5. Educational Foundations of the Field School

FFS alumni are able to not only apply IPM principles in their fields, but they are able to:

- Master a process enabling them to help others learn and apply IPM principles;
- Organise collaborative activities in their communities to institutionalise IPM principles.

A good Field School process ensures these outcomes. The educational concepts under pinning the FFS are drawn from adult non-formal education. These concepts have been found to be relevant across the many countries and cultures in which the FFS approach has been used. In the context of the FFS these concepts have proven to be empowering for farmers.

This chapter presents a review of the concepts that underlie the learning activities found in a Field School. In addition, there is an analysis of the Field School approach using a framework based on Critical Theory. This analysis demonstrates why the FFS has a broader impact than simply changed practises among farmer alumni.

5.1 The Principles of Education and the IPM Farmers Field School

The following are some of the concepts and theories that have contributed to forming the methodological basis of the IPM Farmers Field School.

5.1.1 A Definition of Learning and the Learning Cycle

There are many definitions of learning. D.A. Kolb, in his book, Experiential Learning, proposed a definition of learning that is relevant to the FFS approach.

> "Learning is the process whereby knowledge is created through the transformation of experience."

Kolb proposed the "learning cycle", a concept of the learning process that is well known among practitioners of adult non-formal education. For Kolb the learning process can be boiled down to four elements or stages, which constitute a learning cycle (Kolb, 1984).

- Concrete experience
- Observation and reflection
- Generalisation and abstract conceptualisation
- Active experimentation

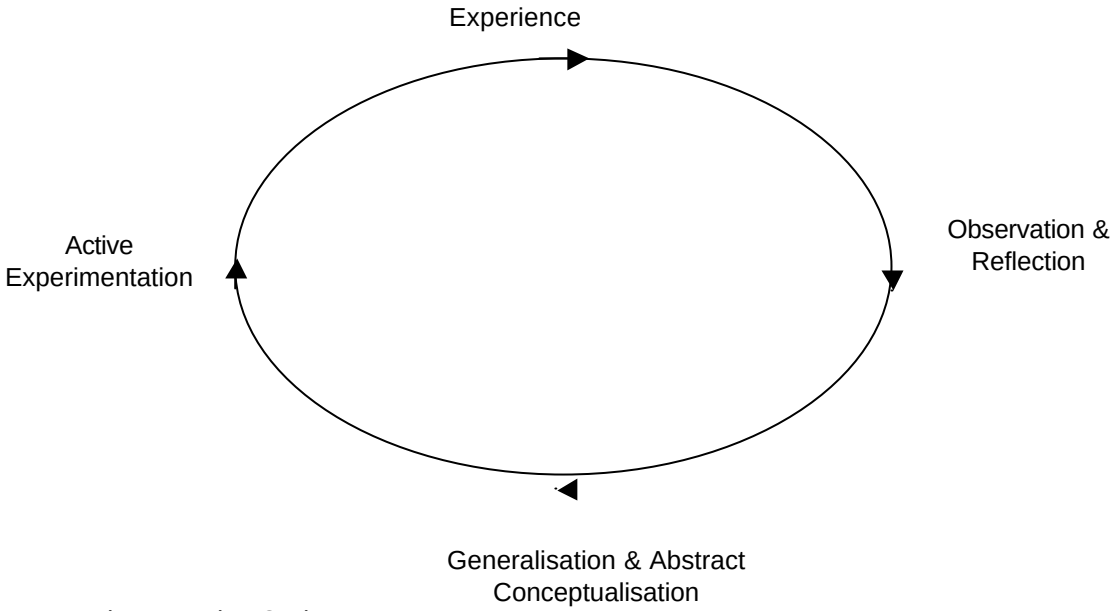

Figure 5.1. The Learning Cycle

All FFS learning activities apply the learning cycle. For example, in a rice IPM FFS, the agroecosystem observation and analysis activity begins with the observation of a ricefield agroecosystem. Participants collect data in the field ("Experience") and return to the meeting place to analyse the data ("Reflection"). The participants make use of their data to prepare a presentation regarding field conditions and propose decisions for actions regarding the ricefield such as apply fertiliser or don't apply insecticides ("Generalisation & Abstract Conceptualisation" leading to a hypothesis). The decision is then implemented over the following week ("Active Experimentation"), and the cycle begins again.

