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## **PASTORAL DEVELOPMENT NETWORK**

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**HIGHLIGHTS FROM SOCIOLOGICAL (CRSP) RESEARCH ON SMALL RUMINANTS**

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## HIGHLIGHTS FROM SOCIOLOGICAL (CRSP) RESEARCH ON SMALL RUMINANTS

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### WHAT IS A CRSP?

The Small Ruminant Collaborative Research Support Programme (SR-CRSP) is the oldest and largest of eight multidisciplinary agricultural education, research and development initiatives established under the US Congress' International Development and Food Assistance Act of 1975, (amending the Foreign Assistance Act of 1961). Title XII of the amendment, otherwise known as the 'Famine Prevention and Freedom from Hunger Act', provided the authority for the CRSPs.

The CRSP mandate is to strengthen the capabilities of US land grant universities and collaborating foreign institutions to apply the results of agricultural research to solving world food and nutrition problems. Furthermore, these collaborative programmes are designed with an explicit focus on the production, distribution, storage, marketing, and consumption of the food crops of smallholders and the poor in less developed countries (ldcs).

Small ruminants were one of the first priorities identified as an important target for CRSP research. Fifty-six percent, 96% and essentially 100% respectively of the world's sheep, goats, and domestic camelids (alpaca and llama) are raised in ldcs, where they constitute a critical part of national food supplies and economies. The animals are primarily owned by small farmers and pastoralists of very limited means.

Initiated in 1978, the SR-CRSP was designed to help alleviate some of the problems hindering small ruminant production in such millieux. Broadly representative research sites were established in five collaborating countries: Brazil, Indonesia, Kenya, Morocco and Peru. Eight foci of research on small ruminants were identified: animal nutrition and feeding, reproduction and genetics, health, production systems, systems analysis, economics, and sociology.

One or more US research institutions was assigned responsibility for each of these research foci. The Department of Rural Sociology at the

University of Missouri-Columbia (UMC) took charge of all sociological research across the five sites. Here we present a few highlights of UMCs efforts to date, focusing upon important overarching issues, particularly unique or significant findings, and major host-country institutional outcomes.<sup>1</sup>

#### TYPOLOGIES OF LIVESTOCK PRODUCERS

The first step in any successful agricultural development project is to define its setting, goals and priorities. But even after these have been established, it is sometimes difficult to target the precise production systems to be assisted in terms of their key socio-economic and other features.

Within the SR-CRSP/Peru, for example, some agreement was reached that the Program should have a focus on peasant communities, since approximately half of Peru's rural population are members of legally recognised Peasant Communities, and since they control over 50% the nation's small ruminants - sheep, goats, llamas and alpacas. However, a question still remained as to what type of communities should be targeted: mixed crop/livestock farmers, or more purely pastoral producers?

To address this critical question, in collaboration with Peru's Direccion de Comunidades Campesinas y Nativas (DCCN), the UMC Sociology Project has been analysing data on 2716 (over 99%) of the nation's legally recognised peasant communities, based on a 1977 study conducted by the Peruvian government. Cluster analysis of this massive database has generated a heuristic typology for orienting SR-CRSP work in peasant communities (Mantgaard, 1986).<sup>2</sup>

Briefly, results indicate that nearly half of the sheep and over a quarter of the alpacas held by Peruvian peasant communities are found among mixed, 'agropastoral' farmers. These findings challenge earlier assumptions that more purely pastoral groups held the vast majority of small ruminants among Peruvian peasants. Andean agropastoralists operate under a very different set of social, physical and techno-economic constraints from 'pure' pastoralists. While the

latter usually live in patrifocal groups on high altitude rangelands above 4000m (Jimenez and Hobbs 1986 and West 1981), agropastoralists are typically neolocal and bilineal and reside at 'lower' altitudes, between 3000 and 4000m. Since mixed farmers simultaneously engage in two very different production systems, their technological needs, land and labour requirements, and marketing and consumption patterns also differ from those of pure pastoralists'. (Guillet 1987; McCorkle 1983; Primov 1981, 1983). Furthermore, agropastoral peasant communities in Peru differ from private farmers in that most of their pasturelands are held in common (McCorkle 1987b), and many production decisions are made communally (Gilles and Jamtgaard 1982; Jamtgaard, 1984). And although each household is assigned its own plots and possesses its own animals, much of the daily work of both cropping and herding involves the coordination of several households (McCorkle 1982b).

