

Adapting the innovation systems approach to agricultural development in Vietnam: challenges to the public extension service

Rupert Friederichsen · Thai Thi Minh ·
Andreas Neef · Volker Hoffmann

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Abstract Competing models of innovation informing agricultural extension, such as transfer of technology, participatory extension and technology development, and innovation systems have been proposed over the last decades. These approaches are often presented as antagonistic or even mutually exclusive. This article shows how practitioners in a rural innovation system draw on different aspects of all three models, while creating a distinct local practice and discourse. We revisit and deepen the critique of Vietnam's "model" approach to upland rural development, voiced a decade ago in this journal. Our analysis of interviews with grassroots extension workers and extension managers reveals how they have received government, donor, and academic discourses on participation, user-orientation, and private sector involvement in innovation. Extension workers as well as managers integrate the reform discourses into the still-dominant transfer of technology model. We show how extensionists draw selectively on these diverse discourses to foster interaction with outsiders and clients, and bolster their livelihood strategies. We

conclude that the conceptual framework suggested by the innovation systems (IS) approach is broadly appropriate for analyzing the Vietnamese case, but that the IS approach in the contemporary Vietnamese context requires adaptation for taking into account the blurred line between private and state sectors, and recognizing the hegemonic position of state-based networks. Improving extensionists' ability to mediate between the conflicting principles of farmers' self-organization and government control is identified as a key challenge for increasing innovative capacity in rural upland Vietnam.

Keywords Innovation systems · Agricultural extension · Demand-orientation · Vietnam · Uplands

Introduction

Vietnam's extension system is undergoing changes that make it increasingly difficult to describe it using familiar categories. The Vietnamese polity and society as a whole are changing from a state-dominated system to a more plural and maybe more open system. However, this change involves more than the straightforward change that the phrase "from state to market" would suggest. Equally, the agricultural extension system is moving away from a purely model-based transfer of technology approach that underpinned postwar efforts to boost agriculture. But whereas the model-based approach has been under attack for at least 10 years, it has yet to be shown to what extent and how exactly alternative models of extension—built around farmers' knowledge, farmers' participation, and farmers' needs—can foster agricultural development within the Vietnamese political and socio-cultural context.

R. Friederichsen (✉)
CISV International, Newcastle upon Tyne, UK
e-mail: rupert.friederichsen@gmail.com

T. T. Minh
Institute of Food and Resource Economics, Faculty of Life Sciences, University of Copenhagen, Copenhagen, Denmark

A. Neef
Resource Governance and Participatory Development, Graduate School of Global Environmental Studies, Kyoto University, Yoshida-Honmachi, Sakyo-ku, Kyoto 606-8501, Japan

V. Hoffmann
Department of Social Sciences in Agriculture, University of Hohenheim, Stuttgart, Germany

The debate around rural innovation and transfer of agricultural technology has occupied a prominent place in the study and practice of rural development throughout the second half of the 20th century. Influential concepts such as transfer of technology (ToT) and the diffusion and adoption of innovations paradigm (Rogers 2003) have increasingly become targets of criticism (Hoffmann 2007). In the applied literature, more stress has been put on the need to foster actors' innovative capacity (rather than provide technical "solutions") through participatory technology development (PTD) whereby farmers are involved early on in the innovation process through, for instance, farmer groups, farmer-led trials, and on-farm experimentation (Ashby 2003; Hoffmann et al. 2009). Conceptually, this has been accompanied by the recognition that innovation depends on networking and collaboration, and the idea that the study of innovation requires a systemic perspective, especially attentive to multiple sources of knowledge and its non-linear movement (Biggs and Smith 1998; Engel 1997; German et al. 2006). Rural areas across Southeast Asia have struggled to keep up with the overall speed of development, in particular ethnic minorities inhabiting remote areas (Rigg 2005). In response, the governments of Laos and Vietnam have created state-led agricultural extension systems, but their ability to reach and cater to ethnic minorities in particular have been limited (Millar et al. 2011; Friederichsen and Neef 2010).

In Vietnam, participatory approaches to rural innovation, such as Farmer Field Schools, Farmer Livestock Schools, and other group-based extension approaches have been championed by international donors since the 1990s. In the state-official extension service, practical change towards participatory extension for animal husbandry has been documented in case studies (Minh et al. 2010; Schad et al. 2011). Since the early 2000s, the policy concept of the "socialization" of extension—*xã hội hóa khuyến nông*—symbolizes the broad shift from a purely state-based model to a more pluralistic and collaborative one, which elevates the private sector, family farm enterprises, and farmers' associations to fully recognized actors alongside the state (Minh 2010). However, there are few studies assessing systematically how the discursive shift from ToT towards more participatory and demand-oriented approaches fits into existing institutional structures and, crucially, how they are received by grassroots extension officers. The ToT-based "model approach" to rural innovation has previously been found to dominate the Vietnamese government's development policy and practice (Peters 2001). This study empirically and conceptually expands on the critique of the model approach and addresses the question: Is the Vietnamese agricultural extension system moving beyond the model approach?

We find that, a decade on from Peters (2001) study, similar problems persist and that model-based thinking is still strong in Vietnam's extension system (see also Schad et al. 2011).

However, although today's extensionists continue to primarily follow the model-based and state-led approach, they also draw on participatory, market- and demand-oriented discourses. In doing so, they produce an inconsistent discourse indicating a changing overall innovation system rife with internal tensions and contradictions. Moreover, the co-existence of various approaches suggests that extensionists cautiously "stretch" and explore the limits of what they can do within the old model approach, rather than replacing one normative approach to extension by another.

One key source of tensions lies in the co-existence of a quickly evolving market economy operating within a one-party Socialist political system that continues to dominate collective decision-making in important ways. Starting in the mid-1980s, Vietnam's *đổi mới* process of mainly economic reforms is widely seen as having heralded a new era shaped by decentralized market forces and the retreat of the state's central planning (Kerkvliet 2005). However, our findings demonstrate the continuing hegemony of the model approach and suggest that the pre-*đổi mới* centralized, state-led planning paradigm is still dominant in the study area. We therefore suggest that this apparent contradiction can be resolved if one accepts that in spite of all *đổi mới* rhetoric, the system of Communist Party dominance in contemporary Vietnam's northern uplands is rather stable, and that the Vietnamese state and private sector can only be understood as closely linked and analyzed in conjunction (Gainsborough 2010; Friederichsen 2012). Innovation systems thinking, therefore, needs to account for the possibility of *public as well as private* nature of extension provision in contemporary Socialist polities such as Vietnam and its consequences at the micro-level.

