participants hope for or think possible. Some questions cover: ● What would you do if you had more time (because you did not have to do a particular task)? ● How do you hope your children's lives will be different from yours? ● Are there specific resources you hope to have access to or to own in the future? Why and how will you gain access? ● What responsibilities would you like to have? Which ones would you prefer not to have? ● What would you do if there were intervention by the government or an aid organization? ● What would you do if there were political, economic, social or environmental change? ● What would happen if plant, animal, technology or other resource were introduced? ● What activities do you think women or men will have in the future?

Information covered	◆ Community's founding date and founders ◆ Historical events tool place locally or in national level which affect in the community such as flood, fire, epidemic, establishment of roads, health centres, etc. ◆ Dates of events ◆ Effects of that events and so on

Source: adapted from Slocum *et al.*, 1995; Selener *et al.*, 1999; Phuyal (unpubl.)

Source: RRA in Kon Plong District, Vietnam, 2002

Village history and changing conditions of forest and natural resources in Kon K Tau Village (No. 3), Po E Commune

Year	Event	Impact on the community and environment
Long time ago	- Village established in current area and called Tu Mu land.*	- Village was named Kon K Tau on the day of establishment.
French occupation	- Route 5 (now renamed R 24) was constructed.	- Access to the national road was established.
Before 1945	- Small pox (Di Me) outbreak.	- Approx. 50% of villagers died.
Before the war	- Tigers, elephants, bears, deer, wild pigs, gibbons and other wilds were observed in the forest.	
1963	- Americans and its set up government occupied the village	- Villagers escaped into the forest - Houses and rice storages were destroyed, and livestock were killed by American army.
1965	- American army sprayed Dioxin along the road, rice fields and upland fields.	- Forest, trees and crops (cassava and maize) were destroyed. It took 4-5 years to recover, and there still remain denuded hills.
1968	- Route 5 was upgraded by the Americans.	- Better access to national road.
1963-75	- Period of brutal war.	- 7 villagers died.
1972-75	- Lack of food, as villagers had to contribute to the soldiers.	
1975	- End of war. Villagers returned to the residential area.	- There were only 50 persons. They started to redevelop the village.
	- Approx. 13 ha of paddy field belonged to the village. People from other villages came to support the people in the village in the production work.	- Average land holding is calculated at 0.26ha/capita.
	- The government collected all guns used for hunting.	- Hunting of big forest animals stopped.
1976	- Route 5 was upgraded by the Vietnamese government.	- Transportation became more convenient.
	- Agricultural Production Cooperation was formed.	- The Union co-ordinated labour exchange among households for production work.
1977	- Commune primary school was built (bamboo and thatched roof) adjacent to the village.	- Children were able to attend primary school.
1984	- Heavy rain resulted in flooding and soil erosion in September.	
1989	- Agricultural Production Cooperation was dissolved.	- Difficult for villagers to maintain livelihoods. - The Union chief became the village chief. Labour exchange was co-ordinated by the villagers themselves.
1991	- Rural access road was improved (from footpath).	- Cars are able to access the village.
1996	- Commune primary school was improved.	- Study environment for children was improved.
1997	- Heavy drought.	- Loss of harvest.
	- Commune health care station was constructed adjacent to the village.	- Villagers have better access to health care facility.
	- Commune People's Committee Office is constructed.	- Better environment for administrative work.
1998	- Animal epidemic outbreak.	- Most livestock died (pigs, buffaloes, and chicken).
	- Clean water supply system was constructed in the village under program 135.	- Villagers have access to clean water.

Year	Event	Impact on the community and environment
Before 1999	- Forest was not strictly managed.	- Slash and burn activities were freely conducted to make milpa/kaingin.
1999	- The FE contracted forest to households for protection.	- Villagers welcomed the revenue from the FPC and their income increased.
	- Restriction of cultivation in the forest was enforced. (Before the restriction, villagers could freely slash and burn in the upland area).	- Before the restriction was enforced, there were around 2-3ha of slash & burn upland farm area, which was cultivated in 2-years rotation cycle.
	- Sale of timber was prohibited.	- Villagers do not sell timber. Even before, they did not sell timber because access to the forest was difficult.
	- The 1st hydroelectric station was built in the village.	- Electricity for lighting was supplied.
2000	- Route 5 was paved asphalt and renamed R 24.	- Transportation was improved. However, no compensation was paid to the villagers (supposedly there were some paddy fields that have been affected when the road was improved/widened).
	- Construction of the new health care station started.	- Environment for health care was improved.
2001	- Nuoc Rang dam was constructed under program 135.	- Approx. 3 ha of paddy rice field was irrigated.
	- Introduction of new rice variety by DARD.	- Results unknown yet.
	- Introduction of oranges for home gardens by DARD.	
	- Commune secondary school was constructed.	- Students can attend secondary school in the commune.
1991-2001	- Suffer from lack of food.	
Present	- The food shortage is not too serious, except for the poor households.	- Average land holding is calculated at 0.07ha/capita. (About 27% compared to 1975).
	- Elephants are not observed in the forest.	
	- Tigers, bears, deer, wild pigs, and other wild animals are still observed, but the number has decreased significantly.	
	- Only the footprints of tigers (but not the animal) are observed in the forest.	
	- Not easy to observe gibbons.	

Note: * The name of the land is 'Tu Mu,' and the name of the village is 'Kon K Tau.'

- New variety of pig was introduced to the village from Quang Ngai Province but the villagers do not remember when.
- Some of the denuded hills around the village area had been bare for a long time, even from before the war (i.e., not due to the agent orange).
- Generally, the villagers perceive that the forest has recovered over time. Some of the denuded hills have been covered by trees (some afforested, some naturally regenerated).
- Generally, the villagers perceive that their lives have become better recently, as some of the villagers are able to own motorbikes and TVs.
- Villagers perceive that land is becoming scarce as the population of the village has increased compared to the past.

