Papers Presented in a Symposium on "*Knowledge Transfer to Farmers in Plant Protection*"* at the Eighth Arab Congress of Plant Protection held in El-Beida, Libya, October 12-16, 2003

IPM Knowledge Transfer – Current Developments and Needs in Farmer training for IPM Implementation

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Abstract

Vos, J. 2003. IPM Knowledge Transfer – Current Developments and Needs in Farmer training for IPM Implementation. Arab J. Pl. Prot. 21: 194-196.

To become successful producers, farmers need access to advisory expertise that helps them make better and more open choices about their own livelihoods. Globalisation poses a threat to smallholders unless they get more effective support in accessing new technologies and markets, and in meeting new standards of quality and reliability. The extension role needs to move towards a mode ranging from advice and training on specific technologies to facilitation in relation to technologies (e.g. improved access) but also in relation to a wider service context (including credit, input supply, processing, marketing). The research role needs to be linked and move towards a mode of seeking to solve farmers' problems and addressing their needs. Examples are given of tackling plant disease problems through farmer participatory training modes. Farmer Participatory Training (FPT) focuses on transfer of knowledge through discovery learning, facilitated by extension. Farmer Participatory Research (FPR) focuses on knowledge generation through novel farmer experimentation, facilitated by research and extension. The focus in FPR is on meeting farmers' needs and demands in appropriate knowledge generation through local technology development and/or validation. The focus of knowledge transfer and generation is indirectly to achieve food security, but first and foremost to improve smallholder producers' livelihoods. Impact assessments of participatory training programmes show more stable production with improved product quality and increase in farmers' incomes. However, for these programmes to move beyond pilot stages, it is concluded that a wider focus would be needed to involve all stakeholders in the IPM knowledge system.

Introduction

Smallholder farmers in resource-poor countries and communities often do not have ready access to tailor-made information on crop management and protection, but receive information through informal sources, such as neighbours and family. In many cases, industry agents are more regular informants than the government extension service. Yet, farmers are dealing with increasingly competitive markets that demand high quality produce for a low price and at the same time with more pressing production problems as soil fertility declines in many areas of the world and pests adapt to break through silver bullet style crop protection. Novel, research generated technologies are often beyond the reach for smallholder farmers who are risk-averse and short of investment funds to input into improved crop production systems.

Traditional field extension services in comparison lack integration both with research and the farming community, but delivers top-down messages from the former to the latter. With research often being capacity, rather than farmer demand-driven and extension experience shortage of funding, extension officers are not able to deliver the kind of tailor-made information farmers need to achieve more sustainable and cost-effective production.

The question arises whether top-down delivery of information, or "Transfer of Technology" is the most efficient method of mobilising knowledge. For many years, scientists and policymakers explained the low adoption rates at farmer level on the poor efficiency of the extension services to lack of facilities, inadequate organisation and/or low levels of training. Whilst all of these are contributory factors, it is now widely acknowledged that low adoption is mainly due to: (i) Lack of integration of research, technical training and actual farmers' constraints and indigenous technologies; (ii) Capacity driven research that results in recommendations not well adapted to farmers' realities; (iii) "Top-Down" approaches to extension, with farmers at the end of the information delivery chain.

In this paper, some of the approaches that involve farmer participation are described as examples of successful extension programmes following novel approaches to knowledge generation and transfer.

Improving the IPM Knowledge System

The actors in the IPM knowledge system are not confined to the farming, extension and research groups only, but goes beyond to include actors such as: (1) policymakers (local, national, international), who e.g. decide about pesticide registration and subsidies; (2) the private industry, that delivers resistant varieties or biocontrol agents; (3) the food chain including the consumers who demand specific qualities of agricultural produce; (4) education bodies such as schools and universities, who influence knowledge levels and do research; (5) credit suppliers such as banks, who decide for which inputs loans can be obtained; (6) etc.

The variety and complexity of the IPM knowledge system shows that IPM training needs to be supported by a variety of actors, not just the extension or research. Ownership enhancement can be achieved through participation by all actors and the so-called 'participatory processes' that enhance adoption. The history of participatory approaches goes back to the 1960s and has gone through various re-incarnations in agriculture, such as the farming systems research of the 1970s and the agro-ecosystem analysis of the 1980s.

* This symposium was sponsored by the FAO Near East Regional Office, Cairo, Egypt.

Participatory Approaches to Knowledge Dissemination

Participatory methods are currently widely used and there is a variety (and confusion) of terms and acronyms to name numerous different applications. The common denominators amongst all are the focus on active participation of the target / end-user groups in discovering new knowledge and the focus on the facilitating role of trainers. Hence, participatory approaches are learner-centred and enhance ownership of findings, thereby improving the understanding of underlying principles of e.g. pest management.