The following section outlines the article's conceptual framework by tracing recent developments in innovation systems thinking and introducing the concept of "actor orientations" that guides the empirical analysis. Then the empirical data and analysis underlying the article are presented, and followed by the discussion of the empirical results. The paper concludes with recommendations for increasing innovative capacity in Vietnam and by suggesting some conceptual adaptations to the innovation systems approach.

Innovation systems approach

The general concept of innovation systems (IS), and more specifically agricultural innovation systems (AIS), has become the dominant approach to understanding as well as fostering innovation (see Fløysand and Jakobsen 2011; Altenburg et al. 2008; STEPS Centre 2010 for general discussions of IS, and Spielman et al. 2011; Spielman and Birner 2008; Clark 2002; and Hall et al. 2001 on AIS). The

IS literature argues that relationships and information exchange across organizations such as (agricultural) enterprises and across domains are key to increasing innovative capacity. The five basic domains of an innovation system are (1) enterprise (e.g., farms), (2) demand (e.g., food consumers), (3) education and research (e.g., agricultural research institutes), (4) support structures (e.g., transport infrastructure, banking system), and (5) intermediaries (e.g., agricultural extension, NGOs or any other group supporting the flow of information in support of innovation) (Rajalahti et al. 2008). Consequently, IS thinking relies heavily on concepts such as networks, bridging, and brokerage.

In its stress on connectivity, the IS approach moves beyond earlier conceptualizations of innovation. IS thinking views innovation as dependent on the multi-directional flow of knowledge and emphasizes the demand side in innovation processes, as opposed to previous concern for the supply and one-way diffusion of scientific knowledge (Klerkx and Leeuwis 2008). Furthermore, innovative capacity is seen as dependent on the effective institutional linking of more than one domain in order to allow for information to flow as widely as possible (Clark 2002). For instance, Spielman et al. (2011) draw on an IS perspective and social network analysis to show that in rural Ethiopia, public extension and administration has such a strong influence on smallholders that market-based and civil society actors risk being crowded out, thereby possibly hindering innovation.

Intermediaries are a central actor type in innovation systems due to their function to bridge informational gaps and mediate between the interests of actors comprising the system. For instance, academic and expert technical knowledge (of financial products, for example) is typically not readily accessible for, applicable and intelligible to farmers and other practitioners. Furthermore, direct interaction may not be feasible due to the geographically dispersed and multi-level nature of the innovation system. In our case, transport infrastructure is often poor and the remoteness of many villages means that only few public or private extensionists actually give farmers access to information, for example, regarding commodity markets, opportunities to access credit, and improved varieties.

Traditionally a stronghold of public, government-funded provision and recipient of official development assistance, the rural intermediary domain is becoming increasingly diverse. It now includes also commercial actors (e.g., agricultural input companies, business consultants) and non-profit organizations (e.g., development NGOs). However, continued public provision of intermediary knowledge services is required because private providers have been found to be insufficiently monitored and supervised, with their services typically only reaching the more market-oriented segment of farmers (Kidd et al. 2000). In addition, the private provision of knowledge services has been found to be

difficult to administer, not least because users and providers find it difficult to agree on a specific value for advisory services (Klerkx and Leeuwis 2009).

Recent studies have moved away from the typically high level of aggregation of earlier IS studies (cf. Klerkx et al. 2010, p. 391). Spatially, the local and interpersonal level has entered the focus, not replacing, but adding to the national and supra-national levels. Temporally, the focus on long-term technological change has been complemented by attention to ongoing innovation processes and shorter time frames. As so-called innovation brokers (Sheate and Partidário 2010), extensionists may be expected to play an impartial third party role for increasing a system's innovative capacity, but they are neither necessarily the source nor even the transmitter of innovations (Klerkx and Leeuwis 2009, p. 851). The three basic functions of innovation brokers in the IS are:

- (1) demand articulation: articulating innovation needs and corresponding demands in terms of technology, knowledge, funding, and policy;
- (2) network formation: facilitation of linkages between relevant actors (scanning, scoping, filtering, and matchmaking of possible cooperation partners); and
- (3) innovation process management: enhancing alignment and learning of the multi-actor network, which involves facilitating learning and cooperation in the innovation process. (Klerkx and Leeuwis 2009, p. 851)

Fulfilling these functions and successfully mediating between all relevant stakeholders is a demanding task which requires a high level of interpersonal and negotiating skills from extensionists as well as a supportive policy framework. Stelling et al. (2009) analyze a learning alliance between extension organizations in Laos set up to strengthen pig husbandry through improved legume production. Their study highlights that creating a network which connects individuals and their organizations from the government and non-governmental sector has mobilized complementarities and led to improvements in levels of support offered to remotely living, poor ethnic minority communities.

As Fløysand and Jakobsen (2011) point out, innovation systems studies should pay close attention to power relations between actors to clarify by whom and how formal and informal knowledge production and dissemination are controlled. Power relations also underpin the interplay between local and external actors in shaping specific innovation practices and processes. In our empirical case, we approach the aspect of power relations from two sides. Firstly, we discuss factors underpinning and stabilizing the dominant approach to innovation; these factors are revealed by unpicking how demonstration models (*mô hình* in Vietnamese) are established and managed. Analyzing *mô hình* reveals key

interests of extensionists, institutional rules governing the extension system, and widely held assumptions regarding ethnic minority farmers' status in society. Secondly, we explore the scope for change through the lens of actor orientations held by grassroots extensionists. We empirically establish how extensionists think about farmers' demands, how they describe the various formal and informal networks that they operate in, and how they manage conflicts that arise in the innovation process. Together, these orientations constitute the room for maneuver which extensionists feel are afforded to them by the rules set by the state and the extension system. This analysis integrates aspects of what actors perceive as determined by their institutional environment, with areas over which actors feel they have discretion and autonomy (cf. Mayntz and Scharpf 1995; Friederichsen 2009). Together, this provides a basis to gauging the extent to which the extension system is moving away from the model approach, towards more participatory and demand-oriented practice.