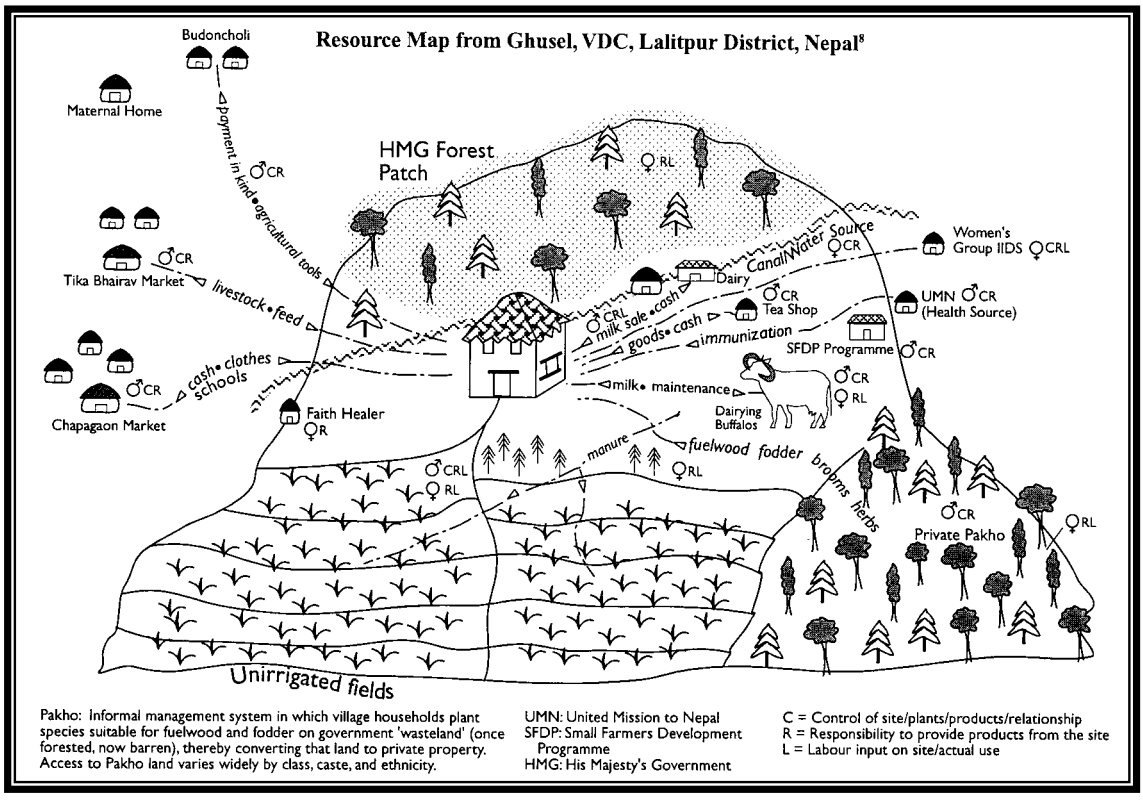
Source: RRA in Kon Plong District, Vietnam, 2002

(5) Resource map (Community map or Social map)

Description	In most heterogeneous societies a number of hierarchy (or caste), ethnicity, social and economic groups are there. It is important to understand the stratification of the communities both in terms of resource and their access and distribution. Understanding on social structure in community is crucial in order to carry on the development activities that aim the empowerment of marginalized section. Moreover, it can generate various information such as household number, population size, literacy number, cattle number, etc.
Purpose	It gives an idea of what the community looks like by identifying the infrastructure, existing resources, the boundaries of the community and other physical characteristics.
Process	Initially a general introduction of the objectives of the exercise must be given. Then the villagers should be encouraged to draw a map of the village. In order to encourage, the facilitator should initiate first to draw. Then every effort must be given to hand over the stick, the map is usually drawn in the common ground using local materials for representation as much as possible. This ensures interest and encourages participation of the community. Constant effort must be given to get women and children's perspective or separate maps can be drawn as well. Some questions to accompany the diagramming include: ● Who has access to the particular resource? Why? ● What are the terms of access? ● Who owns or controls it? ● Who uses it or works with it? ● What are the family's formal and informal credit sources? ● Who has access to credit? Why? How much? ● What are the primary sources of income? ● Who is responsible for which household expenses? ● Where are products sold? ● Who produces them and who sells them? ● What inputs are used? ● What are the sources of these inputs? ● Who exchanges what with whom? ● On whom do the households/communities rely for support? What support? ● Who in the community is not part of any exchange networks? Why?
Information covered	◆ Existing social objects in the community; e.g. houses, road, path, temple, church, school, tap stand, well, farm, forest, grazing land, pond, health center, etc. ◆ Population: male, female, different age group's male and female, number of sick people, number of contraceptive using population, number of pregnant mother, disable, victim of chronic disease, education status, literate number, etc. ◆ Available of resources and its uses, and those users

Source: adapted from NRI, 1995; Slocum *et al.*, 1995; Selener *et al.*, 1999; Phuyal (unpubl.)

