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(The views expressed in this paper are those of the author and not necessarily those of the Centre.)

SMALL FARM EXTENSION AND RESEARCH - ASIAN EXPERIENCES

by

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Introduction

The achievements in world food production in the past 20 years have been impressive. Increases in production primarily of wheat and rice are now producing food equivalent for 500 million additional people (CGIAR, 1985). The increases in rice production have been a result of modern varieties (23%), fertilizer effects (24%), irrigation (29%) and other factors (24%). Most of these productivity gains have occurred in the humid tropics of Asia where rainfall is adequate, land is flat, irrigation potential is high and adequate infrastructure (roads, markets, access to credit and information) exists.

There is now increased concern about the farmers who have been by passed by the green revolution (TAC, 1985). These resource poor farmers (RPF) live in harsher environments with poor soil, unpredictable rainfall and often upland hilly topography. They have less control over physical conditions (e.g. flat land and irrigation), less access to inputs (including information) and less access to markets and transportation. Their farming environment and cropping systems are much more complex and diverse than lowland paddy farmers. Their decision making priorities are often directed to risk aversion and family food rather than cash crops.

Information on RPF farmers based on data from the Eastern Visayas of the Philippines (Lightfoot, 1985) is presented in Table 1. It is obvious that over 50% are tenants on at least some of their land, farm size is small (77% have less than 3 ha and one-third less than 1 ha) and most cultivate less than 2 ha. Income is from a number of sources and the farm families are **POOR.** The farming systems are complex involving a number of different crops and animals, however, none of the crops or animals they produce receives high priority from research or extension. The short fallow is required to protect the land from erosion and regenerate some nutrients. Lightfoot also indicates that in spite of a generally favourable rainfall of 1,200 mm/year, uneven distribution as in 1983 can result in serious droughts. The most important point of this study has been to show the inter-relationship betwen lowland rice and upland crops. Farmers either have some lowland paddy or work as labourers for other paddy farmers. The returns from these activities are greater than the upland crops. Thus the lowland rice activities determine planting dates and management of the upland crops.

Inspite of increased concern for these RPFs in Asia, research and extension directed to them is difficult. The number of small farmers is very large. Thailand has 40 million people involved in rice production (80% of population). The extension agent-farmer ratio in South East Asian countries even at the best is 1:750 and less in the marginal areas where RPFs live. Travel funds are limited. In the Philippines 50 pesos ($3.30 CAD) per month is allocated for transportation allowance to extension agents. RPF live further from roads and extension offices. In Bhutan extension agents often have to walk 2-3 days to visit farmers.

Likewise, research directed to RPF is difficult. RPF manage complex diverse systems using decision criteria different than the lowland farmers who can grow two or three crops per year. Furthermore, because of the number of crop and livestock enterprises, improvement in any one commodity may not change the whole farm picture very much. The variability of crops from year to year and low level of management for most upland crops further compounds the researchers' difficulties.

There are research and cultural biases against the RPFs (Chambers and Ghildyal, 1985). The major actors in any change in agricultural production are the farmers, extension workers and researchers both within national agricultural programs, universities and in international agricultural centres. A number of the important features of each of these actors is presented in Table 2. It is obvious that there are considerable education, income, cultural, and linguistic differences between farmers, extension agents and researchers.

While the problems are immense there are a number of approaches which are trying to improve understanding between the three groups in order to improve agricultural production and the well being of the farmers. This paper will discuss three such approaches: the Training and Visit System, Farming Systems Research and "Farmer-First-Farmer-Last".

Transfer of Technology

The model which is normally used in developing countries of Asia and elsewhere to achieve changes in agricultural productivity is Transfer of Technology (TOT). This model has worked extremely well in increasing agricultural production in North America and Western Europe. It has also worked well in some areas of developing countries

most notably the Punjab in India and irrigated areas of Java (Indonesia), Central Thailand and the Philippines. Figure 1 illustrates the normal working of this approach. It is obvious that this is a top down approach. In addition, there are considerable administrative and bureaucractic difficulties because of the fragmentary nature of the system. Extension usually is a different division or department than researcher. There are a number of different departments, bureaux and institutes involved in various segments of agricultural research. The university researchers and government researchers have very poor linkages between each other. In addition university researchers have poor linkages to extension. It is also obvious from Table 2 and Figure 1 that those with the least contact and understanding of farmers are the most important in determining policy and research.

