Making it easier to keep small animals

RIU

Validated RNRRS Output.

In partnership with producers, studies have identified the problems that farmers living at the edges of forests in tropical Bolivia face when keeping small animals. The research addressed the needs of chickens, ducks, pigs, hair sheep and guinea pigs—all of which had been ignored by past studies. Once problems had been identified, it was possible to solve many of them using very simple measures. The number of chicks, piglets and lambs that died was reduced simply by applying up-to-date veterinary guidelines for vaccination and parasite control, for example. Improving housing and building nest-boxes and farrowing pens also increased the survival rate of piglets and chicks. Applying this approach elsewhere could greatly improve the livelihoods of poor families keeping different types of small animals.

Project Ref: **LPP20:**
Topic: **2. Better Lives for Livestock Keepers: Improved Livestock & Fodder**
Lead Organisation: **Natural Resources Institute (NRI), UK**
Source: **Livestock Production Programme**

Document Contents:

Description

LPP20

Research into Use
NR International
Park House
Bradbourne Lane
Aylesford
Kent
ME20 6SN
UK

Geographical regions included:

Bolivia,

Target Audiences for this content:

Livestock farmers, Forest-dependent poor,

A. Description of the research output(s)

1. Working title of output or cluster of outputs.
In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.

Alternative Strategies for Small Livestock Keepers in Forest Margins.

Suggested Title: Improving the Productivity and Profitability of Small Livestock.

2. Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.

Livestock Production Programme

3. Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RIUP activities.

R6774, with support from ZC0237 for translations into English of four booklets, originally published in Spanish.

The research was conducted by the Natural Resources Institute (NRI), contact Dr Rob Paterson, e-mail address rob44pat@yahoo.co.uk, with the *Centro de Investigación Agrícola Tropical* (CIAT), original contact Dr Franz Rojas, replaced in 2005 by Dr Nelson Joaquín, e-mail address njoaquin@ciatbo.org. (Note that the CIAT based in Santa Cruz, Bolivia, is a local organisation that has nothing to do with the CG centre, the *Centro Internacional de Agricultura Tropical*, based in Cali, Colombia, even though it shares the same acronym).

In the period from April 2003 to March 2005, DFID supported follow-up validation work with poultry, pigs, sheep and goats in two communities in each of the following Municipalities: Vallegrande and Comarapa (Mesothermic Valleys) and Cuevo and Boyuíbe (Chaco). The work was conducted by CIAT under the project code ZC0223 and the contact for scientist is Dr Nelson Joaquín (e-mail address given above).

*4. Describe the RNRRS output or cluster of outputs being proposed and when was it produced? **(max. 400 words)**. This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.*

From 1996 to 2001, project R6774 researched the role of **small animal species** in existing farming systems at the **forest margin** in **tropical Bolivia**, where apart from hair sheep, small animals had previously been almost totally ignored by research. It worked with **chickens**, **ducks**, **pigs**, **hair sheep** and **guinea pigs**.

There were two principal outputs from the project:

- **Methodology**: This **fully participatory** project developed a methodology where the research team of social (economists and sociologists) and biophysical scientists (agronomists, animal production specialists and veterinarians) worked closely with farm families to identify the major problems with small animal species and to design appropriate measures to overcome them. These addressed **animal health, feeding and housing**. The initial research findings were then validated by a new group of farmers who, together with their communities, were free to select the interventions to test and to modify them as they saw fit. The methodology was fully documented in a series of **booklets**, published in Spanish.

- **Technology**: Within the Bolivian humid tropics, the major constraint to poultry production was chick mortality, associated with diseases (chickens) or with cold, damp conditions (ducks). Pigs and hair sheep suffered mostly from internal parasites and/or from shortage of feed. Apart from attacks by dogs, guinea pigs had remarkably few problems. In the baseline situation, whether sold or consumed on the farm, small animal species contributed about 25% of the income of subsistence farmers, when consumption was valued at market prices. The use of existing veterinary recommendations for **vaccinations and parasite control** reduced mortality in chicks, piglets and lambs, while simple **housing** and the provision of nest-boxes and farrowing pens increased the survival of chicks and piglets. These interventions increased productivity by about 30%, realised either as increased income or improved nutrition of the farm family. No interventions were necessary for guinea pigs, although several farmers adopted a design for improved housing which allows easier animal management. The results have been published in journal articles, book chapters, conference proceedings and a series of booklets, in both English and Spanish.

Since the conclusion of the RNRRS project, with funding from DFID and Bolivian central and local governments, CIAT has widened the geographical scope of the work by conducting similar, participatory research with goats. This has allowed the research to benefit poor farmers in drier areas in the Mesothermic Valleys and the Chaco regions of the country.