Empirical data and analysis

Between December 2009 and January 2010, a total of 19 grassroots extensionists (or commune extension workers, CEWs) from four northern Vietnamese uplands districts and six extension managers and leaders at the district and province level were interviewed (see "Appendix"). The districts chosen (see Fig. 1) for in-depth study include Yên Châu, where most of the research team's prior fieldwork has been conducted since the year 2000.¹ Furthermore, Mai Sơn, Sơn La town, and Phú Yên were selected in order to cover a sample that does justice to the heterogeneity of the province. Sơn La town covers a more urbanized setting, whereas Mai Sơn is a district with a strong history of agricultural innovation in, for instance, industrial sugar cane production and more recently attempts to introduce rubber production. Phú Yên was chosen because it is a priority district for provincial poverty reduction programs and related innovation demand.

Interviews with CEWs followed a guideline that was prepared beforehand by the research team. Each interview covered the broad areas of (1) Personal characteristics of respondents (e.g., work experience, education), (2) CEWs' work practice (e.g., day-to-day tasks, relationships with line managers and farmers), (3) CEWs' training and access to new information (e.g., exposure to participatory extension approaches, training provided by international development

projects), and (4) Key innovations (e.g., successes/failures, personal role in innovation processes). A Vietnamese research assistant conducted the approximately one hour-long interviews in Vietnamese language. Interviews were documented through audio recording of the interviews and the German researcher's written notes. The research assistant subsequently transcribed and translated all CEW interviews. This division of tasks was time efficient and allowed a flowing conversation between native speakers to unfold at the time of interviews, and produced a precise record of extensionists' spoken discourse in English and Vietnamese language. Audio recordings of interviews with extension managers were used as a supplementary data source. Quotations and summaries taken from interviews are referenced using the interview codes listed in "Appendix", for instance, CEW1 indicates a commune extension worker and EM20 an extension manager.

The qualitative analysis was performed in two steps. First, a qualitative content analysis using the English translations was performed. Second, an in-depth interpretive analysis going back to the corresponding Vietnamese transcripts probed key hypotheses emerging from step one.

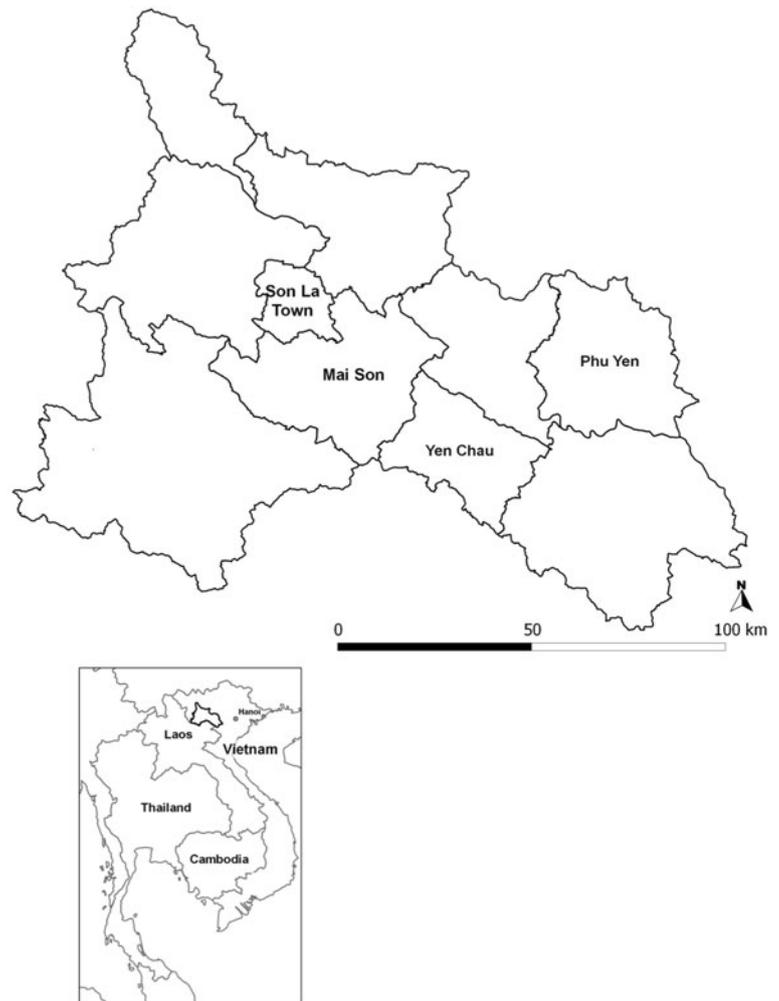
Qualitative content analysis of English transcripts followed Mayring (2003) to enable a rigorous, systematic, and computer-supported analysis (using Atlas.ti[®] software) that is category-lead and deductive rather than open-ended and inductive. The empirical analysis is centered on CEWs and their orientations. CEWs constitute an appropriate entry point to studying the Vietnamese AIS's intermediary domain because they constitute the point of delivery of extension services. To do justice to extensionists as reflective actors, and in addition to the IS scheme, their individual perceptions of their own "self" and their role in the innovation process, as well as their conceptions of "innovation" require analysis. "Clients" in Fig. 2 refers to farmers and farmers' groups, which in general IS terms is equivalent to the enterprise domain. In the Vietnamese AIS, the state largely controls education and research as well as support structures, therefore "state" accounts for what is considered to be two domains in the cited IS literature.

Based on the four dimensions and in a process of discussion spanning the period of fieldwork and analysis, the research team developed a tentative, larger set of codes. In the second step, those codes found most frequently in the empirical material, and which contributed most to answering the four research questions listed below, finally entered the set of four key codes (see diagonals of Fig. 2).

The guiding question for the second step of the analysis is: How far do extensionists depart from the model approach? Reflecting the four key codes, the research questions are:

- Demonstration model: How and to which extent can extensionists imagine departing from the standard

¹ The author team has been involved in different roles in the Collaborative Research Programme into Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia (SFB 564); see <https://sfb564.uni-hohenheim.de>.

Fig. 1 Map of study area

model of innovation transfer exemplified by the demonstration model or *mô hình* in Vietnamese?

