

AN INTERACTIVE APPROACH TO TECHNOLOGY TRANSFER IN A DEVELOPMENT PROJECT - A CASE STUDY

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ABSTRACT

The paper covers technology transfer in the United Nations Development Programme funded Agro-grassland Systems Development Project in Guizhou Province, China, which ran from 1989 to 1994 and involved the development of pasture based smallholder livestock systems at three environmentally contrasting sites. The project involved the participation of management, technical staff and smallholder farmers at the local level with outside support from the Gansu Grassland Ecological Research Institute, Gansu Province, China and Massey University, New Zealand. A feature of the project design was the retention of project management at the local level. Interactive training programmes were conducted in New Zealand and research in China to enable local management and technical staff to identify and evaluate appropriate technology. The project achieved or exceeded nearly all project outputs by the mid-point review. Development beyond this stage was hindered by the lack of flexibility in funding arrangements. Small holder monitoring and demonstration provided more effective technology transfer than the research programme. It was concluded that the design of the project and the interactive technology transfer between the contributing groups offers a model for long term sustainable development.

KEYWORDS

Technology transfer, China, United Nations Development Programme, Interactive

INTRODUCTION

A team of pasture agronomists from New Zealand was involved in a pasture development project in Guizhou Province, China between 1989 and 1994. This paper describes some of their experiences in developing an interactive approach to the transfer of technology to a developing country. The project was jointly funded by the United Nations Development Programme (UNDP), the New Zealand Government, and the Government of the People's Republic of China. Technical support was sub-contracted to Gansu Grassland Ecological Research Institute (GGERI) - the domestic consultants, and Massey University - the international consultants.

The main objective was to develop sustainable, low cost, low input pastoral livestock farming in Guizhou, and thereby improve the living standards of livestock farmers and downstream communities within the Province. Three centres, Weining (Yunan - Guizhou high country 2,500 m), Qinzhen (Central Guizhou hill country 1,300 m), and Dushan (sub-tropical hills 1,000 m) were chosen to represent a cross section of areas in Southern China potentially suitable for pasture development.

PROJECT DESIGN

The three immediate objectives of the projects were to:

1. Improve the productivity of native grasslands and local livestock in Guizhou through the introduction of low cost, low input pasture improvement and management systems.
2. Develop the professional standards of technical personnel and their capability for future research, training and extension services.
3. Upgrade the infra-structure at each centre to a level where each could continue to function effectively for pastoral research and training after the completion of the project.

The project was managed by the Chinese with technical support from the Gansu Grassland Ecological Research Institute, Gansu Province, China and Massey University, New Zealand. This structure was designed to allow the maximum interaction for between local project management and technical staff with Chinese and New Zealand

consultants while retaining implementation at the local level. Technology transfer was expected to be interactive with twenty Chinese technicians (both local project staff and from GGeri) spending up to twelve months in New Zealand to provide experience of appropriate technology together with the confidence necessary to assess the applicability of alternative strategies to Chinese conditions (Chu et al 1993). A research base was to be established at each project site to give technical support for local smallholder development. New Zealand involvement was in technical training within New Zealand and regular visits to China (ranging from 3 weeks to 3 months) to help define and initiate research, development and extension programmes. New Zealand consultants acted as a catalyst for development, with project direction and implementation maintained by local management and support staff.

Three potential areas of risk common to most development projects were identified at the start of the project and the following strategies were used to manage these risks:

1. Lack of local support, especially for logistical planning, implementation, and funding. To help maintain local support in these areas Senior Government officers were involved in Project Management at all levels. Responsibility for project management and implementation was at the local level.

2. The transfer of inappropriate technology. The domestic consultants evaluated technology aimed at developing a low input system before transferring the technology to the local people. The training programme in New Zealand was to enable the Chinese to identify both the principles and practices of low cost pasture based systems in New Zealand and then to adapt what they considered to be relevant technology to grassland systems in China. It could be considered that technology is "appropriate" when adopted by smallholders on a sustainable basis.

Research at the centre level was identified as one way of both evaluating and transferring appropriate technology. The research programme was operated by the domestic consultants (GGeri) in association with local research and extension technicians. It is important to transfer the principles of technology for local management and technical staff to be responsible for identifying and implementing what they consider to be appropriate technology.

3. Lack of continuity by the local people once the outside inputs stop. A management system with performance indices and accountability agreements that extended beyond the duration of the project was required. More importantly, the project was identified as a Chinese project with overseas support not a New Zealand project demonstrating New Zealand technologies in China. Therefore ownership of this project and the technology belonged to the Chinese.

PROJECT EVALUATION

Tables 1 and 2 show physical and financial performance indices at the start of the project, the agreed project targets and the actual performance achieved. The project was judged successful in the sense that most output targets were exceeded. However, targets set by the funding agencies do not measure these outcomes in terms of research and extension capability, technical training, technology adoption, and long term sustainability.