5. What is the type of output(s) being described here?
Please tick one or more of the following options.

Product	***Technology***	***Service***	***Process or Methodology***	***Policy***	***Other Please specify***
	X		*X*		

6. What is the main commodity (ies) upon which the output(s) focussed? Could this output be applied to other commodities, if so, please comment

The outputs focused on egg and meat production from a range of small animal species. Although an increase in

the numbers of animals being slaughtered should have had a small effect on the availability of hides of pigs and sheep, small farmers in Bolivia derive no benefit from the skins of these animals. No attempt was made to evaluate the effect of the project on hide production.

Where goats are milked in a rustic production system, it is likely that they would suffer from the same problems as animals kept for meat. The outputs may therefore be expected to be relevant for non-specialist dairy goat keepers.

7. What production system(s) does/could the output(s) focus upon?
Please tick one or more of the following options. Leave blank if not applicable

With a small amount of additional applied research to confirm the principal local problems, the project outputs would be relevant to most of the production systems found in Latin America, sub-Saharan Africa and South Asia. The original work focused upon the forest-agriculture interface, while later CIAT activities were carried out in hillsides and semi-arid production systems.

Semi-Arid	***High potential***	***Hillsides***	***Forest-Agriculture***	***Peri-urban***	***Land water***	***Tropical moist forest***	***Cross-cutting***
X	*X*	*X*	*X*			*X*	

8. What farming system(s) does the output(s) focus upon?
Please tick one or more of the following options (see Annex B for definitions).
Leave blank if not applicable

As with the previous question, a modest amount of applied research would allow the project methodology to be used in most of the farming systems in the developing world, where small animal species make a significant contribution to family welfare. The original work was carried out in the smallholder rainfed humid system, while later CIAT work was done in smallholder rainfed highland and dry systems.

Smallholder rainfed humid	***Irrigated***	***Wetland rice based***	***Smallholder rainfed highland***	***Smallholder rainfed dry/cold***	***Dualistic***	***Coastal artisanal fishing***
X	*X*		*X*	*X*		

*9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**).*

The present project is concerned with many aspects of husbandry, such as animal health, animal nutrition and animal housing. The project also worked with a range of species including poultry, small ruminants, non-ruminants and rodents. As such, there is scope for clustering with many different projects carried out by RNRRS or other bodies, for the benefit of poor people, concentrating on some of these themes and animal species. This would allow for findings from several avenues of research to be consolidated in order to add value to the work of all projects. Farmers in Bolivia were unwilling to invest time and money in the provision of additional feed for

their small livestock. This is a particular area where experiences from other regions could be used to supplement the findings from Bolivia. The most obvious clusters from the circulated list of RNRRS projects, where synergy might be obtained, would be as noted below.

Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

The following clusters from the circulated list should provide synergy to the present project.

Crop Protection Programme:

- R8339/R7346/R8296: Promotion of crop residues for fodder, ICRISAT (for small ruminants).
- R8405/R8302/R7565: PPT breeding disease resistant cassava, NRI (to remove the toxic element from the foliage).

Crop Post Harvest Programme

- R8267: Sorghum in poultry feed, ICRISAT.

Animal Health Programme

- R6608/R8151: Control of worms in goats in Southern Africa, Onderstepoort Veterinary Institute (as a substitute for chemicals).
- R7595/R7596/R8151/R8022/R8208/R8042/R7173/R7987/R7229/R7357/R5406/R7596/R8313: Delivery of research findings, Makerere University.
- R8152/R7359/8213: Information kiosks in India, University of Reading.

Livestock production Programme

- ZC0243: Smallstock toolbox (some data already incorporated into the toolbox).
- ZC0146: Rabbit Farming, No institutional affilliation (to complement data on other small animal species).
- R7634: Community based goat production in Kenya, Farm Africa (to compare with data from South America).
- ZC0208: Participatory livestock research, NRI (to compare with the methodology used in Bolivia).

Validation

B. Validation of the research output(s)

*10. **How** were the output(s) validated and **who** validated them?*

Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the "who" component detail which

group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation ***(max. 500 words)****.*

The original participatory research was conducted in a series of communities (smallholder rainfed, humid farming system). These were located at the forest margin (forest-agriculture production system). Each farm measured up to 50 hectares, but few had titles, which prevented access to credit. All were resource-poor, subsistence farmers, occasionally selling excess production, particularly to pay for medicines or school fees. Cash income was low and including the market value of home consumption, annual family income was calculated at about US$1,200. Most farms were managed by a couple, but there were some women-headed households where the man was either dead or absent in search of work. In most cases, small animals were managed by women and older children, while the men concerned themselves with cattle (if present) and crop production. Some communities were populated by immigrants from the highlands of the country, while others were composed of local people. Both were targeted, to identify differences between the two ethnic groups. The communities all fall into the category of extreme vulnerable poor (Hobley and Jones, 2006).