Source: RRA in Kon Plong District, Vietnam, 2002

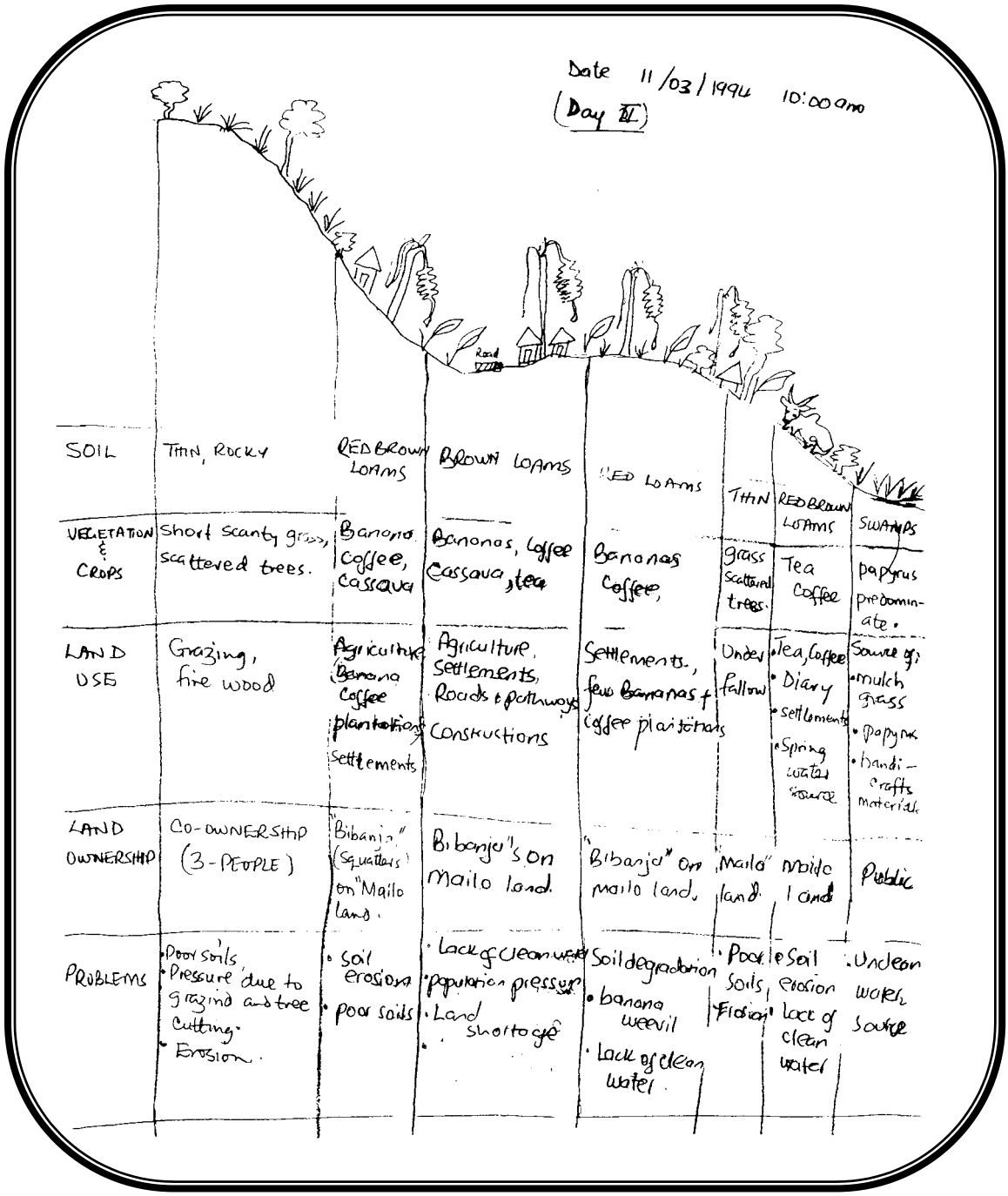


Source: Slocum *et al*., 1995

(6) Transect walks (Community transects)

Description	Systematically walking with key informants through an area, observing, asking, listening, discussing, learning about different ranges / zones and seeking opportunities. The findings are mapped on a transect diagram. Most transect walks result in the outsiders discovering surprising local practices.
Purpose	To demonstrate the importance of going in person (as a team) to observe and talk about things of local importance
Process	**Step 1:** Take key informants and have a transect walk throughout the village. Basically better to follow the 'U' shape for walk in order to have deeper understanding about the area, however, there are many forms: vertical, loop, combing, along a watercourse. **Step 2:** select a group of about six to ten people representing a cross-section of the community. Look out on the landscape from an overlook point with local people to choose a representative path. **Step 3:** If necessary, ask the group to divide into observer teams for; e.g. soils, cropping patterns, and farm size; water points, slope and drainage; and socio-economic indicators. Encourage the groups to make general observations even if the topics overlap. **Step 4:** During the walk, take time for brief and informal interviews of local people in each of the ecological zones. At the these open-ended interviews, focus on such resource issues as soil management, land tenure, access to and availability of water, fuelwood problems or others that local people identify as issues of concern. Interviewers should ask questions but let local people steer the discussion and ask questions of group members. **Step 5:** At the end of the exercise, compile field notes and construct a landscape/land use profile (transect diagram). The information from the interviews can also be used later to help determine problems and opportunities.
Information covered	◆ Aspects on ecological niches; e.g. soils, land uses, vegetation, crops, livestock ◆ Aspects on natural resource conservation and management; e.g. water management, infrastructure, local technologies, introduced technologies ◆ Others; e.g. problems, solutions and opportunities

Source: adapted from Mascarenhas, 1990; Chambers, 1992; Pretty *et al.*, 1995; Slocum *et al.*, 1995; Chambers, 1997; Selener *et al.*, 1999; Phuyal (unpubl.)



Source: Barna, 1994

(7) Well-being ranking (Wealth ranking)

Description	This helps identify groups or cluster of households according to relative wealth, well-being or ill-being. The key indicators are set by the respondents themselves to categorise the households into different socio-economic categories. Various ways of well-being ranking process can be found.
Purpose	It identifies different socio-economic groups in the community according to how they themselves perceive their different levels of well-being. This exercise helps prioritise development actions which fit the needs of each specific group.
Process	There are two ways; i.e. mapping method and card method. <u>Mapping method</u> 1. First, respected members of the community define the well-being criteria according to how they perceive the community's own cultural, social, and economic context. Some of the indicators which might be suggested to help define the criteria are: amount of land owned, number and type of animals, access to credit, family structure, level of food security, number of children, level of schooling, etc. 2. A community map is drawn indicating all the names of each household. It may be useful in this case to use the original community map prepared by other tools; e.g. Venn diagram. Missing household names can easily be added. 3. To finish the exercise, a group of community leaders rank the families on the map according to the established levels of well-being. <u>Card method</u> 1. Prepare a number of cards equivalent to the number of households in the community. 2. Write on each card the name of a household (one household per card). 3. Write on a separate piece of paper each well-being criterion. 4. Group the household cards in rows or piles which correspond to different levels of well-being. The well-being category can also be written on each household card, below the household name.
Information covered	◆ A list of all the households/families in the community ◆ Well-being criteria and indicators defined by the community ◆ Classification of each household in their corresponding level of well-being
Notes	Since the exercise deals with delicate and private issues and requires a high degree of trust between the facilitating team and the community, it is recommended that this exercise be facilitated after the other themes have been completed.

Source: adapted from Chambers, 1997; Selener *et al.*, 1999; Phuyal (unpubl.)

