Participatory Technology Development and its impacts on farmers' livelihoods in Hoa Binh Province, Vietnam

by Nguyen Duc Trung, Elizabeth Hoffecker and Laurens van Veldhuizen

Development Outcomes of Local Innovation (DOLI) research project

Farmers discussing PTD experiment (Photo: Helvetas Vietnam)

DOLI Study Brief

March 2016

Rationale

With technical and financial support from the Swiss Agency for Development and Cooperation (SDC), Helvetas implemented the Social Forestry Support Program (SFSP) and the Extension and Training Support Project for Forestry and Agriculture in the Uplands (ETSP) in Hoa Binh Province from 1994 to 2007. The projects introduced participatory extension and development approaches into the province, including the approach known as Participatory Technology Development (PTD)[1]. After a careful process of assessing the effectiveness of the approach for its extension system and after many successful pilots, the Hoa Binh Provincial People's Committee decided in 2006 to officially recognize PTD as one of the major agricultural extension approaches in the province.

PTD is an approach in which farmers, extension staff and researchers and/or other resource people, as needed, work together to systematically experiment with new, alternative practices and technologies in order to find things that work within a particular local context. According to the Hoa Binh Agricultural Extension Center, PTD is a working approach that combines participatory research and extension in agriculture and natural resource management, based on the involvement of rural communities in developing new production schemes and new resource-management mechanisms appropriate to the needs and capacity of farmers. Apart from generating these innovations, the PTD approach aims at building the capacity of farmers to try out new things – to access, test and experiment with new technologies and practices. This increased "capacity to innovate" that PTD contributes to building helps farmers to better address other and newly emerging challenges in their farming.

In order to understand the longer-term impact of the PTD approach on the livelihoods of farmers in Hoa Binh Province, a team composed of researchers from the International Development Innovation Network (IDIN) at the Massachusetts Institute of Technology (MIT) in the USA, the Prolinnova[2] Secretariat at the Royal Tropical Institute (KIT) in the Netherlands and the PEAPROS consultancy organization in Vietnam conducted a case study between May and August 2016, about eight years after the ETSP closed. This formed part of a larger research project on the Development Outcomes of Local Innovation (DOLI) to investigate the development-related outcomes that emerge from interventions designed to build local capacity for innovation and creative problem-solving in the context of rural farming communities. This research was carried out through case studies in Sri Lanka, Tanzania, Vietnam and Cameroon. The case study in Vietnam focused on understanding to what extent the capacity to innovate of farmers as well as other local actors (such as extension staff) had been strengthened through the use of PTD and related participatory approaches and what development outcomes, if any, these enhanced capacities had helped to bring about in the communities where these approaches had been implemented.

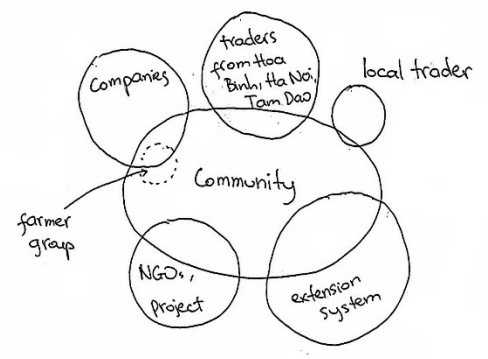
[1] Other participatory approaches introduced and mainstreamed included Farmer Field Schools (FFSs), Participatory Learning and Action (PLA) and Village Development Planning (VDP).

[2] Prolinnova: Promoting Local Innovation in ecologically oriented agriculture and natural resource management (www.prolinnova.net)

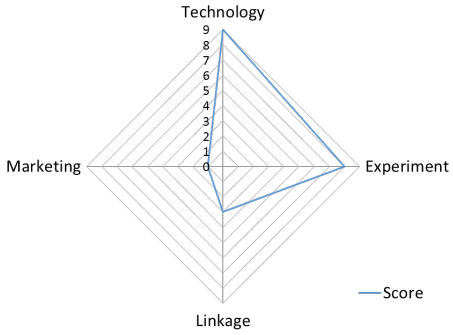
Methodology

Given the lack of existing research on the questions that the DOLI study sought to answer, it was designed as an exploratory study to develop context-specific insights and hypotheses, which can inform future empirical research. As such, a case-study design was used and the methods for collecting the primary data were qualitative in nature. Data were collected from primary as well as secondary sources, such as program documents and reports produced by Helvetas and the Hoa Binh Agricultural Extension Center (HBEC). Primary data were collected through semi-structured as well as open-ended interviews following common interview protocols, focus-group discussions with representatives of different target groups and the application of selected tools of participatory rural appraisal (PRA; see Figure 1).