New communities with similar characteristics (both immigrant and local) were selected for the validation process. In each of four new communities, a meeting was called in the evening. The invitation asked for the participation of men, women and older, school-age children and in all cases, the attendance included almost all available community members. The results obtained in the original research were explained and the community was asked to conduct a validation. Once agreement had been given, they were asked what animal species and which intervention(s) they wished to work with and who amongst them would be primarily responsible for the work, under the guidance of the researchers. The visitors then retired to allow the community total freedom to discuss the questions put to them.

Once decisions were reached, the researchers returned, to emphasise that the ones chosen to conduct the work would be representatives of the whole community and that it was expected that their neighbours would have free access to the trial plots or installations, where they would be able to suggest modifications. The community would be at liberty to adapt the recommended processes according to their own criteria. The researchers would make periodic visits and be available for consultation as required. They would provide purchased inputs (mainly vaccines and wire for animal housing) but the communities would be responsible for conducting the work and for the provision of inputs (animals, poles, thatch, etc.) which could be found on the farms. The dates for the initial visits were agreed.

All animal species investigated during the research phase (chickens, ducks, pigs, hair sheep and guinea pigs) were included in the validation, but no community wished to work with improved animal nutrition. Validation was, therefore, restricted to issues of animal health and housing. In pigs and sheep, parasite control was confirmed as of primary importance, while with chickens, vaccination reduced chick mortality by up to 30%. Night shelters prevented losses in poultry.

11. ***Where and when*** *have the output(s) been validated?*
Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which production system and farming system, using the options provided in questions 7 and 8 respectively, above ***(max 300 words)****.*

Validation has not yet taken place outside Bolivia, although interest has been expressed from neighbouring countries such as Brazil and Paraguay, where members of CIAT staff have been invited to make presentations on the methodology and project documentation has been provided (in Spanish).

Within Bolivia, since 2001, further validation and use of the methodology has taken place in several areas as noted below. In all cases, poor smallholder farmers have been targeted. In the first three cases, the work has concentrated on chickens, while in the drier areas, pigs and goats have been the most common small livestock species.

1. Provinces of Sara and Ichilo: smallholder rain-fed humid; forest-agriculture. Estimated increases in cash income of US$250 per family per year (on a baseline of about US$1,500 per family in cash and kind.
2. San Ignacio de Velasco: smallholder, rain-fed, seasonally dry; semi-arid.
3. Area Integrada (east of Santa Cruz): smallholder, rain-fed, seasonally dry; semi-arid.
4. Mesothermic Valleys (Vallegrande, Comarapa): smallholder, rain-fed, highlands; hillsides.
5. Chaco (Cuevo in Tarija Department and Boyuíbe in Chuquisaca Department): smallholder, rain-fed, dry; semi-arid. Note that this work is taking CIAT out of its home Department of Santa Cruz and that this is raising the profile of the institute on a national basis.

Current Situation

C. Current situation

12. ***How and by whom*** *are the outputs currently being used? Please give a brief description* ***(max. 250 words****).*

In recent years, a series of Foundations (public-private partnerships, one each for the Chaco, Altiplano, Valleys and Humid Tropics) has been established in Bolivia to commission agricultural research and to coordinate technology transfer, under the general title of *Sistema Boliviano de Innovación Tecnológica Agropecuaria* (SIBTA). There is, however, no formal government extension service as has existed for many years in most of the African and Asian countries that are currently targeted by DFID. As a result, research bodies in Bolivia are largely responsible for dissemination of their own results. The research team of CIAT, encompassing biological (agronomists, veterinarians and animal production specialists) and social scientists (agricultural economists and sociologists) together with technical support staff and students, is seen as the rightful experts and diffusers of the technology. In all cases where projects have been established for the diffusion of the methodology, CIAT has been responsible for providing the expertise, while foreign aid donors, government or local authorities have provided operational staff to work with small-scale farmers under the technical guidance of the specialists from CIAT.

There have been several instances where people who have seen animal shelters on farms of friends or neighbours have gone home and built a similar structure of their own, or have requested design details from CIAT. This spontaneous activity is spreading the technology to areas where

there has been no formal project established to promote it. This has served to raise the profile of CIAT across the country.

*13. **Where** are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used **(max. 250 words).***

The outputs are currently being used primarily in the areas where the initial activities were supported by the projects noted under Question 11 above. Within those areas, there is an element of farmer-to-farmer extension so that the number of beneficiaries far exceeds those with direct exposure to the development projects.

CIAT has recently received demands from a total of 12 Municipalities for work with small animal species, while funding is being sought to expand activities into an additional seven Municipalities in the Cordillera region of the country.