Source: RRA in Kon Plong District, Vietnam, 2002

Well-being ranking in Kon K Tau Village (No. 3), Po E Commune (Classification by Men and Women)

	Men's	Women's	
Poor Household	- Lack of food for 3 months. - 1-2 sao of paddy field. (Lack of farming land) - 0.5 sao of upland farm. - No buffalo, no pig, no chicken. - No beds (able to prepare their own mats). - Clothes are not enough. - Possible to send children to primary school. - Have many children but lack main labour force. - House is made of bamboo or wood with thatched roof. - Lack of money to buy fertiliser.	- Lack of food over 3 months. - 1-2 sao of paddy field. - Small paddy areas and poor soil quality. - No buffalo, chicken, or pig. - Lack of bed, mat, and blanket, mosquito net. - Lack of clothes. - Possible to send children to primary school only. - Many children, but lack labour force (6-7 people/HH). - Wooden house with thatched roof (bad quality). - Lack of kitchenware.	- Small area of home garden and few plants. - Lack of good knowledge and skills of small business. - Often people are in bad health condition. - Some households are not active in farming work. - Not enough food to feed children.
Moderate Household	- Just enough food for consumption. - 3-5 sao of paddy field. - Almost 1 sao of upland farm. - 1-2 buffaloes. Pigs and chicken. - 1-2 beds. - Enough clothes to wear. - Possible to send children to lower secondary school. - Wooden house with iron or tile roof. - Lack of money to buy fertiliser.	- Lack of food for 1-2 months. - 3-4 sao of paddy field raked by buffaloes. - Soil of paddy field is not very good. - 1-2 buffaloes, pigs, and chicken. - Enough beds, mats, mosquito nets, and blankets. - Enough clothes but not good in quality. - Possible to send children to class 5 and over. - Wooden house with thatched roof (good quality) or tile roof. - Enough kitchenware. - Work harder and diligently than poor households.	- Take better care of livestock and farming work. - Enough money to employ people to do farming work for them. - Many relatives support them in their farming work (they have less people in their households, but have support from relatives. They pay money or provide rice to the people who support them.) - Own bicycles. - Makes mats and baskets for sales.
Fair Household	- Enough food all year around. - 5-6 sao of paddy field. - No upland farm. - 3-4 buffaloes, pigs and chicken. - Enough good beds. - Enough good clothes. - Possible to send children up to university level. - Wooden house with tile roof. - Have TV and motorbikes. - Enough money to buy fertiliser.	- Little more than enough food for consumption. - 4-5 sao of paddy fields raked by buffaloes. - Owns larger area of upland farm. - 3-4 buffaloes, pigs and chicken. - Enough bed, mats and kitchenware. - Enough clothes in good quality. - Sends children to lower secondary school in Kon Plong District. - Wooden house with tile roof. - Works more diligently and paddy productivity is higher.	- Paddy field is near water source and receives enough water for irrigation. - Soil quality is better. - Enough money to employ people to work for them in their paddy field. - Many vegetables and fruit trees in home garden. - Some households have Gong and Che (bottle). (4 households) - Make mats and baskets for sale. - Have motorbikes and bicycles.

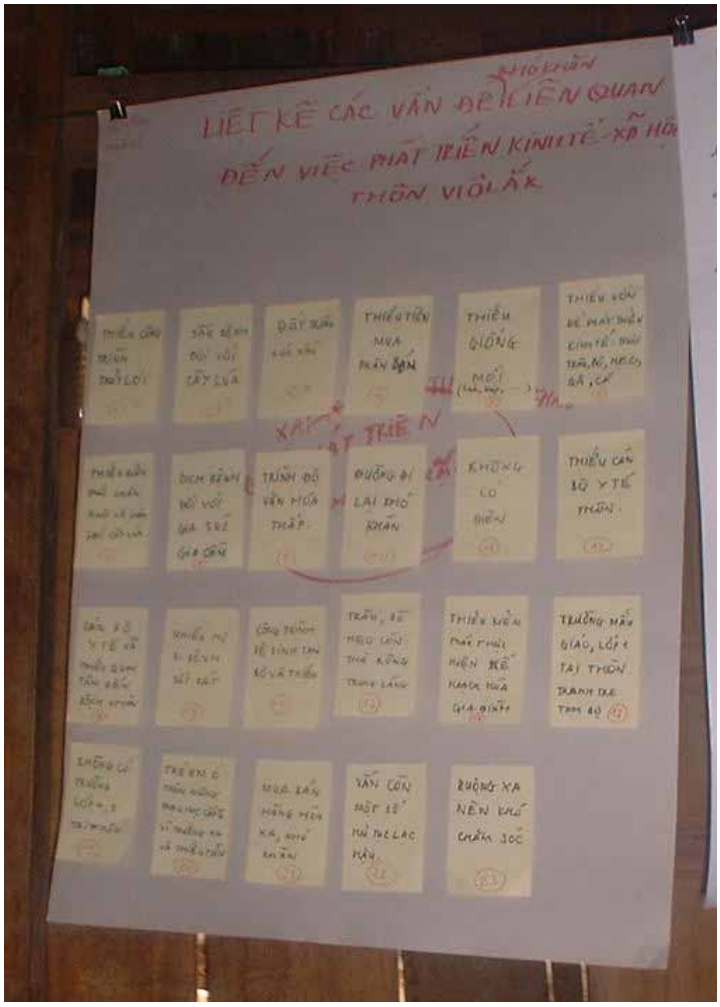
Note:
- Men's group responded that there are no rich households in this village.
- Currently 1 child is studying in Kon Plong District and 2 children in Hieu Commune for lower secondary school. Kon Plong District School is a boarding school, and children receive allowance for meal and clothes. Hieu Commune School is not a boarding school, and they do not receive allowances. Both schools do not collect school fees.
- The size of land depends on the number of main labour force in the household. Poor households tend to have limited number of family labour, so they can only open (and cultivate) small area.
- Women's perception was that the size of upland farm is not a criterion for poverty.