At a broader level, clearly the same kinds of data analysis and methodological techniques used to target SR-CRSP research in Peru can be put to work to typologise production systems and refine agricultural development priorities and strategies in other countries. Studies in each of the five sites have repeatedly emphasised the web of social, cultural, technological, and even socio-political inter-relationships between crops and livestock in smallholder farming systems as a whole eg. for Indonesia (Ithalaw 1983; Suradisastra and Nolan 1983; Gaylor and Bilinsky 1986, Knipscheer and Suradisastra 1986); for Kenya (Mukhebi et al. 1986; Reynolds et al. 1983; Reynolds 1985; Campbell et al. 1984; Noble and Nolan 1983); for Morocco (Mendes 1986; Gilles 1982c; Gilles et al. 1986); for Brazil (Neumaier et al. 1983); and for Peru (Guillet 1987; Perevolotsky 1987). In fact, nearly all the studies cited in this review are relevant.

What this substantial body of SR-CRSP research indicates is that development efforts in mixed farming systems cannot ignore the fact that plant crops simultaneously compete for scarce household land, labour, capital, and technological resources. Neither can such efforts ignore the fact that women and men fulfill differing but

complementary roles in these two production sectors. These realities are particularly evident in SR-CRSP studies of the organisation of labour and decision making responsibilities by sex and age, within and across households, among ldc farmer-stockraisers (eg. Billinsky 1986a&b; Conelly and Nolan 1986; McCorkle, 1986b). Current UMC sociological research by McCorkle and Perevolotsky is advancing towards the construction of a cross-culturally applicable model of such complex, mixed farming systems among peasant smallholders (Perevolotsky, 1987).

#### PROGRAMME VERSUS PRODUCER PERSPECTIVES

For many ldc producers, small ruminants are valued not so much for their yields of animal products and cash as for their role in households' overall survival strategy. Small ruminants are only one component within larger, complex systems of resource and risk management. Interventions which require stockowners to make major additional investments in one sector of production may prejudice other sectors, and hence be rejected.

As SR-CRSP rural sociologists discovered among goatkeepers in the drought-prone sertão of northeast Brazil, programmes' and producers' perspectives on what constitutes appropriate livestock development may differ considerably. The former commonly assume that animal products and profits are more important than the animal production system itself. Accordingly, developers seek to enhance the market value of livestock in the most cost-effective manner. While this assumption is valid where production is geared to market sales, it does not fit subsistence-oriented systems (Primov 1985).

Smallholders in the Brazilian sertão, for example, keep goats primarily as a low or no-cost hedge against drought, to supply basic family needs for cash and meat during these difficult periods. But people devote little time, capital, veterinary or other care to their goats, which largely manage on their own (Neumaier 1986; Primov 1982, 1984). Instead, producers generally prefer to concentrate on cropping and other, more profitable livestock enterprises (sheep and cattle). Thus the role of goats in the sertão is to serve as an

emergency backstop when other productive activities fail. Goats themselves are not a priority production enterprise. Devoting scarce resources to improving the quality and yields of this species defeats the purpose of raising it in the first place. In such cases, interventions calling for increased capital investment in herd quality will likely be rejected, whereas those which maximise the quantity of goats (and thus the absolute numbers surviving droughts) through modest extra inputs of labour or slight shifts in management patterns might be accepted.

Elsewhere, both such interventions might be appropriate. For example, SR-CRSP research in the arid despoblados of northern coastal Peru reveals that goats there constitute a central element in smallholders' overall production system (Perevolotsky 1985a&b). Moreover, the animals and their products are expressly raised for profit-making sales in the market as well as for subsistence in a highly unstable environment (Perevolotsky 1987).

In short, developers must comprehend the place of each commodity in the larger production system before they can design appropriate interventions.

#### PRODUCTS AND PRODUCTION SYSTEMS

The UMC sociological investigations in highland Peru have also found that among most stockraisers the primary small-ruminant production emphasis is not meat, fibre or cash. Instead, it is manure.

As noted earlier, the majority of Peruvian peasants who keep small ruminants also practice intensive agriculture. They produce the bulk of Peru's staple food crop, potatoes. 'But', say Andean cultivators, 'without the fertilizer that our animals give us, we would have no potatoes' (McCorkle, 1983). Independent research by soil scientists confirms this view; and SR-CRSP findings indicate that peasant households typically require one-and-a-half to two tons of manure annually for their fields (Jamtgaard 1984). The manure to be used as fertilizer is collected and stored in the corrals where herds are quartered each night. When the planting season arrives, the year's

manure production is put in sacks, carried to the fields, and mixed into the earth as the potatoes are sown. After the harvest, livestock graze the fallow fields, manuring and reseeding them in the process. Herds also utilise the high-altitude rangelands above 4000m, where agriculture is impossible. The animals thus render the plant resources of this otherwise non-productive biome useful for agriculture. Ruminants process the tough Andean grasses into precious fertilizer, and even obligingly transport it down to the croplands below.