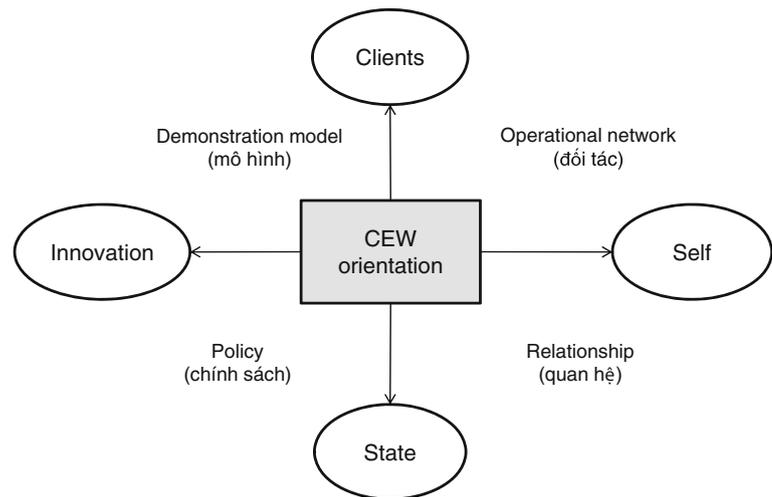
- Operational networks: How do extensionists position themselves in relation to the state-official and other social networks in which they operate?
- Policy: How do extensionists see and position themselves in relation to discrepancies between development policy in support of certain strands of innovation and farmers' demands?
- Relationships: How do extensionists describe their relationships with farmers and other stakeholders?

Results and discussion

Mô hình—Why the model approach to innovation transfer lives on

Peters' (2001) critique of the model approach to rural development in Vietnam identified some key problems that still resonate a decade on. One persistent problem is that

innovation is misunderstood as being synonymous with developing and disseminating models of technological packages for improved agriculture, forestry, and animal husbandry. The concept of *mô hình*, demonstration model, exemplifies this as it still lies at the heart of the prevalent model of (rural) innovation transfer in Vietnam. The term is frequently used and can be safely assumed to carry meaning for anybody working in the extension system. *Mô hình* is used not only in relation to the promotion of innovative technology packages, but can also refer to model villages and model industries, signaling priorities of the government's rural development planning. So the concept *mô hình* can be used across different levels and in several variations, but ownership of the innovation process and key agency tends to be with actors other than farmers or ordinary citizens. In agricultural extension, *mô hình* is the short form commonly used in spoken language. The more precise technical terms *mô hình trình diễn*, performance demonstration model, and *mô hình thử nghiệm*, experimental model, are less commonly used; as shown in Table 1.

Fig. 2 Coding concept**Table 1** *Mô hình*—Variations on a frequently used term

Code name (Vietnamese key word)	Explanation of code	Number of quotations
Demo model (<i>mô hình trình diễn</i>)	Performance model showcasing ready to go technology; in official extension or commercial context	41 (in 16 out of 19 interviews)
Demo trial (<i>mô hình thử nghiệm</i>)	Applied research trial, to demonstrate an ongoing and open-ended search for innovative solutions	10 (in 7 out of 19 interviews)
Demo (<i>mô hình</i>)	Residual code for statements which cannot be unambiguously categorized under other two codes	9 (in 5 out of 19 interviews)

The most common way in which extensionists referred to innovation was simply mentioning individual technologies (85 quotations), as compared to only 17 instances where innovations were addressed in a more integrated manner. Mentioning a specific technology is a common short hand to address important areas of extension work, as are the catchphrases “we transfer science and technology to farmers” (*chuyển giao tiến bộ khoa học cho người dân*) or “we propagandize innovations” (*phổ biến kỹ thuật*). Several respondents touched upon economic aspects of innovations, but only one CEW (CEW1) developed a somewhat elaborate picture of links between innovations and economic variables by suggesting that (1) wealthier farmers tended to be more innovative than poorer farmers, that (2) some innovations are more appropriate to wealthier households, and that (3) a lack of market-orientation of farmers has in the past led to the failure of the introduction of cash crops such as potato and garlic. This discourse of *mô hình* therefore reveals that innovation is often couched in Socialist political and economic vocabulary and

that innovation work is conceptualized as a matter of broadcasting from a central source.

Mô hình and CEWs’ day-to-day work

Implementing *mô hình* is the key delivery mechanism of the state’s extension system making it a central tool in government policy aimed at stimulating innovation to support the modernization and commercialization of agriculture through technology transfer. Nevertheless, also private actors such as seed companies also frequently use *mô hình* in their extension efforts, as it offers a low-cost and easily manageable method for extension, for instance, to demonstrate the potential of new hybrid plant varieties under the ecological conditions of a given locality.

As the extension system’s main type of deliverables, government funds allocated to extension are to a large extent channelled through *mô hình*, and the number of *mô hình* established is a key indicator in the evaluation of extension work. Therefore, CEWs’ discourse around demonstration models reveals a number of common practices that characterize their organizationally defined roles and how they perceive of their roles in the innovation process. *Mô hình* is commonly mentioned in conjunction with specific technologies that the government promotes as part of development planning; for example, demonstration models of hybrid varieties of maize, rice or sugar cane are very popular. *Mô hình* contribute to defining work roles within the extension organization through, for instance, expectations of their line managers, as well as farmers, that CEWs implement, manage, and be responsible for demonstration models. This involves the channeling of money to villages and may include rather unexpected sources of funding:

In this region, maize and rice are the most popular crops. So I focus on the techniques for maize and rice

cultivation through performance models. The Ministry of Construction always offers many models to direct farmers in the best way to apply basic and additional doses of fertilizer. (CEW3)

A CEW with some managerial responsibilities explained that:

I supervise CEWs and check if they follow Government regulations exactly regarding the implementation of models. I also teach and train farmers. [...] For example, regarding the pig breeding model, I only need to look at the pigs to assess how well the extension worker did. Or I can talk to farmers in order to understand how the CEW works. (CEW4)

CEWs reported a monthly income equivalent to 67–77 USD. In order to support a family most CEWs seek to earn additional income, most commonly through their own farming and from trading agricultural inputs such as seeds, fertilizers, and veterinary supplies. It is standard procedure that government or international development agencies pay for the establishment and running of *mô hình* as part of rural development programmes. For grassroots extensionists, this offers official as well as unofficial opportunities to tap into development subsidies. Officially, extensionists are to lead the whole process of innovation-transfer-by- *mô hình*: selecting participating farmers; purchasing required materials; establishing the innovative animal-rearing or crop production model; monitoring the model's performance in comparison to common farmer practice; and, finally, analyzing and disseminating results. Being in charge of this process entails a degree of control over the associated budget which brings status and some material benefit for CEWs through commissions and a mark-up on purchased inputs, and getting a share of the harvest from *mô hình*. Consequently, several extensionists pointed out in interviews that a major obstacle for extension workers is the limited funding available for *mô hình*. From the point of view of the Yên Châu district extension manager, state funding for extension can only cover performance models for some farmers and in some communes. He continued arguing that “The state extension service is not ‘top-down’ like some people say. It is because of limited funding, that we only focus on some priority demands of farmers” (EM20).