It is not known if there has been spontaneous uptake of the methodologies in countries other than Bolivia, where the project has been publicised and where documentation on methodology and results has been provided in Spanish.

*14. What is the scale of current use? Indicating how quickly use was established and whether usage is still spreading **(max 250 words).***

Initial use was established during the validation phase of the RNRRS project, when neighbours of the validators saw the positive effects being generated and established their own programmes with no material support from the project. Since that time, the PRODISA project (Belgian Foreign Aid) in Sara and Ichilo has worked with 458 families in a number of communities, while in San Ignacio, CIAT, with financial support from the national government, has provided direct assistance to 720 families. In both of these cases, the work has concentrated on chickens. There has been no survey conducted to provide accurate figures, but the number of families influenced by the work far exceeds the number of direct beneficiaries and continues to grow.

No current data are available for the numbers of benefiting families in either the Mesothermic Valleys or the Chaco, but in both cases, the target group numbers a minimum of 100 families per year in each Municipality and in addition to this, spontaneous uptake continues to take place. In total, several thousand smallholder families in lowland Bolivia and the neighbouring hillsides have so far benefited from project activities either directly or spontaneously and the number continues to increase.

*15. In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key facts of success? **(max 350 words).***

In Bolivia, there were no particular platforms, policies or institutional structures in place at the start of the RNRRS project that favoured uptake of the results. Rather, local and even national government policies in favour of small animal species developed later, when the project had clearly demonstrated the importance of the existing animal

species to the livelihoods of poor, subsistence farmers. The political development arose from the research and resulted in the establishment of development projects to make greater use of the research results generated by LPP.

The key to the success of the project was that participatory research proved the technology to be appropriate, efficient, economically feasible and easily implemented. Since small animal species are managed by women and children, who benefit directly from any additional productivity of the animals either through more food or more money to invest in other farm enterprises (e.g. establishment of fruit trees), the techniques led to the empowerment of these groups. The extra food on the table, or goods for sale were readily observed by the neighbours and this added to the prestige and standing of project participants, both within the family and in the wider community.

When moving into a new area, some limited funding and logistical support for the purchase of inputs (mainly wire, vaccines and in some circumstances, provision of seed of new forage varieties) would be an important prerequisite,, although in Bolivia, and probably elsewhere, once producers were convinced of the effectiveness of the measures, they were spontaneously willing to invest small amounts of their own money in these necessary inputs. More important in the early stages was the frequent presence and moral support of a respected technician, preferably with a basic knowledge of animal diseases and nutrition. It is believed that the presence of a strong extension service, as exists in parts of Southern Africa and South Asia, would have enabled the impact of the project to be greater and faster, since in all communities that have been exposed to the methodology, uptake has been rapid.

Environmental Impact

H. Environmental impact

24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? ***(max 300 words)***

This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.

The nature of the project is small-scale and works with existing animals. As such, it is not expected to have large environmental impacts, either positive or negative. There are, however, some minor effects that should be mentioned:

- In some forest areas, native animals such as armadillos and large rodents (jochi) have been hunted almost to local extinction. Project participants have expressed great satisfaction that improved productivity of domestic animals has reduced the need to hunt wild animals for family consumption. This will have a positive effect on the conservation of native animal species in the forest.

- The use of night shelters for poultry makes it a simple matter to collect manure for use in vegetable gardens. This will improve soil fertility on small areas of land and reduce the need to regularly move gardens to new areas as fertility is exhausted.
- The confinement of pigs in secure housing at critical times of the cropping season will reduce the damage that they do to crops and also to native vegetation, particularly along stream banks, by grubbing in the soil.

25. Are there any adverse environmental impacts related to the output(s) and their outcome(s)? ***(max 100 words)***

There has been no tendency in Bolivia for farmers to greatly increase their small animal activities as a result of the project, although if there is such a trend in the future, there may be negative effects such as additional land clearance for the expansion of sheep pastures.

26. Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? ***(max 200 words)***

Improved productivity of small animal species contributes greatly to the food security of families living under adverse conditions. If the food supply is assured, this will increase the resilience of the family under changing circumstances, whether as a result of climate change, natural disaster, political measures, or any other cause.

The predicted effects of climate change include increased storminess, but reduced overall rainfall in the lowlands of Bolivia. The provision of shelters, particularly for poultry and sheep would protect them from storms and reduce the losses of chicks and lambs that often result from cold, wet conditions. If overall rainfall decreases, it is easier to provide feed for small animals than for large ruminants.

In most parts of the Bolivian forest margin, the most likely natural disaster is flooding. While crops are particularly prone to floods, there is a chance of saving some small animals from drowning. This would help in the recovery of the family once the flood waters recede.