Source: RRA in Kon Plong District, Vietnam, 2002

(8) Problem ranking

Description	This is a ranked list of the most important problems identified by the community. Later in the process of RRA / PRA, those identified problems are analysed.
Purpose	It identifies which problem the community feels is the most important.
Process	There are two methods applied for this tool; the card method and bean method. Card method A quick and simple way is to ask each participant to vote individually. The facilitator can hand out to each participant a card on which she/he ranks three or four problems. The votes are then counted and the problems are ranked. By this stage, all the participants have the opportunity to individually identify the problem more concretely. Bean method Sometimes the use of a voting mechanism requiring reading and writing does not work well in communities due to illiteracy. However, voting can be done using pictures, symbols or colours to identify the opinions, and by using non-literate methods for the voting or ranking. The bean method can be used in problem ranking with illiterate communities and it has the added advantage of revealing gender differences of opinion. In this method, each problem identified in the previous exercise is graphically represented on sheets of paper laid on the ground. Each participant is then given four different types of bean with one type of bean signifying the most important problem, another the second most important problem and so on. Women can be given different coloured beans from men. The participants are then asked to put the beans under the four problem they feel most important on the sheet. Once the voting finishes, the facilitator counts the beans and organizes the response on a sheet of paper.
Information covered	◆ Simple and concrete statement of the problems as ranked by the community

Source: adapted from Chambers, 1997; Selener *et al.*, 1999



Source: RRA in Kon Plong District, Vietnam, 2002

Problem ranking in Kon K Tau Village (No. 3), Po E Commune

Ranking	Moderate/Fair Group	Poor Group	Combined
1	Lack of medicine for treating and preventing human diseases.	Paddy field is enough but soil is poor.	Villagers' educational level is low.
2	Lack of production tools.	Paddy field often gets plant diseases.	Income opportunity is limited.
3	Animal epidemics break out frequently.	Part of paddy field lack water for irrigation.	Lack of medicines for human diseases.
4	Lack of animal breeds with high productivity.	Many families have many children, but lack family labour force.	Lack of land to expand paddy field and agricultural production.
5	Lack of plant varieties with high productivity.	Villagers' illiteracy rate is still very high.	Lack of technical staff to give instruction on productive activities.
6	Lack of food (vegetables, meat, fish).	Lack of suitable plant varieties and animal breeds with high productivity.	Lack of veterinary staff.
7	Lack of new land suitable for producing rice/cereal.	Animal epidemics break out frequently.	Animal epidemics break out frequently.
8	Not enough roofing materials.	Lack of knowledge on rice cultivation and livestock.	Lack of roofing materials (iron roof).
9	Lack of water for irrigation.	Lack of water resource and irrigation for extending paddy field.	Lack of agricultural tools (Big axe, rice threshing machine, etc).
10	Lack of electricity.	Lack of money to buy fertilizer, pesticide, veterinary medicine.	Irrigation system is not completed/sufficient.

Problem related to agriculture.

Problems Ranked Below No. 10

Moderate/fair group

- Population density is high in residential areas.
- Transportation means do not meet demands and the income levels.
- Lack of fertilizers.
- Villager's knowledge as well as management capacity is weak.
- Productive labour/work is still simple.
- Weather is uncertain and affects agricultural activities.
- Lack of money to buy buffaloes to rake paddy.

Poor group

- Lack of money to buy tile and steel for roofing.
- Children often get sick and lack money to buy medicine.
- Animals often destroy crops in *milpa/kaingin* (upland).
- Not enough money to send children up to secondary school and above.

Combined

- Water pipes for rural clean water system in the village are often damaged.
- Hygiene conditions in village are still poor and lack sanitation systems.

Problem Related to Forest Management and Development

- Forest in the areas of provincial joint border (with Quang Ngai province) is difficult to protect from illegal logging by outsiders.
- Co-ordination between the forest rangers of Kon Tum and Quang Ngai province is not very good.
- Reforestation/afforestation on the bare hills is still difficult. (Many trees planted several years ago have died.)

Source: RRA in Kon Plong District, Vietnam, 2002

4.4 Practical applications of RRA/PRA and the outputs to a project/programme

Sequence of tools applied for RRA/PRA is one of the most significant issues. Figure 4.2 presents the flow of objectives and tools of RRA/PRA which was adapted in the initial 'exploration' stages of an agricultural project when it is vital that the outsiders (practitioners) spend time for learning as much as possible about the local farmer's environment (NRI, 1995).