Mô hình perpetuating traditional hierarchies

Rural ethnic minority populations in Southeast Asia often occupy low status positions in their societies (Duncan 2004), which results in stereotyping assumptions about minority people's knowledge, their levels of education, and their attitudes towards innovation.

CEWs' discourse around *mô hình* often features a patronizing attitude towards farmers. In particular, extensionists overwhelmingly described farmers' “intellectual capacity” (*trình độ dân trí*) in negative terms. In this line of reasoning, limiting farmers' contribution to the innovation process is called for, as this quote illustrates:

... I try to persuade farmers to ignore any backward manners and customs and take science and technology into their agricultural production via performance models. Farmers directly learn and practice so it is easy for them to acquire. (CEW10)

This assessment of farmers' capacity must be kept in mind when analyzing extensionists' discourse on what the most appropriate methods are for training farmers. Speaking out against classroom-based methods and “theory,” extensionists consistently argued for the value of training in the form of guided practice directly on the farm and in the field, as is frequently expressed in the phrase *cầm tay chỉ việc*—meaning “holding hands and working together.”

Extensionists typically distinguish between wealthier and poorer farmers, arguing that the wealthier farmers are more suitable partners to conduct a *mô hình*. This is due to the reporting and documentation requirements which fall on a farmer who hosts a *mô hình*, but also to the risk carried by the farmer on whose field a *mô hình* is set up. Demonstration models overall are seen as involving a low level of risk for farmers because the investment costs of inputs incurred by the innovation in question (e.g., breeding animals, new variety seeds, new mineral fertilizer preparations) are covered by the extension service or by development projects. Nevertheless, there is residual risk because of the possibility of reduced harvest that would affect a farmer's income. In sum, therefore, the perceived correlation between knowledge and wealth results in *mô hình* being established on wealthier farmers' fields.

A separate consequence of stereotypes against ethnic minority farmers is the reluctance to engage farmers as active experimenters in the innovation process. Only three extension workers (CEW13; CEW16; CEW19) clearly stated that they had implemented demonstration *trials*. Such trials were seen as problematic because they involve a higher degree of risk, higher financial input, and higher “intellectual capacity” of farmers. In addition, seed companies, research institutes, and development agencies were named as being required to provide the necessary funds for trials. Two respondents from Sơn La district felt strongly that extension workers are not allowed (*không được phép*) to conduct demonstration trials, but that this is an area of work reserved only for research institutes (CEW9; field notes 05/01/2010). This shows that in contrast to performance models, the idea of demonstration trial is problematic in at least two aspects:

Firstly and in contradiction to stereotype, experimental trials would ascribe ethnic minority farmers a more active, knowledgeable, entrepreneurial, and risk-taking role in the innovation process. Secondly, the implicit linking into the research domain may be considered an illegitimate expansion of the extensionist's sphere of influence. The distinction between demonstration model and trial therefore marks a limit to both farmers' and CEWs' roles in the production of knowledge within the innovation process.

Mô hình as a channel for project subsidies

CEWs' unofficial stream of revenues from *mô hình* does not feature in the interviews for obvious reasons, but it is likely to be a significant part. Vietnamese professionals with longstanding field experience report of the common practice by grassroots extensionists to submit inflated receipts for material purchased when establishing demonstration plots.² So official and unofficial streams of income related to *mô hình* combine to give extensionists a vested interest in conducting them—a motivation not directly and necessarily linked to the question of whether a specific technology promoted through *mô hình* corresponds to farmers' and other stakeholders' needs and demands.

At a general level, the role of national and international projects is similar, and in line with what has already been described by Peters (2001): Both support innovative technology packages or suggest new production lines, and both provide information and funds to promote the respective package, typically using *mô hình*. However, the challenges associated with each differ. In Son La province, two recent and prominent government projects are the promotion of rubber production and a provincial project supporting the intensification of cattle rearing through cut-and-carry fodder production. In the case of rubber, the challenge is a direct clash between government policy strongly pushing for its implementation, and farmers' general reluctance to plant rubber for fear of the risks involved (cf. Friederichsen and Neef 2010). In the case of the intensification of cattle production, the complex nature of the innovation package comprising changes in land use (more area under fodder, less under cash crops), animal rearing practice (kept in stables, stricter control of roaming animals), and difficult-to-explain loan and subsidy arrangements with the state-owned bank pose challenges to extensionists. In contrast, the issue of a lack of continuity was only mentioned with regard to international projects. Two respondents in Mai Sơn district (CEW13; CEW14) observed that internationally funded development projects had achieved a great amount of activity through their funds while they operated

but that activity discontinued soon after the end of subsidies. *Mô hình* are a tangible part of and form a connection between the local level and national and international actors in the IS—without, however, necessarily resolving the above-mentioned problems.

In summary, *mô hình* represent the traditional model approach and represent an interface with organizational structures of the extension system, extensionists' day-to-day routines, and widely held stereotypes relating to ethnic minority farmers. Therefore, *mô hình* are indicative of the obstacles facing the PTD principle of involving farmers actively, widely and early in the process of innovation. In contrast to the IS approach, the flow of knowledge relating to innovation by *mô hình* is conceptualized narrowly as a one-way dissemination process in which extensionists are seen as delivering “science and technology” to farmers. The following discussion will focus on how far extensionists depart from this baseline.