Participatory training is applicable in areas where knowledge is available, either at farmers' level (indigenous knowledge) or at the research level. Such knowledge can be offered in training to solve problems through facilitating a discovery learning process by which the problem diagnosis or identification is followed by understanding the biology and/or ecology in the case of crop pests and finally the experimentation with various management options.

Participatory research is applicable in areas where there are no known solutions for farmers' problems. Many definitions are available, but in general farmers set the agenda, evaluate and develop technologies under their own conditions with assistance from facilitators and resource persons.

Some Examples

1. Discovery learning about the diagnosis of bacterial wilt in Vietnam - Farmers used to recognise wilting tomato plants in their fields, but did not practice rogueing as they lacked the understanding that wilting plants in the field become sources of infection for other plants. The among scientists commonly known exercise of cutting wilting plants at the stem base and inserting a piece of stem in a glass of water to see the bacterial white milky ooze come out was practised with farmers in a field training session. Farmers were excited at the discovery but queried whether this was the disease that was killing their plants. A follow-up experiment was done using two recently potted healthy young plants. The glass with the water and bacterial ooze was emptied on the soil of one potted plant and a glass with clean tap water was emptied on the soil of the other potted plant. The two plants were monitored and after 9 days the results were clearly visible: the infected plant showed the wilt whereas the control plant remained healthy. This simple exercise opened the mind of the farmers. First and foremost, farmers started to understand the spread of the disease in water as well as the fact that wilting plants were sources of infection. Facilitators steered the discussion so that farmers by themselves came to the conclusion that such wilting plants should be removed from the field as soon as symptoms became apparent.

2. Understanding spread of soil-borne diseases in Trinidad - Cabbage black rot is a soil-borne disease that stays in soils on crop debris and can be dispersed through implements or by man. To simulate spread of such soil-borne diseases, a 1 kg bag of wheat flour is emptied on bare soil in a vegetable field and it is explained that wheat flour particles are of similar size as fungal spores or nematodes. Trainees are asked to wet the soles of their shoes / boots / feet and walk through the flour heap into the field and back. Farmers were amazed to see how far the flour could spread and that after returning there was still wheat flour stuck to their soles. They immediately came to the conclusion that one should be very careful with these easily spread pathogens and that one should try and keep the infection level as low as possible, a discussion facilitators helped to come to the decision to remove infected crop debris from the field.

3. Management of root-knot nematodes in Ghana - Vegetable production in Ghana is suffering from root-knot nematodes in many areas. Discussions with farmers and extensionists showed that local knowledge included the use of chicken manure to reduce root-knot nematode problems. To verify this and clarify that mature compost is free of the nematodes, a field study was done with treatments of organic and inorganic fertilisers compared to planting in compost and a control. Trainees monitored tomato growth and production and found that the treatments with inorganic fertilisers and the control didn't grow well and hardly produced. The treatment with organic fertilisers produced well, as the treatment where tomato seedlings were planted in compost. The real discovery learning took however place after the end of the season, when the plants were uprooted and when trainees saw the difference in the root systems between the different treatments. They clearly discovered that where tomato roots grew in compost, they were healthy, thus giving the plants a good start. They also found that in the chicken manure treated plot the roots were infected but not as badly as in the inorganic fertilised or control plot. This discovery led to a change in thinking about crop nutrition in relation to crop health.

Moving Beyond Public Extension

Participatory approaches aren't confined to public extension and are currently used in training school children in IPM or used as a basis for farmer-to-farmer extension through spreading messages by trained farmers in e.g. public places. Such processes aren't meant to replace existing extension structures, but are additional strategies to complement and enhance them. However, to move beyond currently widespread, but oftentimes not yet institutionalised participatory training pilot programmes, participatory approaches will need to become part and parcel of basic extension vocational and academic training.

General Impact

Across the board, impact of farmer participatory IPM is being measured using variables addressing livelihoods strategy capitals. Under the natural capital, maintenance or slight increase of production is generally found, but an improvement in product quality especially in areas where participatory training has led to a decrease in pesticide dependence. In financial terms, due to crop-based rather than calendar-based management, a decrease in costs and an increase in farmers' incomes are reported. In terms of human capital, increased farmers' knowledge, confidence and pride is observed through the focus of training on problem-solving tools that can be used widely to find tailor-made solutions. In addition, farmers feel healthier (often due to reduced exposure to chemical pesticides) and can plan their work load much more systematically through the focus on farmers' health and observation-based decision-making. Under the social and physical capitals, continued group working and participatory technology development are reported, leading to

sustained improvement of livelihoods and appropriate agricultural equipment.

Research and Development Needs

One important conclusion is that research, extension and farming activities should be linked to aid farmer uptake. Where this doesn't happen, low adoption rates will be seen. For widespread implementation of farmer participatory IPM training, the buy-in by a wide range of stakeholders will be needed, including not only farmers and extension agencies, but also resource people across the board (including from industry), and national and international policymakers, to ensure a conducive environment for sustainable uptake.