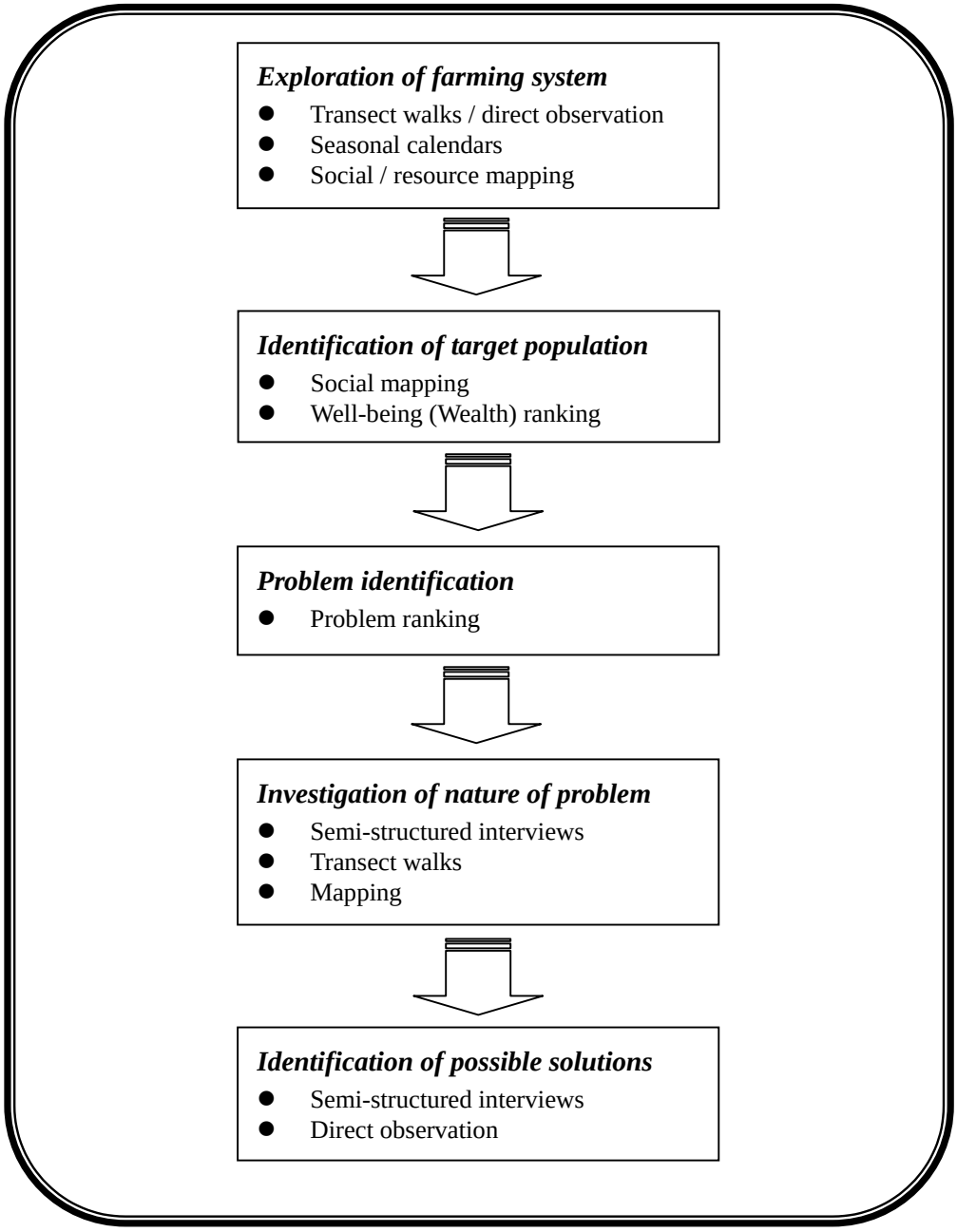


Figure 4.2 PRA techniques used by ACTIONAID Farmer Participatory Research Unit to identify researchable issues

Source: NRI, 1995

In the meantime, there is an example showing the flexible response on the sequence of the PRA practice. Figure 4.3 indicates how the PRA tools were used in a practice and the contrast with Figure 4.2 presents a meaningful suggestion on the process of practices.

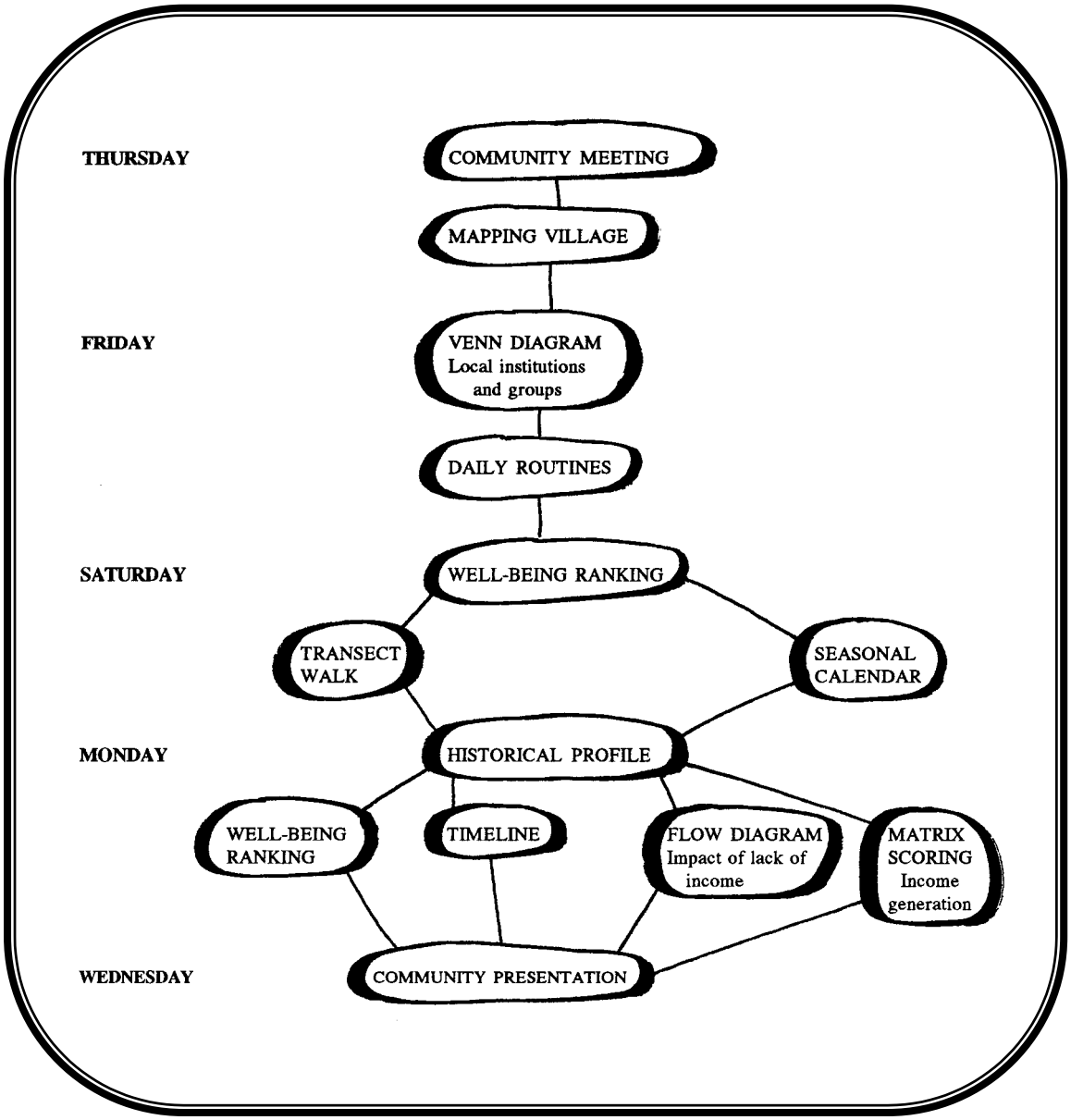


Figure 4.3 Sequence of PRA practice with older and married women's group in Kyakatebe, Uganda

Source: Barna, 1994

On the other hand, the practitioners or project managers are required to manage a project/programme applying RRA/PRA methods in terms of the use of outputs of the RRA/PRA practices. Figure 4.4 demonstrates an example on how the RRA/PRA practice would be arranged for selecting feasible sites for a social forestry plan. Although collaboration with public agencies has not been mentioned so far in this manual, it is very important since the Forest Department in a district/province, for instance, is always a part of stakeholders and a project/programme cannot be achieved without the co-operation by the department.