Demand articulation: policy conflicting with farmers' interests

Grassroots extension workers are required to implement innovations as part of mainly provincial development policies and projects. Seven extensionists acknowledged that conflicts existed between policy and farmer demands. One extension manager hinted at such conflict by saying: “The district extension plan should combine the development policies with farmers' demands. If the district extension plan is only based on farmers' demands, grassroots extension work can only meet farmers' everyday demands with a short-term view. It is necessary to follow the state's development policies and directions in order to achieve the long-term development view” (EM22). Most commonly conflicts were referred to in relation to innovations in specific production lines that were officially promoted but not welcomed by farmers. Examples for unpopular changes in production pushed by the extension system include the new establishment of rubber plantations, pig production which was promoted despite farmers being interested in rabbits, and afforestation, which was unpopular because it reduced farmers' available farm land.

Those seven out of 19 extensionists thereby at least implicitly acknowledged that official development policy sometimes makes it impossible for them to credibly claim that their main concern and mission is to cater to farmers' demands and needs. However, the way in which extensionists discussed this problem indicates how difficult it is for them to formulate a critique of official development that addresses the *processes* of defining development priorities and implementing projects, rather than merely criticizing the specific innovation being promoted.

² For an in-depth discussion of embezzlement of development funds in the Vietnamese public sector, see Fritzen (2005).

In their efforts to play down tensions between policy and farmers, one respondent suggested it was necessary to be patient and give farmers time to understand and follow policy (CEW15); a second one suggested that the rubber promotion scheme's compensation for farmers should be boosted (CEW10).

Two respondents specified non-technical aspects in regard to which they disagree with policy and the implementation of projects. One extension worker explained that she disregards the policy to direct extension towards poor beneficiaries as a priority; instead she chooses farmers for cooperation who show enthusiasm and give her a clear sense that there is readiness to innovate and demand for her advice [CEW6]. A second respondent complained about two not further specified government-initiated projects, one promoting cotton and the second castor oil. Although he was expected to mediate between both projects and farmers, he was not involved in planning them, and not even given any advance notice. In addition, he claimed that the castor oil project "not only collected 10 to 20 thousand Vietnam Dong (0.5–1 USD) per capita but also cheated farmers out of 500 hectares of land for planting castor oil plants. When the project failed, they [the castor oil project employees] refused to compensate farmers for the loss of revenue and ran away. We don't know how to find them, but clearly that's fraud!" (CEW17).

These examples show that only very few extensionists dare to openly challenge the hegemony of government development planning and its role in the innovation system. The majority of respondents were unwilling to acknowledge conflicts between demand and policy during interviews in the first place. Of those who did raise criticism, only one located the problem in the policy itself and, by claiming she had not complied with official priorities, contested it actively. The majority of extensionists, however, did not distance themselves sufficiently from the official agenda even to acknowledge any mismatch between policy and farmer demands. The few CEWs that did acknowledge the problem only gave very few examples to substantiate their critical engagement with political directives.

Network formation: dominance of state-based networks and tentative moves beyond

In describing their work, extensionists refer to a number of overlapping social networks within which they operate. Among these, the government network is clearly dominant, and five other networks appear as subsidiaries. The networks and frequencies of their mentioning are listed in Table 2.

Two aspects emerge from the analysis of the networks: firstly, the hegemonic position that the government network retains and, secondly, the dynamic of the actor

constellation that becomes visible in the frequent mentioning of emerging private networks and in different forms of farmer groups.

Within the official network it is commune officials and village headmen who are most often referred to. In particular, commune authorities are important, because extensionists are appointed by commune-level leaders, and are accountable to and monitored by them. As the lowest level of local authorities, communes also set out and implement local development plans and activities to which extensionists have to contribute. Village headmen, in contrast, are mostly described as facilitators for communicating with villagers. Together, therefore, the official network at village and commune levels is indispensable for extensionists' work.

Extension clubs are a new institution under the socialization of extension policy and allow farmers to form associations around shared interests in developing specific lines of production and to acquire related technical knowledge and market information. Extension clubs are mentioned frequently (30 quotations) and by two out of three extensionists. In official documents and development literature they are heralded as institutional innovations in agricultural extension which afford farmers greater autonomy in their decision-making regarding agricultural innovations, and foster self-organization and efficiency through a focus on farmers' needs and their demands on extension (cf. Schad et al. 2011; Shanks et al. 2003). The interviewed extensionists, in contrast, tended to be dismissive about the effectiveness of clubs and depicted their proper functioning as being contingent on other networks. The following two CEW statements exemplify this view:

In general, extension clubs are very inactive, so that normally we have to help them instead of being supported by them. No month passes without me having to talk to some village headmen, encouraging them to combine activities of an extension club with other activities in the village. (CEW12)

The capacity and methods of extension workers are crucial for the impact of extension clubs. In addition, it also depends on the management of each commune, each village. (CEW11)

Overall, extension clubs were described as being part of and steered by the official extension system and local governance. For example, extension clubs' meetings typically take place during mass organization³ or general

³ Mass organizations, such as Farmers' Union or Women's Union, are a part of Vietnam's Communist Party-controlled governance system and play an important role in articulating the government and Party apparatus with local communities.

Table 2 Extensionists' professional networks

Code name	Explanation of code	Number of quotations
Formal network	Includes only official positions such as commune and district People Committees, village headmen, commune veterinarians, village-level and commune extension workers	62 (in 19 out of 19 interviews)
Extension clubs	Officially sanctioned voluntary clubs established to promote agricultural innovativeness	30 (in 13 interviews)
Mass organizations	Any (combination) of the so-called unions, e.g., farmers' union, women's union, etc.	15 (in 6 interviews)
Farmer groups	Groups set up as part of the extension club policy as well as other demand-oriented extension approaches	11 (in 13 interviews)
Private business	E.g., agricultural input traders	9 (in 7 interviews)
Individual farmers	Coded when individual farmers were highlighted as part of extensionists' professional networks	9 (in 4 interviews)

village meetings; the same persons who are village-level leaders of unions were mentioned to be extension club leaders; clubs were portrayed as receiving advice from extensionists, and some extensionists even claimed to be determining the rules of extension clubs. Therefore, the extension clubs appear to be firmly embedded in existing, largely government controlled networks.