5.1.2 Andragogy

Malcolm Knowles thought and wrote about the education of adults. He distinguished pedagogy from something he termed as andragogy. For Knowles, pedagogy was the art of teaching children and andragogy was the art of teaching adults (Knowles, 1968). The FFS is an approach that exemplifies andragogy. Table 5.1 compares pedagogy with andragogy based on four main assumptions that can be found within each approach (from Jarvis, 1987).

A Comparison of the Assumptions of Pedagogy and Andragogy

Key Assumptions	Pedagogy	Andragogy
Concept of the learner	The role of the learner is by nature a dependent one. The teacher is expected to take full responsibility for determining what is to be learned, when it is to be learned, how it is to be learned, and if it has to be learned.	Because of the process of maturation a person moves from dependency towards increasing self-directedness, but at different rates for different people and in different dimensions of life. Adults have a psychological need to be self-directing.
Role of learners' experience	The experience learners bring to a learning situation is of little worth. It may be used as a starting point. The experience from which learners learn is that of the teacher, the textbook writer, etc. The primary techniques of teaching, accordingly, are transmitted techniques--lectures, reading, etc.	As people mature they acquire an increasing reservoir of experience that is a rich source for learning-for themselves and others. Adults attach more meaning to learning they gain from experience than what they gain from passive methods. The primary methods for adult learning are experiential
Readiness to learn	People are ready to learn what society says they should learn, provided the pressure put on them (i.e. fear of failure) are great enough. Most people of the same age are ready to learn the same things. Thus, learning is to follow a standard curricula with a uniform progression.	People become ready to learn something when they experience a need to learn it in order to cope more satisfyingly with real life tasks or problems. The educator has a responsibility to help them discover their "needs to know".
Orientation to learning	Learners see education as a process of acquiring subject-matter content, most of which they understand will be useful only at a later time in life. Thus the curriculum should be organised into subject-matter units which follow the logic of the subject. People are subject-centred in their approach to learning.	Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply what they learn today to living more effectively tomorrow. Thus learning experience should be organised around capacity development categories.

(from Jarvis, 1987)

Table 5.1. Pedagogy and Andragogy Compared

5.1.4 Learner Centred Approach

The FFS has been described as a "learner centred" approach. Learner centred approaches emphasise self-directed learning and are commonly used with adults. These approaches put the trainer in the role of a facilitator. Carl Rogers' work forms a theoretical basis for learner centred approaches. The fundamental principle of this approach is that adult learning can be optimised when the learner is put in control of his or her learning. Rogers' work suggest that adult learners require:

- Learning to be relevant to their needs
- Activities that encourage self-direction
- Processes that foster independence, creativity, self reliance, self-criticism, and self-evaluation
- Facilitators not teachers

The FFS builds on Rogers' work from a methodological perspective. The following is what Carl Rogers had to say about facilitation (Rogers, 1969)

Box 5.1

Rogers' Guidelines for Facilitators

The facilitator has much to do with setting the initial mood or climate of the group or class experience.

The facilitator helps to elicit and clarify the purpose of the individuals in the class as well as the more general purposes of the group.

He relies upon the desire of each student to implement those purposes that have meaning for him as the motivational force behind significant learning.

He endeavours to organise and make easily available the widest possible range of resources for learning.

He regards himself as a flexible resource to be utilised by the group.

In responding to expressions in the classroom group, he accepts both the intellectual content and the emotionalised attitudes, endeavouring to give each aspect the approximate degree of emphasis that it has for the individual or the group.

As the acceptant classroom climate becomes established, the facilitator is able increasingly to become a participant learner, a member of the group, expressing his views as those of one individual only.