Training and Visit System

The TOT model involves two essential elements (1) transfer and (2) technology development. Particular attention has been paid to the transfer process. The World Bank has committed over 1 billion dollars in the last 10 years to support the Training and Visit System (T&V). This system has been introduced to over 40 countries. Benor et al (1984) describe the key elements "T&V is a systematic program of training for the Village Extension Worker (VEW), combined with frequent visits to farmers' fields. In the field, the VEW teaches farmers recommended agricultural practices, shows them how to implement these practices, motivates them to adopt some on their fields, and evaluates production constraints and advises farmers how to overcome them. The system is organized to give the Village Extension Worker every fortnight intensive training in those specific agricultural practices and recommendations that relate directly to farm operations during the coming weeks, and to provide him with suitable technical and supervisory guidance to enable him to teach these recommendations well to farmers. The VEW visits once a fortnight, on a fixed day known to all farmers and his supervisors, each of the eight small groups of farmers with which he works. Other staff at the subdivision - district, zone and headquarters level - support in one way or another the work of the VEW and have similar fixed work responsibilities and training." The T&V system also encourages the strengthening of links between extension and research, and suggests that extension agents carry out adaptive research and on-farm trials. While T&V has strengthened the farmer-extension link it has also revealed other constraints to adoption of new technology such as tenure, lack of capital and institutional. Perhaps the major achievement has been to show the lack of good technology available to extension agents (Chambers and Jiggins, 1986).

Farming Systems Research

Improvements to the technology development process have been addressed by the farming systems methodology. This approach was initiated in the early 70's at the International Rice Research Institute (IRRI) in the Philippines.[1/] The method originally called cropping systems has been expanded to include other components of the farming systems and is now known as farming systems research. This methodology is used by a number of other international centres and national programs in many countries. The terminology and methodology differ between centres, agencies and countries (CIMMYT, 1985; Gilbert et al, 1980; Shanner et al, 1982; Zandstra et al, 1981). However, the important feature of FSR is its system approach which involves interdisciplinary teams usually including a socio-economist. The elements of the approach are:

(1) Site selection and description

(2) Design of research which involves both examining cropping patterns and component technologies

(3) Testing stressing on-farm research which can be either research managed or farmer managed

(4) Pre-production testing (multilocation trials) and pilot production programs closely involving researchers and extension agents.

This methodology is now used in many Asian countries. The training and coordination are centred at IRRI but are being decentralized as national programs become stronger. There are now 14 Asian countries plus Mauritius involved in the Asian Farming Systems Network (AFSN). The network coordinates a number of international testings of cropping patterns and component technology. However, the major functions of the AFSN are sharing of information, designing methodology and research protocols, and suggesting and revising training materials. One of the major impacts of the AFSN has been to institutionalize and popularize the on-farm methodology.

This approach has had considerable success in introducing new approaches to farmers in rice based systems. In Iloilo Province in the Philippines, there has been considerable adoption of improved varieties, new seed establishment techniques and mechanical threshing. This has resulted in considerable crop intensification, increased production and increased income to farmers (Barlow et al, 1983). Likewise experience in Indonesia (Siwi et al, 1985) shows that cropping systems has made major contributions in both partially irrigated and rainfed dryland conditions. The approach is particularly successful in designing new cropping patterns for transmigration areas. Siwi et al point out the following important points from this approach:

"(1) The importance of on-farm research in developing new cropping techniques that farmers can and will accept. Only research in farmers' fields can fully test the new methods, show their weaknesses and point out what problems remain to be solved.

(2) The importance of involving farmers, extension workers and government officials from the beginning. They provide valuable insight into problems and possible solution at the research stage and their cooperation is essential later if the research results are to reach a large number of farmers over a wide area.

(3) The importance of government production programs in encouraging large numbers of farmers to accept the new techniques. These production programs combine extension and training for farmers with the provision of credits and subsidized inputs to enable them to take advantage of the improved cropping systems.