Eighteen months after the completion of the project, smallholder systems are still in place and have evolved in response to economic pressures with the emphasis on dairy and goat production at the expense of the less profitable beef and sheep production. Two centres (Weining and Dushan) are continuing to expand and develop while the third (Qinzhen) is struggling to survive, both at the centre and smallholder level.

RESOURCES

Planning and implementation at the local level provided ownership but also often led to a lack of physical and financial resources to sustain development. Examples were the inadequate supply or the poor quality of seed and capital livestock. Although apparent in the first years of the project these inadequacies were not properly addressed. Some seed was imported to help in the short term but a request to import stock was declined by the funding agencies. Although critical path analysis may have helped in the planning of resource issues the main problem appeared to be lack of appreciation of the limitations of local supply by local project personnel. These resource issues have now been recognized and are being addressed at the local level. It was not until the user could recognize inadequate outcomes that problems were addressed.

PROCESSING AND MARKETING

With no local pasture based animal production systems in Guizhou Province, little was known of the potential local markets or export markets to other Provinces. The lack of funding for and expertise in processing and marketing affected small holder development through both market and price uncertainty. Although important, these issues were outside the UNDP guidelines. Increased flexibility on the part of the funding agencies would have allowed input into downstream production and marketing once the production base was established.

RESEARCH

Not all research was well directed as projects were planned early in the development cycle before local issues were clearly identified. Research projects were conducted at the centres but, although these were written up, results were often not discussed at the local level or used as an extension tool. It was concluded that in this situation, research was not an appropriate vehicle for technology transfer. This problem was identified early in the project and the emphasis on technology development changed to provide more intensive monitoring of selected smallholder focus farms. An example of appropriate technology was the development of the night penning method as a management tool for pasture development and improvement (Jiang et al 1997).

TRAINING

The training programme enabled local technical people to understand New Zealand technology but they were not able to successfully adapt (or simplify) this technology for the Chinese small holder situation. Implementation therefore lacked focus and the smallholders had no real model to follow. Experience suggests that smallholder demonstration units should have been established early in the project to help train local technical staff and for technology transfer.

TECHNOLOGY TRANSFER

Transfer of technology and understanding of low cost systems reached the local technicians, but there were few examples of the implementation and evolution of new technologies into smallholder

systems. This appeared to be due to social issues, and to small holders reacting to market forces while technical staff still related to a command economy.

There was a lack of appreciation by small holder farmers of the need for maintenance fertiliser on established pastures, because the long term benefits were not adequately demonstrated. The concepts of improved pasture as a low cost feed for livestock production, feed planning, and the use of appropriate grazing strategies were hindered by traditional attitudes towards "grass" not as a "crop" but as a native pasture. There was also a lack of innovation in the integration of improved pastures into existing smallholder units.

The two centres, which continued to develop after the project terminated, both had a base of experience in pasture development before the project started and had one or more highly motivated administrators or technical personnel.

CONCLUSIONS

1. The project successfully reached its development targets. This success and the continued development after the end of the project was due to project ownership and responsibility. Although many short term technical problems would have been overcome with a more direct input from the foreign consultants, the approach adopted is expected to improve longer term as problems are identified and appropriate solutions found at the local level. The project offers a model for the design of projects requiring long term sustainable development.

2. Overall, the transfer of technology was successful to the local technical people but was less successful to the final "users" of the technology i.e. the small holder farmer. Smallholders should have been involved earlier in the project to develop on farm demonstration.

3. Development appeared to be more sustainable where some existing infrastructure and experience existed. The development of communication skills and personal motivation was important for the success of the project.

4. Project planning and funding should be more flexible to allow reaction to actual outcomes. Funding should not all be committed at the start allowing project mid-term evaluations that enable both technical and financial direction to be modified.

REFERENCES

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Table 1

UNDP Agro-grassland Systems Project - Physical outputs

	Pasture yield (kg DM/ha)	Dairy Cattle		Sheep		Beef Cattle	
		Number	Milk Yield (kg/cow)	Number	Wool Yield (kg/ewe)	Number	18 month Liveweight
Start	1,200		1,100		1.2		150
Target	7,000	90	22,000	2,495	4.0	90	250
Actual	6,783	131	3,000	4,939	5.5	917	280
%(A:T)	97%	146%	150%	198%	137%	1,019%	112%

Table 2

UNDP Agro-grassland Systems Project - Financial outputs

Annual Income RMB (Chinese Dollars)	Dairy Farmers	Sheep Farmers	Beef Farmers
Start	185	200	185
Target	1,200	1,200	1,200
Actual	1,740	1,900	1,151
% (A:T)	145%	158%	96%