Figure 1: PRA tools used in Quyet Chien Commune



a. Venn diagram for institutional context



b. Results of matrix scoring for capacity to innovate

The interview protocols were designed for three major target groups: i) local farmers, ii) extension workers, and iii) local authorities and other stakeholders, including staff from international and local non-governmental organizations (NGOs). The PRA tools used in this research included historical mapping (timeline), Venn diagrams for visualizing changing institutional contexts, and matrix scoring for aspects related to the capacity to innovate. The study involved 29 farmers as participants as well as 14 extension and Department of Agriculture and Rural Development (DARD) staff (current and former), six local authorities (village heads and commune chairpersons) and seven staff from local NGOs and community-based organizations that were active in the study areas.

Immediately after conclusion of the fieldwork, draft findings were presented during a half-day workshop to 30 representatives of key stakeholder groups involved in the study, including staff from HBEC at district and commune level, leadership from Hoa Binh DARD, representatives of two NGOs and a researcher from the Vietnamese Forestry University. During this workshop, participants provided the research team with additional information regarding the implementation of PTD as well as capacities that had been developed within the extension system. These insights and the data collected from this workshop were included in the final study findings.

Local context

Hoa Binh Province is located in the Northern Mountainous Region to the northwest of Vietnam's capital city Hanoi. This region is characterized by irregular topography, consisting of steep slopes and mountains interspersed with small, fertile valleys. It has cold and dry winters and hot and wet summers in the higher mountains, with milder weather in the lower hills. Only about 14% of its land area is regarded as arable, but it is very suitable for a variety of crops. With many rivers, streams, ponds and lakes, Hoa Binh has favorable conditions for the development of aquaculture. The region is the home of several of Vietnam's ethnic minority groups, including the Muong, Kinh, Thai, Tay, Yao and H'mong. Among the provinces that comprise the Northern Mountainous Region, Hoa Binh is the province closest to Hanoi. After the capital expanded in 2008, Hoa Binh became located directly next to Hanoi with better connectivity in terms of transportation infrastructure and market access.

Landscape in Hoa Binh Province (Photo: Laurens van Veldhuizen)

Since the implementation of the Doi Moi program (economic reforms initiated in Vietnam in 1986 with the goal of creating a "socialist-oriented market economy"), Vietnam in general and Hoa Binh in particular have witnessed remarkable development. In particular, the socio-economic development program for the most vulnerable communes in ethnic minority and mountainous areas, called the "135

program", initiated by the Government of Vietnam in 1998, supported the local communities to alleviate hunger and poverty through development of infrastructure (roads, electricity, irrigation, schools and hospitals) and sustainable livelihoods.

Hoa Binh has also received considerable technical and financial support from other development programs/projects funded and implemented by international donors (World Bank, Asian Development Bank), international organizations (Japan International Cooperation Agency/JICA, Helvetas, World Vision, Child Fund) and a local NGO (RIC: Research Centre for Community Development Initiatives). Some of these programs also have promoted participatory approaches such as Farmer Field Schools (FFSs) and Village/Commune Development Planning (VDP/CDP), including the Northern Mountainous Poverty Reduction Project (NMPRP) funded by the World Bank and implemented by the Ministry of Planning and Investment.

PTD implementation in Hoa Binh

PTD was first introduced and tested in Hoa Binh Province in 2000 in two communes in Ky Son and Lac Son Districts as part of the Social Forestry Support Program (SFSP). These pilots were developed and implemented by three different agencies, namely Soils and Fertilizers Research Institute (SFRI), Vietnam Forestry University (VFU), and Hoa Binh Agricultural Extension Center (HBEC). After completion of the SFSP, the follow-up ETSP continued to support HBEC to expand the use of PTD. The National Agricultural Extension Center produced a handbook on PTD in Vietnamese and English.