In addition, there is confusion around the related concept of informal farmer interest groups (*nhóm sở thích*). Extension clubs are formally registered with local authorities and usually comprise informal interest groups. In general, an interest group is formed around one specified line of agricultural production on which the group wants to improve. Some extensionists, however, used the term interest group to describe groups that were formed only for the duration of training sessions; others used it interchangeably with broader (not technology-specific) self-organizing groups [*nhóm cộng tác viên*] that are promoted locally as part of a demand-driven extension approach (cf. Minh et al. 2011). In any case, the confusion about exact terminology demonstrates that farmers' groups are a phenomenon that is hard to grasp precisely for extensionists. In addition, it indicates that thinking about and communicating with farmers as groups who are self-organizing to some extent and formed according to shared interests and needs is becoming part of extensionists' responsibility. In comparison to *mô hình* and the discourse

around specific innovative technologies, this signals increasing, albeit nascent attentiveness towards farmers as clients, placing their needs and agency more centrally in the innovation process.

Seven respondents mentioned private businesses as part of their operational network, stating that they had previously worked with and introduced outside businesses to farmers. Four out of this group, and six out of all interviewed extensionists, stated that they have their own business, therefore displaying entrepreneurial behavior and involvement in private business activities. Given the rise of the private business sector in Vietnam, extensionists' attitudes to, their understanding of, and their role in rural markets are clearly important. By definition, their job places them at the intersection between village-based producers and external knowledge and networks, and many of them readily acknowledge that a lack of alignment between farmers' production and market demand accounts for the past failure of extension-supported innovations. Extensionists' private business activities can also benefit from their being part of the government network. Their position allows them access to knowledge about agricultural policies, and their travel allowances enable them to commute between often remote rural villages and market centers regularly and over an extended period of time, without immediately requiring financial returns. In any case, extensionists' uniting of private and state-official roles in one person resonate with Gainsborough's (2010) call to treat with caution the binary distinction between state and the private sector in contemporary Vietnam. CEWs are a case in point for an understanding of the Vietnamese "private business sector" as often dependent on individuals who occupy decision-making and gate-keeper positions in the state administrative machinery, as well as private enterprises.

Innovation process management: personal relationships

Implementing development policies, managing farmers' demands, and dealing with the risks and possible failures of innovation processes all complicate farmer/extensionist relationships. This has to be understood against a background where stereotyping of ethnic minority farmers not only by majority Kinh Vietnamese, but also between members of different ethnic minority groups is common in northern upland Vietnam. As an example, one Black Thai⁴ extensionist stated that: "Kho Mú people normally have the lowest intellectual standard and they are very backward.

⁴ In Son La province, the Black Thai are the biggest ethnic group, are well represented in official positions and hold a high status in comparison to smaller ethnic minority groups.

However, conveniently, local people here in general are very united and they always trust extensionists” (CEW10). Claims of widespread illiteracy, backwardness, and a low level of education, are commonly summarized as “low intellectual standard.” At the same time, many extensionists have long-standing work experience in which they collaborate with members of different ethnic groups. Consequently, many extensionists also have differentiated views and recognize cultural, particularly language diversity, as a big challenge for their work. So in the opening statement of the same respondent one can gauge stereotypes as well as the challenge which cultural diversity represents for extensionists: “There are a lot of difficulties I encounter, such as low intellectual standard of local farmers, the disadvantage of language difference. For example, particularly in Hát Lót commune, there are five ethnic minority groups including Khơ Mú, Hmông, Thái, Kinh, Mường” (CEW10).

Only five instances were coded as stereotyping, where very general negative comments about farmers were made without any effort to differentiate or substantiate them. In contrast, 23 instances were coded as “saturated” comments about farmers, where respondents did specify and support their claims by giving, for instance, examples of illiteracy rates, changes in their own perceptions, or mentioning attempts to address, for example, communication difficulties across language barriers. Equally, 10 respondents described the complexity of relationships between them and clients. It is therefore clear that cultural differences are perceived strongly by CEWs, and that a tendency to assign knowledge-related inferiority to ethnic minorities exists. Nevertheless, most CEWs described multi-faceted and dynamic relationships with their clients and only one respondent remained exclusively at a schematic level in claiming “I often communicate with farmers by teaching them in the training courses or in the models” (CEW5).

From the more detailed descriptions of relationships that extensionists need to manage, the complexity of the social field emerges clearly; extensionists have to consider multiple groups, and each has its own strengths, demands, knowledge needs, and problems:

Rich farmers are most difficult to work with because they often misunderstand that the main task of extension workers is to reveal their important information and experiences to other farmers in the village. The rich people always keep their experiences as a secret and they don’t like to share. The group of businessmen or private traders are also difficult to approach because—I don’t know why—they always try to avoid meeting and sharing with us. Regarding the group of poor farmers, they are much easier to approach but it is too hard to get them to follow what I say. (CEW1)

Examples for how extensionists have to negotiate their responsibilities with farmers and how they have to earn acceptance and trust by farmers include:

They totally blame it on me whenever they find it difficult or impossible to sell their products. That’s a typical situation I often encounter. Farmers hold me responsible for directing them to produce but not guiding the others to purchase their products. In this case, I had to explain to them that extension service only has responsibility as the one directing and helping farmers to improve their knowledge and skills, approach closer to science and technology as well as propagandizing information but not as a business unit to help selling products. (CEW6)

As in the above two quotations, at root, all extensionists saw it as their responsibility to “bring” technological innovations to farmers. Seeing the extensionist as an innovation broker whose principal role is to network is currently inconceivable in Vietnam. However, extensionists do see how complex and delicate their networking tasks are.

I always consider my current job as quite an art, and an extensionist should be a real artist. Therefore, I always try to be flexible in working instead of following mechanically what the boss assigns me. In order to be trusted and loved by farmers, extensionists must behave and consider themselves as a member of farmers’ families [...] No matter which ethnic minority group, extensionists have responsibility to help farmers to improve their productivity and get rid of poverty. (CEW11)

The claim that establishing close personal relationships and earning trust from farmers is crucial for their work, and that this requires time is often repeated in interviews (CEW10; CEW11). This can be interpreted as part of a rational strategy to operate effectively in a changing and complex environment: An environment which is characterized by high cultural diversity from the outset, where government, development, and commercial organizations pursue differing and evolving agendas of rural development, and where an increasing number of technical alternatives are open to farmers. Choosing between these alternatives is associated with risks and unknown consequences for both farmers and CEWs. Building on personal relationships whilst avoiding upsetting hegemonic actors and networks therefore are essential for successful grassroots innovation intermediaries.