He takes the initiative in sharing himself with the group - his feelings as well as his thoughts - in ways that do not demand or impose but represent simply a personal sharing which students may take or leave.

Throughout the classroom experience, he remains alert to the expressions indicative of deep or strong feelings.

In his functioning as a facilitator of learning, the leader endeavours to recognise and accept his own limitations.

5.1.5 Learning Theory and the FFS

Ideas from three different theoretical branches of psychology contribute to the basic "learning theory" upon which the FFS is based: Stimulus-Response Theory, Cognitive Theory, and Motivation and Personality Theory. (The following is drawn from a summary by Dilts, 1986)

Box 5.2

Pyschological Principles

Stimulus-Response Theory

The learner should be active, rather than a passive listener or viewer.

Frequency of repetition is important in acquiring skill, and for retention through overlearning.

Reinforcement is important. In repetition desirable or correct responses should be rewarded.

Generalisation and discrimination suggest the importance of practice in varied contexts, so that learning will become important to a wider range of stimuli.

Novelty in behaviour can be enhanced through imitation of models, through cueing, and through behaviour shaping.

Cognitive Theory

The organisation of knowledge to be presented is not arbitrary. Information to be presented should go not just from simple to complex, but from simple wholes to more complex wholes.

Cognitive feedback confirms correct knowledge and corrects faulty learning. The learner tries something provisionally and then accepts or rejects what he does on the basis of its consequences. This is similar to S-R reinforcement, but places more emphasis on the testing of hypotheses.

Goal setting by the learner is important as motivation for learning and his success or failure determines how he sets future goals.

Divergent thinking that leads to multiple paths and answers is to be encouraged alongside convergent thinking which has a sole logical path to a single answer.

Motivational and Personality Theory

The learner's abilities are important. Rates of learning vary from individual to individual and must be accommodated in training design.

Anxiety levels affect learning differently in each individual and vary in their effect with the type of learning task being undertaken.

A similar situation may evoke different levels of motivation from different individuals depending on whether they are oriented to affiliation needs or achievement needs.

The organisation of motives and values within the individual is relevant to his learning. People tend to learn what they perceive as relevant to their specific needs and interests.

The group atmosphere of learning (competition, collaboration, isolation, etc.) will affect satisfaction in learning as well as the product of learning.

5.2 A Critical Theory Framework and the FFS Approach

Humans approach knowledge with an "orientation toward technical control, toward mutual understanding in the conduct of life, and toward emancipation from seemingly "natural" constraint" (Habermas, 1971). With this statement Habermas presents the three cognitive interests all humans share which form the basis for their interest in learning: the technical, the practical, and the emancipatory. These three cognitive interests grow out of three distinct areas of human social existence: work, interaction with others, and power (Ingram, 1987). As cognitive interests, they govern the interest of humans in gaining knowledge and hence underlie human conduct. The following presents the characteristics of the learning domains associated with each cognitive interest. Figure 5.2, provides a summary of these characteristics.

5.2.1 The Technical Domain

The “technical interest” learning domain grows out of the need to control the physical and social environment, as such the interest makes use of instrumental action. This interest has as its prototype the natural sciences. The type of knowledge developed consistent with this interest (i.e. technical knowledge) derives its power by being able to offer explanatory theories. These theories are based on causal relationships. Technological knowledge is exploitable only as processes can be objectified. The problem is that not all processes can be objectified.

5.2.2 The Practical Domain

In order to live with other human beings we must interact with them and come to know them. Thus “practical knowledge” is dominated by communication and is typified by communicative action. This knowledge interest is based on coming to understand human actions. Communicative action in society is founded on norms that make clear the consensual agreement regarding behaviour shared by at least two actors. Social norms are valid only where there is this shared and mutual understanding of intentions and a recognition that there are obligations inherent in the social act of communication (Mezirow, 1980). In this practical domain the concern is with understanding and meaning, not with causality, prediction, and control. While technical knowledge depends upon separateness and externalisation, practical knowledge depends upon connectedness and inclusion. Thus at the core of practical knowledge is the act of speech (Park, 1994).

