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**Introduction of New Forage Technology in North Vietnam Using
Participatory Approaches: Experiences and Lessons Learned**

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Abstract

Agriculture plays an important socio-economic role in Vietnam. Animal production is expanding due to the continuous increase in demand resulting from high demographic growth in urban areas and changing food habits. Livestock development is a strategic policy of the Vietnamese government due to its potential contribution to employment creation and income generation. Increasing ruminant production requires large areas of land for forage production, however, and as there is already considerable pressure on land in Vietnam, the intensification of forage production is essential. Furthermore, the majority of farmers have limited access to appropriate technologies and improved knowledge, posing a major constraint to the development of more profitable livestock development activities.

Participatory analysis was conducted in partnership with farmers in several provinces in North Vietnam. The main problem farmers identified in relation to ruminant production was shortage of grass during the winter. In response to this finding, agronomic researchers set about providing new forage species (*Avena*, *Lolium*, *Medicago*, *Vicia*, etc.) and testing them under farmer-managed conditions. The establishment of close linkages among farmers, extension workers and researchers throughout the study ensured that local knowledge and new technologies were combined in practice, enabling participating farmers to better understand research results and thereby disseminate appropriate innovations more effectively amongst their peers.

The temperate forage species *Avena strigosa* exhibited the best adaptation to local conditions and farming systems, together with highest production levels and good nutritive value. In the first year of the project (2003/2004), 0.1 hectares were planted in one province by two farmers who were mobilized for the experiment; three years later (2006/2007), around 150 hectares will be planted with temperate forage species, with more than 650 farmers involved across seven provinces.

The dissemination of research results amongst local leaders will enable the intervention to contribute to local strategies for ruminant production and development. Institutional strengthening, training, the assimilation of findings and the sharing of information are also crucial to the wider implementation of such new agricultural technologies in rural areas of Vietnam.

Keywords: ruminant intensification, forage production, participatory approaches

Introduction

The intensification of cattle production in Vietnam is a relatively recent development which faces a number of obstacles. Key constraints are farmers' lack of appropriate knowledge concerning ruminant production, insufficient specialist veterinary services and a lack of good quality feed, especially green forage. The absence of an organized animal commodity chain, lack of capital for investment and a poor breeding pool also impede the expansion of cattle husbandry. However, some provinces already have significant experience in the dairy and beef sectors. Dairy cattle have been raised in Moc Chau district (Son La province) for more than 40 years, for example. This mountainous region is particularly suited to dairy farming due to the relative availability of land for forage production and the better climatic conditions it enjoys compared to the delta zones (Red River, Mekong). Since 2002 many other provinces have been identified as priority areas for ruminant production in Vietnam as part of the National Development Plan for the dairy sector, and more recently the beef sector.

While institutional support to the dairy and beef livestock sectors has increased over recent years, close linkages already existed between agricultural universities, research centres, mass organisations and farmers. The contribution of universities is principally organized through practical field work and training for students, while research centres conduct numerous trials on feeding and animal performance, feed treatments, etc. CIRAD, together with Vietnamese research institutes and the Hanoi Agricultural University (as part of the PRISE platform), supports the emergent dairy sector with research and development activities which have a special focus on the feeding and nutrition of dairy cattle.

Participatory methods were employed to conduct an analysis of local farming systems and the livestock situation in order to find out more about farmers' needs in relation to ruminant production. The role of the agronomic researchers and extension workers was firstly to understand and respond to farmers' reported needs, to translate their response into a meaningful scientific framework with comprehensive indicators, and finally to scale up the innovations which were introduced.

Farming System Analysis

Project location

The first stage of the work was the selection of an appropriate location for research and development activities. Son La province (Moc Chau district) was identified as the priority option, in agreement with the National Institute of Animal Husbandry (NIAH). Moc Chau was the preferred choice due to its relative experience in the dairy sector and because it is considered an important point of reference for other Vietnamese regions involved in dairy activities. The existing partnership between NIAH and the Moc Chau Milk Company facilitated researchers' access to field sites, and hence their link with dairy farmers.

After the first year of work in Moc Chau district, other provinces in North Vietnam (Bac Ninh, Ha Nam, Ha Tay, Ha Noi, Hoa Binh, Hung Yen, Thai Binh and Vinh Phuc) expressed interest in our project and were included in ongoing activities. The particularities of each agro-ecological zone at the different locations, as well as the varied ethnic typology of each setting, required some modification of the initial strategy and in some cases a redefinition of project goals.

Farming system analysis

The first objective of the work was to identify the local farming system and establish research and development priorities related to ruminant nutrition and feeding. This was achieved through farmer questionnaires, farm visits, meetings with farmers and consultation with individuals responsible for local agriculture development and representatives of breeding companies. These preliminary steps were crucial to the establishment of appropriate, relevant research and development activities.