Conducting a PRA (Source: Helvetas Vietnam)

As implemented initially in Hoa Binh Province, the PTD process involved a consistent set of steps and engagements with farmers, and typically lasted one growing season (3–6 months, and occasionally longer). The start of the process involved a series of 2–3 community meetings in a given commune in which extension staff and/or other stakeholder leading the process (such as SFRI or VFU) met with farmers as well as

the key decision-makers in order to understand the challenges farmers were facing and the types of solutions they were already developing, and to present possible innovative approaches which HBEC, VFU or SFRI had identified as having potential to work in the local context. After a participatory process of discussing and ranking the various possible solutions, an approach was selected[3] and a subset of farmers were chosen (following strict selection criteria) as volunteers to try out the new approach. In the examples researched in this study, these experimenting groups involved 10–30 farmers.

The farmers who were selected to develop a particular "model" were then given technical training in best practices for implementing the approach (e.g. growing the new crop or animal breed, or practicing the new farming technique) as well as training in data collection and monitoring in order to be able to compare the results of the new approach with standard practice. In addition, participants received training in "soft skills" such as public speaking and presenting the results of their field trials. The monitoring data collected by the experimenting farmers were gathered by HBEC and shared in a final workshop for evaluating the success of the pilots.

After five years of implementation, in May 2004, HBEC and Helvetas organized a seminar on the effectiveness of the PTD approach in Hoa Binh Province. This seminar confirmed the suitability and adaptability of this approach for agricultural extension in the province. HBEC then advised the Hoa Binh DARD to propose to the Provincial People's Committee (PPC) to expand the implementation of PTD. On 13 August 2004, Hoa Binh Province issued Letter No. 1264/UBND-NLN approving an expansion in testing the PTD approach within the provincial extension system. HBEC held two training-of-trainer courses on PTD for provincial extension officials as well as extension workers in district stations. These courses helped spread the concept and practices of PTD to the entire provincial extension system and created the foundation for the replication of PTD in all districts of the province.

In March 2006, the DARD organized a seminar to reflect on and share experiences with PTD made between September 2004 and March 2006. Based on these findings, in May 2006, Hoa Binh PPC recognized PTD as the official approach of agricultural extension in the province in its Letter No. 690/UBND.

From 2007 to 2016, after the PPC allowed the PTD approach to be officially applied in extension work of the province, the Hoa Binh extension system has maintained and synchronously implemented PTD at different levels from province to district and commune by mobilizing various resources, including provincial and district budgets as well as funds mobilized from development projects (JICA, World Bank) and the private sector (for example, a private seed company and an organic vegetable company). Each year, on average, HBEC has implemented about 200 extension cases (including PTD processes and field demonstrations). Table 1 shows the relevant HBEC activities from 2013 to 2015.

[3] In the Vietnamese context, the innovative approach that was selected was referred to as a "model." Each "model" that the research team studied represented a specific innovative approach (e.g. new crop, new agricultural practice, new technology) that was developed and/or introduced through PTD.

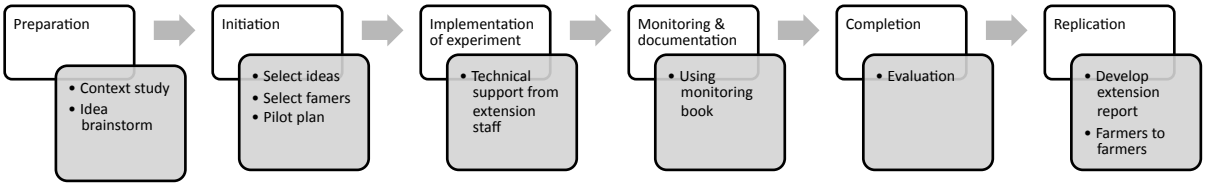
Table 1: HBEC activities related to PTD processes and field demonstrations 2013–15

Year	No. of extension cases (PTD + field demonstration)	No. of farmer participants	Budget (VND: Vietnamese dong)	Rough € equivalent
2013	282	4030	6,735,401,000	244,610
2014	214	2031	5,941,290,000	203,720
2015	200	2230	3,457,354,000	142,530

Source: Summarized from annual reports of HBEC in 2013, 2014, and 2015.

Over the years, PTD implementation became more flexible than it had been in SFSP/ETSP, as is evident in the report on the sharing of findings workshop hosted by HBEC in 2016 to discuss the findings of this case study. PTD still follows the main steps as illustrated in Figure 2 below; however, there are now some cases in which the initial 2–3 steps are skipped over in order to move more quickly to implementation of a solution already developed by a private company or by HBEC. The number of farmers involved in more recent cases of PTD in Hoa Binh that could be identified in this case study varied from as few as two to as many as 20.