While technical knowledge relies upon empirical science to reveal knowledge, practical knowledge is based on the historical-hermeneutic sciences where

knowledge is created in the interpretation process. Hermeneutics concerns itself with interactions and patterns and is focused on determining meaning rather than causality (Dilts, 1985, p. 81).

A Critical Theory Perspective of Learning and Human Interests

Areas of Social Existence	Domains of Learning	Characteristics of the Domain
Work	Technical	1. Technical control of environment 2. Characterized by: Instrumental Action 3. Goal: effective prediction & control of reality 4. Use of empirical sciences
Interaction With Others	Practical	1. Understanding and meaning of social processes 2. Characterized by: Communicative Action 3. Goal: the meaning of interactions and patterns 4. Use of historical hermeneutic sciences
Power	Empowerment	1. Internal and environmental factors that inhibit our control over our own lives 2. Characterized by self-reflective action 3. Goal: able to differentiate between factors that are beyond our control & those 'assumed' beyond our control to expand our area of action. 4. Self-reflection, critical thinking

Table 5.2. Critical Theory Framework

5.2.3 The Empowerment Domain

Indonesia: IPM alumni at their National Congress prepare policy analysis for Minister of

Knowledge associated with empowerment, based on action and reflection, deals with individual self-knowledge. Self-reflection releases the subject from dependence on hypostatized powers (Habermas, 1971, p. 311). Self-reflection, critical thinking, which examines both the internal factors and the environmental limits that together inhibit our control over our own lives produces a knowledge that leads to empowerment. In investigations concerned with empowerment, people, knowing what they wish to achieve, examine the structural issues of the world they live in. Knowledge associated with empowerment is concerned not with causality or meaning, but with structure. Because progress in technological knowledge and practical knowledge requires unconstrained discourse, there is a sense in which all knowledge is related to an empowerment interest (Ingram, 1987, p. 13).

5.2.4 The FFS Learning Approach

The Critical Theory Framework presented above provides a basis for thinking about the FFS approach. As Ingram pointed out, all knowledge is related to an emancipatory interest, we learn so that we have more control over our world. Learning also frees us from dependence on others. Habermas points out that the first two domains combine through the use of self-reflection to become emancipatory (Habermas, 1971, p. 314).

While the original purpose for learning might arise from the technical domain, the learner will not necessarily be able to apply that learning if the practical and empowerment domains have been ignored. What is learned about a technical interest remains to be applied in a social context and this demands interaction. The learner needs to know how to explain and talk about, to take communicative action concerning, what has been learned relating to a technical interest. In many cases learning concerning a technical interest cannot be applied before the learner has been freed from factors once assumed to be out of the learner's control. The learner assumes a problem is external in nature only to discover that it is internal, one the learner can take action to remedy. Having discovered this, the learner becomes free to employ technical knowledge. Thus learning interests, while they can be discussed separately, cannot be contained by separate categories. The FFS approach unifies these interests and domains in an integrated and integrative educational process.

The general purposes of FFS learning associated with the technical domain concerns the management decisions that have to be made by a farmer applying IPM principles. These decisions are related to agronomic and ecological factors. FFS alumni live in a world where non-IPM alumni may not only not understand IPM, they may be openly antagonistic to alumni who would refuse to apply pesticides. Thus learning in the FFS connected to the interaction domain must serve several purposes focused on helping other farmers to understand and apply IPM principles plus organising and collaboratively managing local IPM programmes. Empowerment domain concerns reflect the developmental process whereby farmers become able to identify factors that inhibit their control over their lives and the means to resolve those issues.

Figure 5.3, “Purposes of FFS Approach”, links the Critical Theory framework presented earlier to the FFS approach. The column, “The Purposes of the FFS Approach”, identifies the general purposes addressed by an IPM FFS associated with each domain, technical, practical, and empowerment.