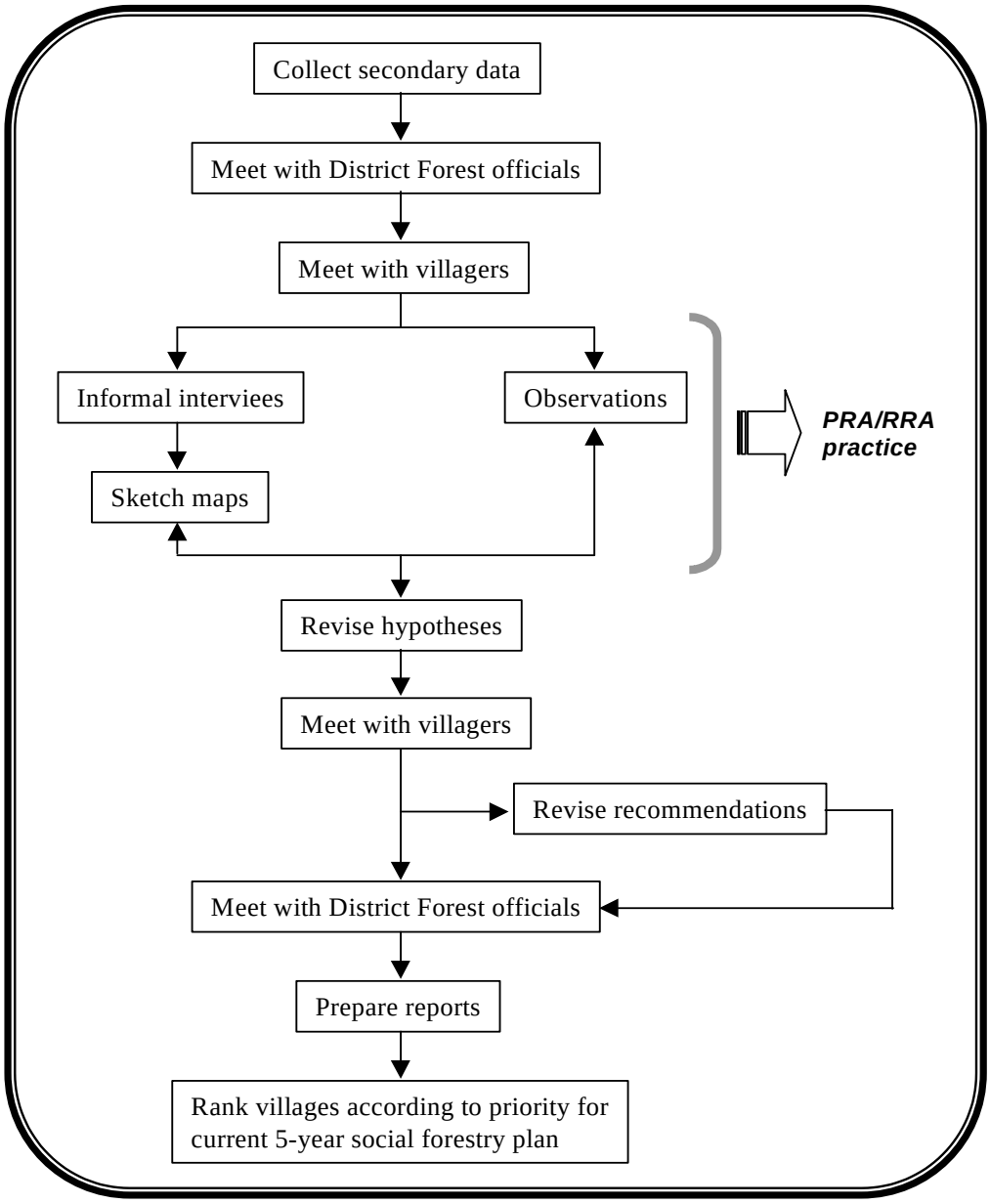


Figure 4.4 Using RRA/PRA methods to identify recommend sites for social forestry projects

Source: adapted from Direksi Perum Perhutani, 1989, quoted in Fox *et al*., 1990

5 Analysis, review and evaluation of RRA/PRA practice

After RRA/PRA practice, the outputs are to be analysed, reviewed and evaluated in order to prepare a final report.

5.1 After research (survey): some critical questions

The following is aspects to be respected when starting analysis, review and evaluation on the survey results and these are common consideration for any socio-economic related surveys (Pratt and Loizos, 1992).

(1) Ethical use of information

Can the data collected be used in any way to harm the interests of those who provided it? Must access to it be restricted to protect informants? Have any informants' identities been revealed, where it would be wiser to keep them anonymous? Who 'owns' the information? Is it clear whether the people who collected the information own it, or the subjects of the research, or the commissioning agency who paid for the research? Whatever the contractual obligations of the researchers and their employers, there is also an ethical dilemma over the use of the information obtained from a 'subject' population. There is as yet little or no protection for people who may have unwittingly supplied information about their livelihood. Data protection legislation is still in its infancy.

(2) Access to research

Traditionally a great deal of research was carried out by universities and other research centres and was in theory at least accessible to all who wished to consult the published results. Gaining access to university libraries tended to need an academic sponsor, but the intention of the researchers was to make information available through publications. Recently the trend has been increasingly towards commissioned research, and more research is now classified as confidential because it is carried out within the confines of programme cycles and refers to the individuals managing these programme. Because of a change in the economic and political fortunes of independent researchers many of them now carry out research as consultants, reinforcing the tendency to make material the property of the commissioning agency. It is perhaps understandable that agencies will withhold information if they feel that its release could cause damage. Sometimes people will hold back from being honest if they are aware that what they write will be publicised, especially where management and decision-making processes are

included in the research or evaluation being carried out. It is to be hoped that agencies seek to establish guidelines which are neither too restrictive in making information less accessible nor compromising in their openness. We need to distinguish between 'private' information relating to a programme and its personnel and information which should be in the public domain.

(3) Report writing

You should include in the final report a section on the methodology used to collect the information; this may be a simple list of people interviewed or copies of questionnaires used. Other detailed which explain the process used in the data collection are useful for those checking the validity of your findings but also give guidance to others who may need to check or reassess a situation in the future.

(4) Communicating the results

How is the information being disseminated and to whom? Different media will be appropriate to different groups; academic journals may reach a handful of people, more popularly written booklets a wider number, short newspaper style reports more still and so on. As noted above, some groups have used theatre, video, film, and radio to disseminate their findings.

(5) Evaluating research

When the research has been completed, the original terms of reference should be reviewed to see how far the results of the research have met the original needs the terms of reference expressed. In the case of research which is essentially a programme evaluation, it may also be important to see who needs to take action on the research. This may also apply to feasibility studies.