The questionnaire survey, which was conducted with a representative number of farmers, enabled researchers to gather general information about the local farming system and the main problems farmers faced in feeding their animals. During preliminary meetings with farmers, demands for support were wide-ranging. When farmers were asked to prioritise these demands, however, it was found that requirements were generally similar among those residing in the same commune/village or district. Researchers were careful to ask farmers about their experiences of and opinions regarding ways of solving the problems they identified. This process was essential as it enabled researchers to better understand the issues facing farmers and prevented misunderstandings. The views of agricultural extension staff and commune leaders were also taken into account during the analytical stage.

Specific objective of the project

The majority of farmers, across all agro-ecological zones, reported lack of forage to be the main factor limiting animal production. Training, and special support in the provision of a balanced diet for cattle were also important priority areas. Although subsequent activities addressed all three areas, fieldwork focused on improving forage production.

In North Vietnam, farmers largely encounter forage constraints during the winter, when temperatures are lower, limiting the development of tropical forage plants. In fact, low temperatures (below 15°C) inhibit the growth of the majority of tropical grasses. The colder period varies from region to region, from a minimum of two to three months in some provinces around Hanoi (Delta Zone) to a maximum of five to six months in mountainous areas, such as Moc Chau. During the winter, the forage shortage is traditionally met using natural grasses (which are low in nutritive value), preserved forage (hay, silage) and various agro-industrial by-products which are locally available. However, in areas with a large animal population these resources are insufficient, resulting in a deterioration of the physical condition of the animals, and consequently a reduction in their production potential (meat, milk). To date, little published research exists concerning the use of temperate fodder in northern Vietnam. Working in close collaboration with farmers, the first priority was therefore to select alternative forage plants, namely temperate species, which are resistant to cold temperatures and able to produce enough quantity and good quality grass during the winter.

On-farm Experiments and Survey

Proposed solutions

With the support of the local authorities it was possible to identify the climatic and soil characteristics of the different regions with some precision. This information was essential to guide the selection of forage species that could be adapted to local conditions. The list of existing temperate forage species is extensive. A set of fifteen species and varieties was chosen that offered the best potential. The species selected belong mainly to the gramineous family (*Avena sativa*, *Avena strigosa*, *Lolium multiflorum*, *Festuca arundinacea*, *Hordeum*

vulgare, *Triticosecale*, *triticum turgidum*) and leguminous family (*Vicia villosa*, *trifolium repens*, *Medicago sativa*), in association with grass species.

Prior to establishing on-farm experiments, meetings were held with local leaders and farmers who had volunteered a section of their land for the research. The involvement of these farmer “key informants” was critical as it facilitated the rapid sharing of results and enhanced farmers’ understanding and adoption of the new technologies. From the second year of the project onwards, field visits to the experimental sites were of great importance for maintaining contact with farmers and exchanging experiences.

Implementation of experiment

The forage initiative began in September 2003 with two experiments, covering a total surface area of around 0.1 hectares. The main objectives were: (1) to test the agro-climatic adaptation of fifteen new temperate forage species to winter conditions; (2) to determine their production potential, and (3) to evaluate their reproductive potential (seed production) in order to select a smaller number of species for subsequent wider adoption. The experiments were carried out under normal farming conditions at two sites which were monitored by a team composed of farmers, extension workers and researchers. Periodic surveys were conducted to measure and observe species adaptation and evolution and, further, served as a platform for discussion, not just between researchers and the farmers in charge of the survey, but also among farmers who regularly came to visit the experiment sites.

The involvement of local staff in the periodic surveys was extremely important because it enabled the constant observation of the study and the regular recording of results in collaboration with farmers. Moreover, local government staff were also vital in ensuring farmers’ participation in the research process, and played a key role in promoting the new technologies and integrating them within local development strategies. The participatory approach, adopted throughout the study, respected the knowledge of farmers who have direct experience of agricultural practices, giving them more control over the research process and enabling them to influence how study findings were used.

Results

After completing and evaluating the first round of fodder tests on experimental plots, five forage species were selected which had adapted well to local agro-climatic conditions and had also met farmers’ requirements. The selected species were two *Avena* species (*sativa* and *strigosa*) and one grass-legume association named Avex (commercial name).

Avena sativa was the temperate forage species which produced the most significant dry matter yields, its average output per hectare being around 10 tons of dry matter, which is comparable with yields obtained in Europe. However, in terms of seed production, a plant characteristic which is very important to farmers and which is particularly critical in Vietnam, where there is currently no commodity chain for seeds of temperate origin, this species exhibited low potential.