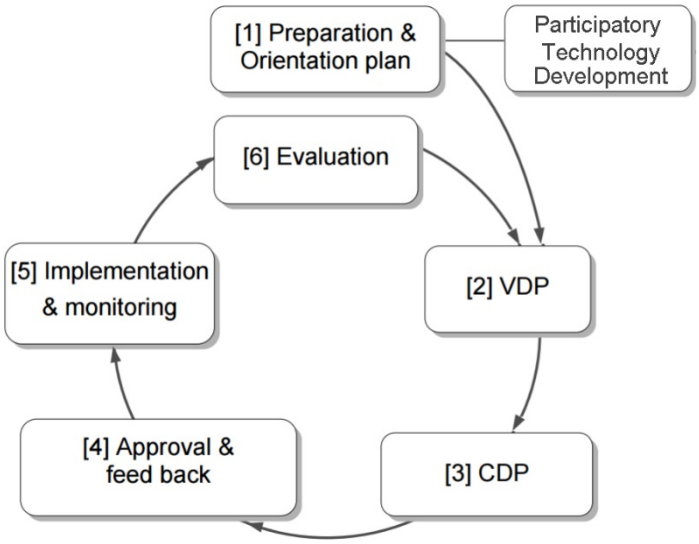
Figure 2: Main steps in the PTD process in Hoa Binh Province in 2016



Source: Adapted from HBEC presentation in the sharing workshop, Hoa Binh, 2016.

After the institutionalization of PTD in 2007, the way in which the PTD approach was applied varied, depending on the characteristics of different programs and projects implemented in Hoa Binh Province. The PTD approach was formally included in the policy, training and practice in HBEC's working agenda. After the VDP/CDP approach was introduced in the province, especially by the NMPRP, PTD was then integrated into the VDP/SCP process. According to HBEC, PTD is now considered as an input to the VDP related to agriculture and farming technique development. When making the Preparation & Orientation plan of the VDP, if any need were to be identified to develop new technology, then PTD would be integrated into the Village Socio-Economic Development Plan. The replication of a successful PTD case to other villages or other communes should be integrated into the Commune Socio-Economic Development Plan, as shown in Figure 3.

Figure 3: Integration of PTD in the decentralized development planning system



Source: HBEC, adapted from the Procedures for Village & Commune Development Planning Guidelines, ETSP, Helvetas Vietnam.

Development outcomes

The interviews with both farmers and extension staff revealed that involvement in PTD strengthened their capacity to innovate in several important ways. Farmers reported that their skills and confidence related to experimenting and trying new things (techniques, crops, approaches) improved. Farmers interviewed during the study had learned how to carry out an experiment, monitor the results and make decisions on different alternatives based on their priorities, capabilities and externalities. This helped them gain confidence in planning their agricultural activities as well as selecting suitable crops and techniques for their plots.

Involvement in PTD also allowed the farmers to access new knowledge and skills related to agricultural production, including new cultivation methods, new varieties, and new techniques of land cultivation and fertilizer and pesticide application. They regarded these technical skills as the foundation for conducting experiments and being able to compare different practices in order to select the most suitable way forward. Soft skills that are also part of the capacity to innovate, such as confidence in engaging with officials and researchers as well as having skills necessary to work well with others (such as being able to effectively present and share information, organize and facilitate interactive meetings, and present in public) were developed by some farmers in the study. These farmers were often selected as resource persons for PTD activities implemented by HBEC. Table 2 summarizes the findings on these changes for the farmers interviewed.

Table 2: Findings related to strengthened capacities of farmers

New skills and knowledge
1. Technical: how to plant and use new varieties and breeds, new methods of cultivation (e.g. sloping land), improved farming techniques (e.g. fertilizer application), animal husbandry practices 2. Increased skills and knowledge related to the capacity to innovate: a) Ability to identify and prioritize opportunities and challenges b) Ability to conduct experiments, monitor, learn and improve c) Ability to assess options and trade-offs, take calculated risks d) "Soft skills" to present, speak in public, teach other farmers
Changed mindset and behaviors
1. More open and willing to try new things, more open to risk 2. More willing to share and teach each other 3. More "proactive" in improving their farms; more willing to invest 4. More proactive in seeking information and linking with others
Strengthened linkages
1. More frequent interaction with extension services 2. Changed and strengthened relationship with extension 3. Increased connections to other stakeholders (e.g. traders, private industry, other NGOs and market actors)