(6) Lessons learned

What have the different people involved in the process learned? This should not only include those commissioning and directing the research but also everyone else. For example, if interviewers were involved or the staff of a project, did they learn anything from the process of data collection and analysis? Were attempts made to explain to them what the conclusions were and how they were reached? Did they learn anything about the process of data collection itself, and the techniques involved? Furthermore was there any attempt to feed back to the groups being researched? We have seen examples where researchers/evaluators have employed

methods such as popular drama to illustrate some of the findings of a research programme. Where a group is literate it is often possible to feed back the outline of a report on the spot, and of course the word processor has made it much easier to produce draft reports *in situ* rather than having to wait until they have been typed and printed.

(7) Benefits to the community

Has the community gained any new knowledge or skills as a result of the process of research? A great deal of participatory research enables groups to review their own situation and to learn the techniques for carrying out their own reviews in the future.

(8) Use of research

Underlining all these questions is the key one: how is the research being used? Merely to further the careers of researchers? For the internal decision making of the commissioning institution (be it government or NCO)? For action in terms of redesigning an existing development programme or initiating a new one? There are many examples around the world where there is very little feedback from research or where information is not available in the country in which the research was carried out. There are ways of making even academic material available, for example, by placing copies of reports in local university libraries; making copies of data discs available, and producing annotated bibliographies of material collected during the research.

Lastly, is there a channel for criticism or experience to feed back? If things go wrong how do project designers and managers find out about it and take action? Are the opportunities created for people at the sharp end to comment on what they are being asked to do? Are communication channels open? Has the research experience fostered a critical culture and fresh thinking among all concerned?

5.2 Review and field note preparation

The findings of RRA/PRA should be reviewed each day, ideally including the community members, to reveal gaps, uncover misunderstandings, and correct misconceptions based on limited information sources. These reviews may redirect plans for the next day's practice if new sources of information are discovered.

RRA/PRA teams should also prepare a set of more clearly written consolidated field notes to be

used by the whole team as a basis for further discussion, analysis, and report preparation. These notes are often completed the same day the interviews are conducted, to avoid confusion or memory loss (Noochdumrong *et al*., 1999).

(1) Order of field note preparation

The consolidated field notes can be structured either in the chronological order in which interviews occurred, or according to the topics, subtopics, and questions established prior to and during the fieldwork. Both formats have their advantages and disadvantages.

Chronological order usually captures more detail from a given interview, but makes it more difficult to determine if each subtopic or question has been adequately covered. Subtopic and question order help determine the relevance and completeness of the data collected. The choice of format may depend on the topics under study or RRA/PRA time constraints: chronological order may be more appropriate when the study requires a great deal of detail, whereas subtopic and question order are recommended when data needs are more general or when time constraints require rapid discussion and conclusion of the PRA.

(2) Patterns of field report preparation

The assignment of note preparation tasks has usually followed one of three basic patterns:

i) It requires the joint participation of all team members in note preparation. Although only one person actually writes the notes, all are present to discuss each point. While this pattern provides extensive opportunities for team consultation and discussion, it can be very time-consuming.
ii) This occurs when one person, usually the person with the most complete set of field notes, prepares an initial draft of the notes. Other team members then edit the draft, adding missing information and detail from their own notes. This pattern manages to capture most of the detail while requiring less researcher time.
iii) This pattern has all team members submit their field notes to one researcher, who combines them into a single set of notes.

(3) Discussion on field notes

After a set of notes has been prepared, they are used as the basis for a discussion session during which all study findings are discussed, and conclusions are articulated and agree upon by team members. An overhead projector, transparencies, and a tape recorder are helpful during this session, to facilitate the discussion and record findings and conclusions for use in final report preparation.

5.3 Writing-up of final report

A summary of the conclusions of this session will be circulated to verify research team consensus. The designated report writer will then prepare a draft final report from the results of the discussion session, the consolidated notes, secondary sources, and field aids such as maps, data tables, etc. The draft is then circulated and refined until it is ready for final publication. This final step has often been found to be rather time-consuming, so that some RRA/PRA studies have to publish their final report. Thus, preliminary summary findings are often provided to activities requiring more input from particular RRA/PRA studies.

Producing a field study report is often an important objective for RRA/PRA but can be the most difficult part. People always seem to find the time to do the field work, yet are almost always ‘too busy’ to write the report up properly.

Although PRA team should not focus unduly on the presentation of findings not be evaluated on the basis, the report will be an important resource for follow-up for several reasons:

- It provides baseline information on which future activities will be built and performance can be monitored;
- A detailed report can convince other governmental and non-governmental organizations of the value of becoming involved in a community or area, or adopting a new approach;
- If good quality reports are made within the same institution, then inter-village comparisons and analyses of regional trends and changes become possible;
- It contributes maintaining a good institutional memory.

There is no single correct way of facilitating the writing-up but there are several ways to make this process are enjoyable and productive as possible.

- Analysis and writing-up should be a continuous process. Make sure enough time is scheduled for this each day of the fieldwork and it is not left to a last minute rush.
- Prepare a framework for documenting the process and key findings of each discussion that the RRA/PRA team fill in each day, one for each diagram or discussion. If the other member in RRA/PRA team read these as they are filled in, then requested RRA/PRA team add further information that has been left out or is too brief.
- Hold regular feedback meetings during which information gathered is also information shared.

Likewise, writing skills are needed for accurate and complete report writing. A five-step process for writing-up is shown in Box 5.

Box 5 A five-stage process for report writing

Step 1: Collect information by objective. This can be best begin in the field when the team is preparing their feedback session for the village. Write out each objective on a large sheet of paper. Then brainstorm all the important things that have been learned under each objective and write them down. If possible, do this on cards.

Step 2: Organize the information. If the information is on cards, you can group different subjects together. Once all the information is grouped by subject, then you can write an outline for the final report from the cards you have organized.

Step 3: Analyse the information. As a team, decide which information is the most important. What was surprising about what you learned in the field? Which parts do you want to treat in greater detail in the report because of their importance? What are the implications of what you have learned for future activities with the village or your organization? These key issues should be noted since they will be used to write a concluding section of the report.

Step 4: Write-up the information in a report. This can be divided up so that each team member writes a section.

Step 5: Review the report. All the members of the team should read the report to make sure that the information is correct from their perspective and that nothing of importance has been left out. One person can edit the report to make sure that there is no duplication between sections and to incorporate the diagrams into the text.

Source: Noochdumrong *et al*., 1999

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