(4) Experience has demonstrated that the research results can be transferred from the original target area to other areas. The cropping patterns developed can be used - with modifications to suit local conditions - in wide areas of Indonesia. This means that the original investment made in cropping systems research has paid off by raising farmers' welfare and increasing food production throughout the country."

In the Philippines the methodology as developed by the AFSN has now been institutionalized in the Regional Integrated Agricultural Research Systems (RIARS), one centre located in each of the 12 regions (Quisumbing, 1982).

The Ministry of Agriculture sees two stages in the development of appropriate farm level technology - Technology Generation (TG) and Technology Verification (TV). TG in the Philippines is a priority of the research stations including international centres (e.g. IRRI) and universities.

TV is carried out at the regional level emphasizing that:

(1) Trials are done under farm conditions

(2) The alternative technology should be properly selected

(3) The existing farmers' practice is the basis for evaluating the alternative technology

The evaluation is carried out by the Provincial Technology Verification Team (PTVT) usually a research and extension worker.

The important features of the RIARS system are:

(1) Decentralized

(2) All technology undergoes on-farm verification

(3) Extension workers involved in on-farm trials

(4) Site specific recommendations are made

(5) Social scientists are involved at the regional level in collecting site description data and economic comparisons of trials

(6) There is feedback to researchers and research stations

The RIARS system is new (started in 1983) but preliminary indications are that the technology generation system is still weak. The verification trials show that many of the introduced cropping patterns and component technologies do not offer better economic returns than existing farmers patterns. In addition the feedback link between TV and TG is weak.[2]/ However the decentralized approach has been reinforced by recent political events in the Philippines. A regional approach to technology generation is starting. This should enable the numerous research stations and agricultural colleges based in each region to become more involved in generating technology for the region. This short circuiting should allow for greater feedback between TG and TV. There is considerable interest in the RIARS approach and an ongoing evaluation is being carried out.[3]/

The farming systems approach has been successful in Asia in introducing new cropping patterns and component technologies. This has worked best in favourable environments with simple rice based systems and shows promise in countries with very weak agricultural infrastructure, e.g. Bhutan as a means of doing efficient adaptive research trials. The TOT model has been improved by feedback from on-farm trials. However, the FSR approach still does not establish strong farmer-extension links and still involves a fairly heavy top down approach. While this methodology has been successful with farmers in relatively favourable environments, it has not been successfully applied to resource poor farmers who often live in high risk environments with very complex farming systems. These systems also vary considerably from year to year making it impossible to do cropping pattern trials.

Farmer-First-Farmer-Last

Another approach is that of the Farmer-First-Farmer-Last (FFL) model (Chambers and Ghildyal, 1985; Chambers and Jiggins, 1986). This model was first used at CIP (Centro Internacional de la Papa) (Rhoades, 1985). Rhoades' description of the reorientation of research at CIP that resulted once the researchers started learning from farmers is a classic.

This approach involves a paradigm shift. It requires all those involved in agriculture development and research to reorientate their thing to "put the last first" (Chambers, 1983). Farm households must be seen as rational, managing complex systems with very limited resources constantly making decision based on risk minimization, and food and cash needs of the family. The research agenda then becomes one of learning more about the system and interaction, about the farmers' indigenous knowledge, decision making process and possible points of intervention. On farm research is more complicated as crops and planting dates do not follow the orderly sequence of lowland agriculture. Decisions are often made quickly based on the onset of the rains and cropping patterns may vary considerably from year to year.

Lightfoot (1986) stresses the need to understand and monitor indigenous research. He gives examples of projects that supplied farmers with new varieties of sweet potatoes and upland rice. These actions inadventently allowed farmers to do their own experimentation which yielded information on the use of upland rice varieties under lowland flood conditions and the performance of new sweet potato cultivars under farmers conditions. These experiments could not have been designed by researchers.

North East Thailand extends over 170,000 km^2, has a population of 15 million and is the poorest area of Thailand. Soils are poor, rainfall erratic and crop yields low. At least half of the single crop of rainfed rice is retained for home consumption. In recent years cassava production has become very important as a cash crop. However, recent policy decisions by the European Economic Community (EEC) have decreased markets. There has been considerable emphasis on agricultural research to develop crop alternatives for the North East.