Conclusion

This study identified four key areas that indicate the extent to which the Vietnamese agricultural extension system is moving beyond the model approach. The discussion of the

dominant extension practice—*mô hình*—has highlighted how the traditional approach based on demonstration *models* continues to shape extensionists' work. The notion of demonstration *trials*, although more in line with innovation systems and participatory technology development principles, enjoys little support from CEWs. Moving towards participatory forms of extension, as exemplified by demonstration trials, faces a formidable obstacle given that deep-seated cultural and institutionalized stereotypes militate against attributing a more active and knowledgeable role to ethnic minority farmers in the innovation process. International development agencies have made considerable efforts in Vietnam over the last two decades to introduce participatory approaches to agricultural extension and to shape the extension system's organizational structures so as to better support them. This study shows that, currently, organizational culture and individual extensionists' attitudes are as important factors on which the success or otherwise of farmer participation in agricultural innovation systems depend.

Considerable scope for and actual change towards a more demand-oriented extension system was observed through the increased attention to farmers' needs and the articulation of their demand by CEWs. This, however, immediately leads to the question of how CEWs can then mediate between or harmonize farmers' demands and government development policy in cases where the two conflict. The analysis showed that extensionists hesitate to discuss and engage critically with official policy. So unless CEWs feel supported by their line managers and local authorities, farmers' knowledge runs the risk of entering the extension system through CEWs only to end up ignored by decision-makers higher up in the organizational hierarchies. Therefore, fostering the extension workers'—CEWs and their line managers—mediation and negotiation skills for conflict resolution should be a priority of future development projects supporting the Vietnamese extension system.

The nature of networks within which Vietnamese extensionists work are complex and defy clear categorization, thereby constituting a challenge to innovation systems thinking. Put simply, government networks still occupy a dominant position in the innovation system, despite the emergence of private actors and new types of farmer groups. The situation is complicated because, on the one hand, government-employed extensionists are often at the same time private entrepreneurs. Farmer groups, on the other hand, are not only associations of private farm entrepreneurs but also closely intertwined with networks closely associated with the state, such as the Farmers' Union. Therefore, an important change in the innovation

system is the blurring of boundaries between the state and private enterprise at the local level, and general categories that capture the overlaps between the private and public spheres are still lacking. For the Vietnamese and other Southeast Asian rural and transition contexts, more in-depth research is needed into how farmer groups can successfully self-organize and establish their autonomy to further farmers' interests independently from official development agendas. As part of governments' rural development strategy, the agricultural extension service will continue providing a lens on official development policy and practice. Studying the ways in which farmers organize themselves in response will help understanding how, to what extent, and by whom the power to define goals and methods of rural development will be contested in the future.

Establishing good personal relationships within and outside of local communities is as central to the interviewed extensionists' work as is navigating the blurred line between the state and private enterprise. This finding confirms the central role of linkages and bridging in innovation system approaches but shifts the emphasis towards micro-level and personal relationships. It also implies that a pure model of participatory and demand-driven extension is not appropriate to guide changes in the innovation system. In a situation where elements of market-driven development co-exist with state-led development planning, demand-driven extension systematically exposes grassroots extension workers to the danger of being perceived as duplicitous. Even if extensionists genuinely are interested in and attempt to follow farmers' demands, extensionists are also compelled to implement government policy, regardless of whether this is in direct opposition to farmers' demands. Therefore, in order to appropriately conceptualize as well as practically support the Vietnamese agricultural extension system, close attention should be paid to extensionists' everyday reality of frequent contradictions between official rhetoric and practice, and recurring conflicts between farmers' interests, local authorities' exigencies, and extensionists' own livelihood strategies.

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Appendix

See Table 3.

Table 3 Respondent table

District	Respondent type (CEW, manager)	Gender (Female, male)	Ethnic group	Interview code
Yên Châu	CEW	Male	Black Thai	CEW1
	CEW	Female	Kinh	CEW2
	CEW	Male	Kinh	CEW3
	CEW	Male	n.a.	CEW4
	CEW	Male	Kinh	CEW5
	CEW	Female	Kinh	CEW6
	CEW	Female	Kinh	CEW7
Sơn La	Manager	Male	Kinh	EM20
	CEW	Male	Kinh	CEW8
	CEW	Female	Kinh	CEW9
	Manager	Female	Kinh	EM21
	Manager at province level	Female	Kinh	EM22
Mai Sơn	Manager at province level	Female	Kinh	EM23
	CEW	Male	Black Thai	CEW10
	CEW	Male	Kinh	CEW11
	CEW	Female	Kinh	CEW12
	CEW	Male	Kinh	CEW13
Phú Yên	CEW	Female	Kinh	CEW14
	Manager	Male	Kinh	EM24
	CEW	Male	Muong	CEW15
	CEW	Male	Kinh	CEW16
	CEW	Male	Kinh	CEW17
	CEW	Female	Kinh	CEW18
	CEW	Male	Black Thai	CEW19
	Manager	Male	Kinh	EM25

All respondents were employed by the public extension service at the time of interview

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Author Biographies

Rupert Friederichsen has researched rural development, participatory agricultural research, and Vietnam's northern uplands. He holds a PhD degree from University of Hohenheim, Germany. He has taught development geography at Sheffield University, environmental management at Manchester Metropolitan University, and Southeast Asian politics at Durham University, UK. Currently, he works for CISV International, a peace education charity in Newcastle upon Tyne, UK.

Thai Thi Minh is Postdoc at the Institute of Food and Resource Economics, Faculty of Science, University of Copenhagen. She holds a PhD degree in agricultural communication and rural sociology from the University of Hohenheim, Germany. Her research focuses on agricultural and agribusiness innovation systems, institution and learning in innovation systems, incubation and innovation network, and rural innovation process.

Andreas Neef is Professor of Resource Governance and Participatory Development at the Graduate School for Global Environmental Studies, Kyoto University. He holds a PhD degree in agricultural economics and rural sociology from the University of Hohenheim, Germany. His research focuses on participatory approaches to agricultural and environmental research, rural innovation processes, natural resource governance, and local adaptation to climate change.

Volker Hoffmann is Professor *emeritus* of Agricultural Communication and Extension at The University of Hohenheim, Germany. He holds a PhD in social sciences and his research concerns all kinds of practical problem solutions in the field of communication, extension, innovation and knowledge management in agriculture, food, and rural development.