The Learning Domains and the FFS Approach

Learning Domain		The Purposes of the FFS Approach
Technical		1. Alumni manage use of agricultural inputs based on their analysis of field conditions and knowledge of plant requirements. 2. Alumni able to analyse ecological conditions based on understanding of field ecology. 3. Alumni design and implement field studies that will help them increase knowledge of ecological and agronomic issues.
Practical		1. Alumni able to effectively collaborate among themselves and with others. 2. Alumni facilitate/participate in group processes aimed at identification, analysis, and solving problems. These processes characterised by communicative action. 3. Alumni facilitate learning among others so that IPM becomes the accepted approach to rice growing in their village. 4. Alumni organise community action to resolve agriculture problems.
Empowerment		1. Alumni have developed skills that support critical thinking. Able to identify and analyse field problems and take action to solve those problems in common with others. 2. Analytical skills of alumni result in expanded area of action. They are able to organise community action, information networks, village IPM programmes.

Table 5.3. Purposes of FFS Approach

The following paragraphs address each domain, its specific learning purposes and how the Field School approach addresses these purposes. The discussion refers to the IPM principles: 1) grow a healthy crop, 2) conserve natural enemies, 3) regular field observations, and 4) farmers as IPM experts.

Technical. The purpose of the FFS approach in connection with this domain focuses on the management and decision making skills of a farmer concerning agronomic and ecological factors. In order that farmers are able to grow a healthy crop, emphasis is placed upon agronomic management issues such as seed selection, soil preparation, planting in nurseries and transplanting to the field, soil fertility management, water requirements of plants and the timing of irrigation, and cultivation issues. The decisions regarding the use of inputs are connected to plant physiological development and the plant's needs at different stages of its development. The goal is to help farmers optimise their yields by fulfilling the potential inherent in the plant.

To be able to conserve natural enemies requires that farmers are able to recognise the different factors in the rice field ecosystem and understand their interactions. Plant eating insects, predators, and parasites are studied in the context of how they relate to the rice plant and the stages of the plant's development. They learn how to conserve natural enemies on the basis of their own analysis of the factors existing in their fields and, hence, avoid unnecessary pesticide applications.

Observe field regularly concerns learning how to see what is happening in the rice field over time. The observation is based on the collection and analysis of field data. In the learning situation farmers use a formal process (the Agroecosystem Analysis or AESA) to gain these observational and analytical skills. Having learned about agronomic and ecological issues, the farmer, during the observation, sees what is happening in the field and is able to make decisions based on knowledge of cause and effect relationships in the field.

Almost all FFS learning activities bear a direct relationship to the technical domain. In particular the AESA, Special Topic Activities, the comparative studies, and additional field studies conducted during and FFS all affect the technical skills of a farmer. All of these activities employ the experiential or discovery 'learning cycle': hypothesis formation, data collection, analysis, synthesis, reformation of hypothesis, and testing of the new hypothesis. The AESA in particular helps farmers to master technical issues by experimentation and analyses. Weekly action decisions are taken and implemented as a result of the AESA. Each succeeding week allows the farmers to see and analyse the results of their previous decisions as they conduct additional AESA's.

During their FFS farmers master the experimental approaches used in special topic activities and in comparative field studies. The participants learn to employ the discovery learning cycle. As farmers gain increased understanding of their agroecosystem through experimentation they increase their control over their agroecosystem. The FFS results not only in participants creating an IPM 'knowledge base', but they learn how to learn and are enabled to continue to create their own knowledge related to this domain. In Gerung (see Chapter Four), FFS alumni were conducting studies concerning not only rice agroecosystem ecology, but also the agroecosystem ecology of soybeans and chillies.

Practical. While the principles of IPM suggest that the Field School approach might be limited to a focus on the technical domain, the practical domain is crucial. There are practical domain purposes integrated into every FFS activity. The purpose of the practical domain in the FFS is to enhance a range of leadership skills that will, essentially help them to facilitate learning activities and group problem solving processes as they initiate collaborative activities to institutionalise IPM at the village level. Specific leadership skills related to this domain include discussion skills, questioning, analysis, problem solving processes, and communication skills.