Conclusion

Re-education and re-organisation are seen as the most promising way forward for smallholder farmer groups to compete more successfully in the global economy. Both are being addressed in the pilot participatory approaches towards knowledge transfer described in this paper. For efficient implementation, the most important stakeholders will need to support the adaptation of such successful experiences.

Farmer organisations are already in existence in many countries and links are being made with fair trade / organic institutions. It is the experience that such organisations lack training in basic agronomic solutions to pest and other problems, which can be resolved through farmer-driven training programmes conducted by extension or through other mechanisms (e.g. farmer-to-farmer training, field days, mass media), supported by resource persons from research institutions or others.

The problem of low efficiency of extension-type agencies is generally perceived as caused by lack of appropriate funding for training of staff and extension activities and/or inadequate organisational structures. Training programmes will also have to take into consideration the capacity of extension to conduct sustainable farmer training within the national / local policy framework, as well as search for alternative methods to scale-up the transfer of successful training experiences to as many farming communities as feasible.

Efficient feedback from producers to researchers and vice versa is key to appropriate knowledge development. This two-way communication is currently often hampered by researchers' agendas being set by policymakers as well as their traditional education system, which trains agronomists in a single disciplinary way. There will be a need for training of researchers in farmer participatory approaches for them to become more skilled in their role to support farmer-led knowledge development.

More fundamentally, conventional research and extension systems have never been designed to accommodate multiple feedback mechanisms that allow for two-way communication between all stakeholders involved. The re-designing or re-focusing of such systems does not occur overnight, and can't be achieved through extra funding to continue current systems. Serious attention will be needed for adequate training curricula in participatory and multi-disciplinary approaches both for current and new generations of researchers and extensionists.

Last but not least, without an enabling policy environment and a co-ordinated effort to benefit smallholder producers, any training programme would fail to sustain itself after project completion. It is up to local and national policymakers to ensure the maintenance of extension budgets, revisit pesticide policies, etc. for a sustainable production at the smallholder farmers' level. Linking the policy with consumer stakes, a development need across the globe would be the in-country certification according to the different consumer country guidelines.

الملخص

فوس، جيني. 2003. نقل المعرفة في مجال المكافحة المتكاملة للآفات – التطورات الحديثة والاحتياجات في مجال تدريب الزراع لتطبيق برامج المكافحة المتكاملة. مجلة وقاية النبات العربية. 21: 194–196.

كي يضحي الزراع منتجين ناجحين، فانهم بحاجة إلى خبرة ناصحة تساعدهم على تبني خيارات أفضل وأكثر انفتاحاً فيما يخص شؤونهم المعاشية. وتشكل العولمة خطراً على صغار المالكين، إن هم لم يحصلوا على دعم فاعل في تقويم التقاني الحديثة والأسواق وفي الوفاء بالمعايير الحديثة للنوعية والأسواق. ولا بدّ من تحريك دور الإرشاد إلى طريقة تتأرجح من النصح والتدريب على تقاني نوعية إلى التسهيلات فيما يخص التقاني (إمكانية وصول أفضل)، وبارتباط أيضاً مع المفهوم الأوسع للخدمة (القروض، الإمدادات، الإنتاج، التصنيع، والتسويق). ويجب ربط دور البحوث وتحريكها باتجاه طريقة تسعى لحل مشكلات الزراع والوفاء باحتياجاتهم. وستعطى أمثلة عن كيفية التعامل مع مشكلات أمراض النبات من خلال طرائق التدريب التشاركية. ويركز تدريب الزراع بالمشاركة (PFT) على نقل المعرفة من خلال تدريب الاستكشاف بمساعدة الإرشاد. وتركز البحوث بمشاركة الزراع (FPR) على توليد المعرفة من خلال تجارب جديدة للزراع، بمساعدة جهاز البحث والإرشاد. ويتم التركيز في مجال البحوث بمشاركة الزراع على الوفاء باحتياجات الزراع ومتطلباتهم في توليد المعرفة المناسبة من خلال تطوير التقاني المحلية و/أو تطبيقها. والتركيز على نقل المعرفة طريقة غير مباشرة لتحقيق الأمن الغذائي. والأهم من ذلك تحسين الحالة المعيشية لصغار الزراع. وتظهر تقويمات التأثير لبرامج التدريب بالمشاركة أن الإنتاج يكون أكثر استقراراً مع تحسن في نوعية المنتج وزيادة في عائدات الزراع. وإذا ما أريد لهذه البرامج التحرك وراء هذه المراحل الرائدة. لا بدّ من تركيز أوسع على مساهمة صانعي القرار في نظام المعرفة بالمكافحة المتكاملة.

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