Source: Summarized from interviews and group discussion

These strengthened capacities, including both technical and experimentation skills, helped the farmers to intensify and diversify their agricultural production activities. In some districts with favorable natural conditions such as Cao Phong and Tan Lac and where farmers had good experience, tradition and rapidly improving market access, they were able to shift from self-sufficient subsistence production to market-oriented commodity production. In the districts with less favorable conditions, such as Ky Son and Da Bac, the farmers were able to test and adopt new crops and types of livestock, leading to more diversified agricultural production and options to generate higher and more stable income (see Table 3).

Table 3: Results and outcomes of selected PTD cases in Hoa Binh Province

District / PTD case	Initial extent of participation	Spread of case	Outcomes
Cao Phong			
Mulberry 2000–2001	24–30 households	250 farmers in 3 communes	Crop diversification; input for craft industry
Orange 2007–2010	Unknown	Widespread; now main cash crop in district	Intensified cropping for commodity production

Ky Son			
Giant tea 2000-2001	12 households	In Vanh Village and neighboring villages	Crop diversification; reduced labor inputs
Rattan fencing 2000	30 farmers	Still grown in Vanh village limited spread	Unclear
Cattle fattening 2004-2005	Unknown	Popular and standardized method for cattle raising	Reduced labor inputs; environmental protection
Tan Lac			
Chayote vegetable 2008	2 households (5000 m^2)	40 ha in Quyet Chien Commune	Commodity production
Red grapefruit 2005–2009	Unknown (5 hectares)	Nearly 1000 ha in Tan Lac	Crop diversification; commodity production
Kim Boi			
BC15 rice 2010	15 households; 5.4 ha	Widespread at provincial scale	Commodity production for state-owned enterprise

Source: DOLI case study data

The PTD process strengthened the capacity to innovate not only of farmers but also of the extension staff in Hoa Binh Province (these changes are summarized in Table 4 below). Of particular note, as it was mentioned consistently by both farmers and extension staff, was a change in the relationships and dynamics between farmers and those working in the extension system. Through participation in the PTD process, the extension staff at the commune level started to work more closely with the farmers, began to appreciate that farmers possessed valuable knowledge and experience, and started to engage in active efforts to learn from farmers. This represented a significant shift in paradigm and practice from the traditional top-down model employed throughout the extension system and government agencies more broadly, in which extension staff were seen as the source of specialized expertise and farmers as recipients of advice and inputs.

Table 4: Findings related to strengthened capacities of extension staff

New skills and knowledge
1. Technical: about new growing techniques and animal husbandry practices developed by innovative farmers in other districts (through learning tours) a) Technical: skills related to PTD, experimentation, innovation process b) How to do needs assessment of farmers, PRA techniques c) How to identify, rank, and prioritize challenges and opportunities d) How to set up and monitor experiments and field trials

2. Increased “soft skills” related to participatory processes:
    a) Learning how to ask questions to farmers and listen to them
    b) Skills facilitating farmer meetings and participatory processes
    c) Communication skills with farmers: learning how to “speak to farmers” and build rapport and how to be responsive to farmer needs

Changed mindset and behaviors

1. A changed view of farmers: learned how to “sit together with the farmers at the same level”
2. More willing to spend time in the field “learning by doing” with farmers
3. Change in view of role: willing to connect farmers to other sources of information and expertise beyond their own

Strengthened linkages

1. A change in the relationship between extension and farmers, from “top down” to “bottom up”
2. Increased connections with other stakeholders (SFRI, VFU, private sector such as seed companies, etc.)

Source: Summarized from interviews and group discussion

Over the past years, changes in the capacities and approaches within the extension system combined with changes experienced by farmers have led to an increase in farmer income. Farmers and extension staff developed new income-generating activities such as growing chayote (*Sechium edule*) and high-value citrus crops (e.g. grapefruit, oranges, pomelo) and raising new types of livestock such as domesticated wild pig. The income from those activities was remarkably higher than from conventional agricultural activities in these areas, such as growing sugarcane and rice. For example, a farmer in Nam Phong Commune (Cao Phong District) can earn 600–800 million VND from a hectare of orange trees, in comparison to only 200 million VND from the sugarcane crop previously grown there. During the study, various indicators of higher incomes could be seen in the households that produce chayote, grapefruit (Tan Lac District) and oranges (Cao Phong District). These families had newer and more solidly constructed types of housing (i.e. concrete instead of the traditional wood and thatch), better means of transportation (e.g. motorbikes) and more household assets than did other local farm families.