Farmers participating in an FFS learn the 'grammar' of their agroecosystems and IPM. For example, they don't just learn to identify an insect but they learn about its life cycle and function in the ecosystem. They are able to talk about one factor of the ecosystem as it interacts with other factors in the ecosystem. Every FFS activity includes analysis, presentation, and discussion sessions. During these sessions participants practise their analytical skills, learn to present to groups, and learn to handle difficult questions. Participants coach each other as

they make presentations: the shy overcome their hesitance to talk, the imprecise achieve clarity, the weak argument is strengthened, and they gain "voice".

Again, the Gerung case of Chapter Four provides ample examples of the effects of FFS learning involving the practical domain.

- Alumni are conducting FFS's for other farmers or teaching children the basics of ecology.
- Practical field problems are being identified and solved by means of various field studies.
- Alumni are developing IPM organisations and institutionalising IPM in their sub-district.

Empowerment. There are factors in all of our lives that we tend to make larger than life and to treat as if they were beyond our control. To successfully take control of these factors, we need to de-mystify them through critical analysis. Critical analysis is a skill that farmers master as part of the FFS. Every FFS activity is designed to include an analytical step. All participants have an opportunity to enhance their critical analysis skills during the FFS. Group presentations and discussions develop analytical skills. A good FFS facilitator will help enhance analysis through the probing questions that he or she asks. A principle of empowerment, the possibility of and the need for the progressive replacement of more naive perceptions by more integrative and more discriminating perceptions (Freire, 1968), is a direct result of the critical analyses that take place within an FFS.

In the Gerung case the description of the organising activities of FFS alumni provides several examples of group decision-making, collaboration, and analysis of opportunities to create IPM organisations. The decision to organise was in itself a clear example of alumni empowerment. Farmers, pre-FFS, were organised by extension field workers into Farmer Groups; the groups went moribund. FFS alumni reactivated the moribund Farmers Groups and initiated their own alumni association. Typically, farmers have been "organised" by others to further the organisers' goals, FFS alumni organise themselves in response to their own needs and determine their own goals.

Empowerment plays out into everyday life for alumni. The Gerung case is just one example of what FFS alumni are doing. Many groups of alumni in Indonesia have noted the inconsistency between IPM and the demand of village credit programmes that farmers accept insecticides as part of the credit package. Literally hundreds of alumni groups have protested against such demands and have successfully changed local policy. Thousands of Farmer IPM Trainers in Indonesia have formed a national group for themselves and they have:

- Investigated adulteration of fertiliser;
- Campaigned on behalf of farmers' rights;
- Spoken out against the inefficiencies of the extension system;
- Changed government agriculture policies that were inimical to IPM;

- Confronted local governments as well as the national assembly to lobby for increased farmer rights.

In countries across the region FFS alumni have been successful in taking greater control over their lives. Examples include:

- In Cambodia alumni are: being installed on local development councils, using the FFS to train handicapped farmers, and studying health issues related to insecticides to raise the awareness of their neighbours about the hazards of pesticide use.
- In China women who have gone through FFS are organising FFS for other women to improve their IPM and farming skills in a response to the increased farming related responsibilities that women have had to take on as their husbands seek higher incomes in urban areas.
- In Thailand, children who have gone through FFS in their schools are helping their parents to apply more sustainable approaches to farming.
- In the Philippines alumni have held national congresses as well a local congresses to try and solve their problems.
- In Vietnam IPM alumni are: becoming active in gender rights, organising action research to study agricultural problems relevant to their communities, and playing key roles in village decision making.
- In Sri Lanka alumni have helped to maintain local IPM programmes in spite of an absence of national funding and civil war.

Empowerment might begin in the FFS, but the FFS is just the first step along a road that is being built by alumni throughout Asia.