The FFL approach is being applied in North East Thailand by the Farming Systems Research Project, Khon Kaen University.[4]/ Their earlier research was carried out on station and on farm. However, during the process of this work the multidisciplinary team of agronomists, social scientists and extension agents discovered farmers in one region successfully growing peanuts after rice using residual soil moisture. The team learned from the practising farmers and transferred this technology to farmers in another province using "a farmer to farmer" extension approach (Jintrawet et al, 1985). The team used social science techniques of informal interviews and group discussion and interaction. This approach called Rapid Rural Appraisal is receiving more attention as a means to allow meaningful communication between researchers and villages. (See KKU/FF 1985). The success of this approach in N E Thailand is also assisted by the fact that most members of the team speak the local dialect.

The experiences of the farmer to farmer approach not only increased the efficiency of the technology transfer but it suggested areas of research which are needed to fine tune the technology in the new environment. The research is currently being carried out in farmers' fields and research stations.

This approach will be difficult to replicate within the traditional agricultural research and extension system because of the lack of social scientists in the system and the various bureaucractic constraints to interdisciplinary work. Nevertheless the KKU staff are training Department of Agriculture and Department of Agricultural Extension staff in these techniques with the hope they will be more involved in future projects.

Conclusion

The three approaches discussed in this paper are not mutually exclusive. In fact what is encouraging is the potential for overlap and interaction between these approaches: There is increased emphasis on closer interaction of FSR and T&V (see Cernea et al, 1985 and particularly Denning, 1985). The RRA approach is becoming more widely used in FSR (Galt, 1985)] and is now being incorporated into the training modules used by IRRI (IRRI, 1986 a, b). In fact what is most encouraging is that the FFL approaches being developed in N E Thailand are being made available to others in Asia through the AFSN.

The barriers to effective communications between farmers, extension agents and researchers are great (Table 2), however, the three approaches of T&V, FSR and FFL are having some success. Technologies are being developed and verified with more input and feedback from farmers than previously. Some of these technologies are being adopted and modified by farmers. The challenge is to improve this process and will require continued effort by individuals, national and international institutions and donor agencies.

Notes

1/ IDRC has been involved in supporting Cropping Systems research at IRRI since 1971. Current projects include support to IRRI to coordinate the AFSN and sub-networks in crop-livestock, grain legumes for rice based systems and assist national programs in socio-economics. There is direct support to National programs in Bhutan, China and Thailand plus additional support to Thailand, Indonesia and Philippines in crop-livestock and grain legumes for rice based systems. Additional related projects are supported in Bangladesh, Nepal, Pakistan and Sri Lanka.

2/ An annual MAF-IRRI Transfer of Technology Workshop is intended to serve as the feedback mechanism for TG and TV. Based on informal interviews with RIARS staff from Region I, III and VIII by the author in May 1986, these meetings are better at informing RIARS staff about promising technologies than informing researchers about the field level problems of the technology.

3/ The RIARS system is currently being evaluated against the conventional extension system (T&V) to determine their relative merits in TOT. (IDRC Project - Technology Transfer Evaluation [Philippines]).

4/ The Farming Systems Research Project at Khon Kaen University is funded by USAID and Ford Foundation. However, IDRC funded projects have assisted in identifying alternative crops for the North East particularly peanuts and, with USAID (Peanut-CRSP) are funding on going research on peanut component technology. IDRC also is supporting socio-economic training for Khon Kaen staff and various monitoring tours and workshops to spread the information to other Asian countries.

LIST OF REFERENCES

Barlow, C., Jayasuriya, S., and Price, E.C., 1983. Evaluating Technology for New Farming Systems: Case Studies from Philippine Rice Farms. International Rice Research Institute, Los Banos, Philippines. 110 pp.

Benor, D., Harrison, J.Q., and Baxter, M., 1984. Agricultural Extension: The Training and Visit System. The World Bank, Washington, D.C. 85 pp.