An additional intermediate outcome affecting not only the PTD pilot communities but also other communities throughout Hoa Binh was the institutionalization of PTD within the government extension system in the form of the PPC formal decisions and subsequent budget allocations for implementing PTD province-wide. As PTD had obviously strengthened farmers’ and extension staff’s capacity to innovate in the pilot areas, its institutionalization helped to spread changes in attitudes, knowledge and skills related to capacity to innovate throughout the extension system. This is likely to have a positive influence of agricultural innovation more widely in the province.

At the same time, the study also found that the PTD approach has become less prominent in the work of the Hoa Binh extension service since 2010. Interviewees mentioned multiple factors that may have contributed to the reduced emphasis on facilitating PTD, including the reduced need for PTD (which was perceived as being most appropriate for testing and introducing major new crops and techniques), the preference of current donor projects for the FFS approach (which has gained popularity as an effective means of disseminating new crops and techniques), budget limitations within the government extension system and – perhaps most significantly – the loss of experienced PTD field staff through retirement as well as promotion. Furthermore, incoming junior staff members who took part in this study reported that they are not currently being trained in PTD, either in their universities or when they reach HBEC. This further erodes the capacity of the agricultural extension system to continue implementing this approach in its former intensity.

Conclusions

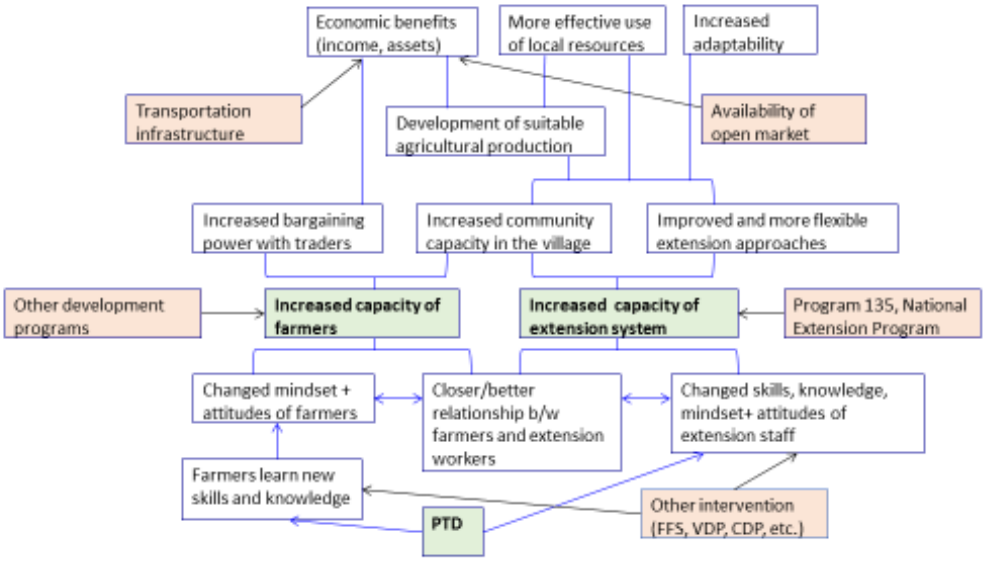
Overall, the study found that PTD contributed to building capacities within the pilot farming communities as well as within the broader agricultural extension system of Hoa Binh Province. These enhanced capacities helped farmers take advantage of major economic and policy changes occurring at regional and national level, such as the shift towards market-oriented agricultural production and the government investments in local infrastructure in Hoa Binh Province, which linked it better to rapidly growing urban markets.

As a result, farmers who were previously producing only for their families or local markets could diversify and intensify their production to include cash crops to sell on larger markets, while other farmers switched their production entirely from lower-value cash crops such as sugarcane to higher-value crops such as oranges. The skills, capacities and mindsets that farmers developed through their exposure to PTD and other participatory methods helped them make this transition successfully, equipping them with the knowledge and confidence to make informed choices regarding how best to allocate and use their scarce land and other resources in order to increase their incomes and family wellbeing. The role of PTD in interaction with developments in the local context and local institutions towards realizing the above-mentioned development outcomes was discussed extensively with the stakeholders during the validation workshop. This led to the agreed framework shown in Figure 4.