Avena strigosa produced an average of 8.5 tons of dry matter during the winter period (December to March) but achieved better results in terms of seed production and seed germination rate. The species has a shorter vegetative cycle than *sativa*, which is more adapted to regions with a short winter (such as the delta zones) and functions more effectively within crop rotation systems. The two *Avena* species have similar chemical composition and nutritive value.

Avex association exhibited the best adaptation in the provinces around Hanoi. The energy and protein content of Avex is also slightly higher compared to *Avena* species, but seed production capacity is heterogeneous, depending on the forage species in the mixture, and the harvesting of the Avex mixture posed a number of problems to farmers.

At significant stages of the experiment, the research team organised meetings where they presented the results to date. These meetings were of crucial importance as they allowed farmers to share results and experiences and raise any questions, and enabled participants to compare the objectives established at the beginning of the experiment to be compared with the observed results, creating a dialogue between researchers and farmers. For such approaches to be successful researchers must be willing to establish a dialogue with farmers on more or less equal terms. The selection of the communication tools and mass media (video, pictures, leaflets, posters, etc.) used during these exchanges paid careful attention to language “level” and included illustrations to convey key messages more effectively.

According to farmer feedback and the data collected during the experiments, the three species selected had promising potential to address the winter forage deficit. The next objective was to extend the area over which these new and appropriate forage species were cultivated in order to confirm the initial results.

Scaling-up of the Experiment

The expansion of the cultivation area to test the best adapted species began during the second year of the project. The aim of this second phase was: (1) to test the adoption of these species and create awareness amongst farmers of these new forage production methods; (2) to monitor the introduction of the species within existing agricultural farming systems; and (3) to confirm, under real conditions, the results of the earlier experiment. In some cases it was also possible to observe the advantages offered by the new forage cultures in terms of animal production and feeding behaviour.

Although the selection of participating farmers was in some cases controlled by local leaders, seeds were also made accessible to other farmers who had expressed interest in winter forage production, and the distribution of seeds to farmers was accompanied by technical information brochures and training sessions. In the second year of the project (2004/2005), four hectares of the selected temperate forage species were sown in Son La and Hoa Binh provinces, with thirty-six farmers involved in the scaling-up process. The farmers’ opinions about forage development were recorded and analyzed by the research team. Overall, the forage results were positive, confirming the previous results and supporting the continuation of forage development activities.

In 2005/2006, almost 20 hectares of *Avena* species and Avex mixture were sown in the same two provinces, with the involvement of more than 90 farmers. In addition, collaboration between researchers and the Ministry of Agriculture and Rural Development of Vietnam and the Belgium Technical Cooperation (dairy project), linked five new provinces (Bac Ninh, Ha Nam, Ha Tay, Ha Noi and Vinh Phuc) to the forage project, resulting in twenty experimental sites (300 m²/each), spread over 10 districts. The aim of this expansion was to test experimental sites representing different types of soil and climatic conditions which are present in the delta zone. A survey of forage adaptation and development was carried out by a working group, which included farmers, researchers and extension workers.

The results obtained from the first few years of experimentation on temperate forage species in North Vietnam are variable. This is as expected and can be considered normal due to the heterogeneity of soil types across the experimental sites as well as differences in the

management of the forage experiments by farmers. Overall results suggest that the species tested offer an appropriate solution to the winter forage deficit.

The number of farmers attracted to the agricultural practice which was introduced and the surface of land allocated to the new temperate species can be considered useful indicators of farmer adoption. The current year (2006/2007) marks a new stage in the expansion of the new technology amongst local farmers. The expected area for forage production is about 150 ha, a sevenfold increase compared to the area cultivated in the previous year. More than 650 farmers will be involved. Importantly, in some districts the acquisition of seeds will be made entirely by farmers who are willing to pay the market price in order to obtain the temperate seeds; in other districts farmers will make a partial contribution to seed acquisition.

Conclusions

From this case study, it can be concluded that involving farmers from the outset of any innovative process increases the probability that the technologies introduced are appropriate to farmers' requirements. The dialogue which was created with farmers at the beginning of the project and the implementation of experiments and forage species surveys (monitoring of yields, harvest management, agricultural calendars) in close association with farmers in their own fields, greatly facilitated the dissemination of the research results. It appears that the methodologies tested and developed by the forage project will result in an improvement in extension strategies for animal production as well as better linkages between researchers, development agents and farmers.

Two challenges remain, however. Firstly, the project needs to secure the involvement of decision-makers in order for the positive impacts of the new agricultural practice developed amongst target farming communities to be scaled up. Secondly, to ensure broader and more efficient propagation of the practice, a national system of seed production and a commercial commodity chain for temperate seeds needs to be established and maintained.