Cernea, M.M., Coulter, J.K., and Russell, J.F.A., 1985. Research-Extension-Farmer: A Two-Way Continuum for Agricultural Development. A World Bank and UNDP Symposium. March 1984. Denpasar, Indonesia. The World Bank, Washington, D.C. 171 pp.

CGIAR, 1985. Summary of International Agricultural Research Centers: A Study of Achievements and Potential. Consultative Group in International Agricultural Research. The World Bank, Washington, D.C. 30 pp.

Chambers R., 1983. Rural Development: Putting the Last First. Longman, London. 246 pp.

Chambers, R., and Ghildyal, B.P., 1985. Agricultural Research for Resource-Poor Farmers: The Farmer-First-and-Last Model. Agricultural Administration 20: 1-30. Elsevier Applied Science Publishers Ltd, England.

Chambers, R., and Jiggins, J., 1986. Agricultural Research for Resource-Poor Farmers: A Parsimonious Paradigm. (Mimeo). 47 pp.

CIMMYT, 1985. CIMMYT's Approach to Systems-Based Research. IARC Workshop on Farming Systems Research. February 1986. ICRISAT, India. CIMMYT, Mexico. 14 pp.

Galt, D.L., 1985. How Rapid Rural Appraisal and Other Socio-Economic Diagnostic Techniques Fit Into The Cyclic FSR/E Process, in KKU/FF 1985 Proceedings of International Conference on Rapid Rural Appraisal. 2-5 September 1985. Khon Kaen, Thailand.

Gilbert, E.H., Norman, D.W., and Winch, F.E., 1980. Farming Systems Research: A Critical Appraisal. Michigan State University Rural Development Paper, 6.

IRRI a, 1986. Report of the Proceedings of Farming System Socio-Economic Monitoring Tour/Workshop. 16-28 September 1985. International Rice Research Institute, Los Banos, Philippines. 769 pp.

IRRI b, 1986. Frming Systems Training - The FSR Practicuum. (Mimeo). International Rice Research Institute, Los Banos, Philippines.

KKU/FF, 1985. Proceeding of International Conference on Rapid Rural Appraisal. 2-5 September 1985. Khon Kaen, Thailand.

Jintrawet, A., Smutkupt, S., Wongsamun, C., Katawetin, R., and Kerdsuk, V., 1985. Extension Activities for Peanuts After Rice in Ban Sum Jan, Northeast Thailand: A Case Study in Farmer-to-Farmer Extension Methodology. The Farming Systems Research Project. Khon Kaen University, Khon Kaen, Thailand.

Lightfoot, C. and Rufino Ayaso III, 1985. Upland Rice in the Upland Farming Systems of Eastern Visayas. MAF-IRRI Transfer of Technology Workshop. 4-5 April 1985. IRRI, Los Banos, Philippines. 17 pp.

Lightfoot, C., 1986. Indigenous Research and On-Farm Trials. In Press. Journal of Agricultural Administration.

Quisumbing, E.C., 1982. The Emerging Research System of the Ministry of Agriculture: Part III. Ministry of Agriculture, Philippines. (Mimeo). 39 pp.

Rhoades, R.E., 1985. The Art of the Informal Agricultural Survey. in KKU/FF 1985 Proceedings of International Conference on Rapid Rural Appraisal. 2-5 September 1985. Khon Kaen, Thailand.

TAC, 1985. TAC Review of CGIAR Priorities and Future Strategies. TAC Secretariat, FAO, Rome, Italy.

Shaner, W.W., Philipp, P.F., and Schmehl, W.R. (1982). Farming Systems Research and Development Guidelines for Developing Countries. Westview Press, Boulder, Co., USA.

Siwi, B.H., Inu G. Ismail, Imtias Basa, A. Syarifuddin, M. Sultoni Arifin, Aman Djauhari, Mahyuddin Syam, Paul Mundy, and Jerry L. McIntosh, 1985. The Impact of Cropping Systems Research in Indonesia. Prepared for IDRC. (Mimeo). 35 pp.

Zandstra, H.G., Price, E.C., Litsinger, J.A. and Morris, R.A., 1981. A Methodology for On-Farm Cropping Systems Research. International Rice Research Institute, Los Banos, Philippines. 147 pp.