In combination with other participatory approaches and tools promoted by the projects and HBEC such as FFSs and VDP/CDP, PTD also helped improve the working relationships between farmers and extension staff. Both farmers and extension staff who were interviewed in the study regarded PTD as a useful approach for co-developing new techniques related to agricultural production that could draw on the knowledge of both farmers and extension staff, resulting in well-adapted local solutions. The institutionalization of PTD in Hoa Binh Province as an official extension approach was considered by local stakeholders to be an indicator of the success of the two projects implemented by Helvetas during the last decade. However, despite the official adoption of PTD by the extension system, the study

team found limited evidence of its current application in day-to-day extension practice for the reasons presented above, particularly those related to insufficient funding for the costs associated with implementing PTD at the local level.

Figure 4: The PTD – Development outcome framework in the case of the Hoa Binh case



Policy implications and recommendations

Policy implications for the agricultural sector in Hoa Binh Province

1. ***Integrate PTD activities into the annual workplan of the extension services.*** Hoa Binh provincial authorities, especially the leaders of the agricultural sector, assessed PTD as a useful extension approach and committed their support to continue the implementation of PTD in Hoa Binh. In order to fully utilize the potential of PTD, Hoa Binh DARD in general and HBEC in particular should consider developing an annual workplan for the extension services that includes PTD activities and projected funding sources/options. Building of staff capacity in PTD also needs to be planned.

2. ***Identify new contexts in which PTD can be applied.*** Some extension staff thought that there was a decreasing need for applying a PTD approach because cropping patterns are currently fixed in some areas and there is less need to introduce major novelties into the farming systems. But PTD does not need to be limited to creating new technologies from scratch; it can also be used to modify existing technologies or adapt technologies and approaches to new areas and changing contexts. It can likewise be used for developing post-harvest storage and packaging techniques. PTD processes and experiments can also be integrated into other participatory approaches that are in widespread use, such as FFSs.

3. ***Assist in the formation and strengthening of farmer groups.*** The lesson learnt from other DOLI case studies in Sri Lanka and Tanzania showed that the formation of small groups of experimenting farmers was one of the key factors contributing to the success of capacity-building efforts related to local innovation. In Hoa Binh Province, the capacity of farmers to form and work in groups is still fairly weak. Hoa Binh DARD could mobilize the Farmer Union at all levels to help the farmers set up groups/clubs for sharing technical information, experimentation and technology development. It is also recommended that other types of groups such as community-based organizations and common-interest groups be encouraged to apply a PTD approach. Elsewhere in Vietnam, there is a good example of working through farmer groups to strengthen the impact of PTD: the work of VVOB (Flemish Association for Development Cooperation and Technical Assistance) in the Mekong Delta. This is a potential source of capacity building and mentoring for other organizations wanting to take this approach.

Recommendations for the agricultural sector in Vietnam

1. ***Evaluate the implementation and results of PTD nationally.*** Now that PTD has been recognized and applied as an official extension approach in Hoa Binh Province – although in differing degrees of intensity – and has also been applied elsewhere in Vietnam with the support of VVOB, it would be a good time to assess the experiences in and outcomes of practicing PTD more widely within the country, and to explore its appropriateness for the national extension system.
2. ***Disseminate the PTD training manual more widely.*** The development of a PTD training manual by the National Agricultural Extension Center (NAEC) in 2002 was highly appreciated then and is still appreciated to this day by those who are familiar with the manual. It is recommended that the NAEC share the manual with all of the provincial centers and all universities with an agriculture faculty in order to spread information on the PTD approach and to help scale up its application.

List of acronyms

CDP	Commune Development Planning
DARD	Department of Agriculture and Rural Development
DOLI	Development Outcomes of Local Innovation
ETSP	Extension and Training Support Project
FFS	Farmer Field School
HBEC	Hoa Binh Agricultural Extension Center
JICA	Japan International Cooperation Agency
NAEC	National Agricultural Extension Centre
NGO	non-governmental organization
NMPRP	Northern Mountainous Poverty Reduction Project
PPC	Provincial People's Committee
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
SFRI	Soils and Fertilizers Research Institute
SFSP	Social Forestry Support Program
VDP	Village Development Planning
VFU	Vietnam Forestry University
VVOB	Flemish Association for Development Cooperation and Technical Assistance