Table 1 - DESCRIPTION OF UPLAND FARMERS IN EASTERN VISAYAS
(after Lightfoot, 1985)

DESCRIPTION OF FARMS BY LAND TENURE, FARM SIZE AND AREA CULTIVATED

LAND TENURE		FARM SIZE		AREA CULTIVATED	
Landlord	2%	Less 1.0	36%	None	14%
Owner Operator	30%	1.0 - 2.9	41%	Less 1.0	32%
Amortizing Owner	15%	3.0 - 4.9	13%	1.0 - 1.9	36%
Part Owner	23%	More 5.0	10%	2.0 - 3.0	14%
Full Tenant	30%			More 3.0	4%

DISTRIBUTION OF SOURCES OF INCOME

SOURCES OF INCOME	PERCENT
Crop sales	100
Tuba sales	36
Livestock sales	50
Hired labour wage	54
Others*	39

*Others include carpentry, cutting timber, working in construction, sales from firewood and money sent from children in Manila.

73% of families earn less than the Food Poverty Threshold of 360 CAD

DISTRIBUTION OF CROPS AND LIVESTOCK

CROPS	PERCENT	LIVESTOCK	PERCENT
Coconut	100	Carabao	75
Banana	100	Swine	93
Corn	86	Chicken	100
Upland rice	89	Goats	7
Cassava	61		
Sweet potato	43		

DISTRIBUTION OF FALLOW YEARS

FALLOW YEARS	PERCENT
1 - 2	54
3 - 4	50
5 - 6	39
7 - 8	7
9 - 10	11

NATIONAL AND INTEkmATONAL RESEARCHERS

	Resource Poor Farmer (RPF)	Village Extension Worker (VEW)	National Researchers		International Centre
			Government	University	
Location	Rural	Village, may not be originally from the area	National or Regional Centres (recent external pressure e.g. World Bank has decentralized to Regional or Provincial Centres)	Regional Cities or National Capital	Isolated compound usually from Western countries
Education	Less than middle school Large amount of indigenous knowledge of farming	Middle school Ag Diploma or BSA Little in-service training	M.Sc, some Ph.D's Often locally trained Some special training courses	Ph.D. predominates Often overseas educated plus short courses and conferences	Ph.D. with previous research experience
Linguistic Ability	Local dialect	National language May speak local dialect	National language Some speak English	National language Many speak English	English working language
Income	Little cash Produces food	Low salary	Income lower than other researchers	Salaries often low	Very high and substantial benefits
Part-time Employment	Male - migratory - farm and construction labourers	-	Little opportunity for supplementary income	Salaries supplemented by research honoraria and consultancies	
Transport	Foot, animal, local bus	Foot, bicycle, local bus, occasionally motorcycle	Motorcycle, government vehicle	Private car, project vehicle, occasionally motor cycle	Private or Centre vehicle

Table 2 (cont'd) - COMPARISON OF RESOURCE POOR FARMER (RPF) WITH VILLAGE EXTENSION WORKER AND NATIONAL AND INTERNATONAL RESEARCHERS

	Resource Poor Farmer (RPF)	Village Extension Worker (VEW)	National Researchers		International Centre
			Government	University	
Sex	Household headed by male. Female and children important for many farming tasks and decision making	Male and under 30	Male and over 30	Male and over 30	Male and over 35
Political and Policy Involvement	Powerless	Very little involvement	Supportive of ruling party Some input to policy	May be politically involved Often consultants on policy issues	Often involved in regional and global policy
Comments	Farm size small - 0.5-2 ha. Often tenant farmer Farms very diverse for food and cash	Multi purpose role (i.e. many demands) Concentrates on cash crops Passes on information from above Fragmented departments (e.g. extension usually different department from agriculture and livestock) Low motivation and high turnover rate	Usually member of urban elite therefore culture, food and values different from farmers, however, greater links to farmers than other researchers	Member of urban elite	Western values and culture Usually don't speak national language Very little knowledge of farmers Most research on station yet research mandate over wide area

FIGURE 1 - SCHEMATIC TRANSFER OF TECHNOLOGY APPROACH