In addition to its critical role in Peruvian agriculture, manure is important in other ways, too. In the frosty, treeless heights of the Andes, animal dung constitutes practically the sole source of cooking and heating fuel. It is also useful in constructing adobe houses and corrals.

Indeed, so valuable is this small-ruminant product that, besides being bought and sold, in many Peruvian communities manure can be used almost like money - to pay wages for agricultural labour, to rent extra land for cropping, or to lease a corral. It is even exchanged as a gift among friends and relatives.

Fuel and fertilizer are 'bottom line' essentials for human existence in the harsh, cold sierra environment. Since there is almost no source of fuel other than dung, and since chemical fertilizers are prohibitively expensive for most peasants, this critical resource tends to overshadow other small-ruminant products in significance.

The 'bottom-line' importance and the multiple uses of manure in the Andes help to explain one behaviour which has puzzled some researchers - peasants' seemingly irrational reluctance to slaughter aged, ailing, or otherwise unthrifty animals. Peasants' herds often include many animals that are long past their reproductive prime and their meat-, milk-, or fibre-producing peak. But, these same animals do continue to produce desperately needed manure! This is one of the principal reasons for Andean and other peasant agropastoralists' conservative culling practices.

In broader terms, the role and importance of even the most humble animal products within non-Western agricultural systems and household economies as a whole must be carefully assessed before either crop or livestock interventions are planned. Otherwise, developers run the risk of directly imperiling human survival.

#### WOMEN AND SMALL RUMINANTS

Since its inception, the SR-CRSP Sociology Project has been studying the role of women in animal husbandry (Nolan 1985a). Working closely with local researchers, UMC social scientists have demonstrated that women in Indonesia (Wahyuni et al. 1987), Kenya (Conelly et al. 1986; Noble 1986; Noble and Nolan 1982), and Peru (Bursten and Abuhadba 1987; Fernandez 1987; Fernandez and Salvatierra 1986) have major responsibilities for the care of small ruminants and often for major production and management decisions as well.

In highland Peru, for example, women and children generally see to the daily herding of ruminants, while men devote most of their time to cultivation. Indonesian women also take part in providing feed for their household's sheep and goats, which are raised in small flocks (4-5 animals) under intensive management conditions. Additionally, women in both countries play significant roles in treating veterinary problems and in marketing animals.

The situation in Western Kenya where many women are the heads of farm households, is more complicated. Traditionally, it has been culturally unacceptable for women to care for livestock other than poultry. However, this tradition is rapidly changing. More and more women farmers are expressing keen interest in raising the dual-purpose goats which the SR-CRSP is developing in Kenya.

To date research results point to the need for explicit recognition of the important contributions women make to animal production. As the CR-CRSP begins to test new technology for and with small ruminant producers, special attention will be given to ensuring that the 'real' stockraiser is taken into account when new ideas are tried.



## TRADITIONAL RESOURCE MANAGEMENT SYSTEMS

In Morocco's High Atlas Mountains, a 300 year old system of pasture management is being studied by SR-CRSP rural sociologists and range managers, through the Institut Agronomique et Veterinaire Hassan II in Rabat. Data on traditionally projected pasture areas known as adgala indicate that this ancient system is simple, inexpensive to manage, and environmentally sound (Artz and Jamtgaard 1985; Mendes 1987).

Research focuses on the characteristics of successful pasture conservation systems, versus those in decline. An important finding is that traditional systems rely more on regulating the length of grazing season, socially flexible and/or hierarchical rights to rangelands, and controlled use of wells (Gilles 1982b). This contrasts with Western practices and most range management projects, which emphasise fixed stocking rates, rigid control of herd movements, and privatisation of pasture rights. Pastoral groups understandably resist efforts to diminish herd size to circumscribe livestock mobility, or to limit access to traditional grazing grounds (Gilles 1982d).

Examples of indigenous farming communities which have successfully sustained their rangelands for hundreds of years can be found in many parts of the world. Although the SR-CRSP study examines a traditional Moroccan institution, when combined with the global scientific literature on pastoralists, it may generate solutions for livestock development problems in other arid and semi-arid parts of Africa, Asia and Latin America (Artz et al. 1984; Gilles 1982a, 1986, 1987; Gilles and Jamtgaard 1981).

This comparative perspective may explain why so many range development projects have failed. They are too often grounded in the assumptions and historical evolution of range science in the West. Development programmes could more profitably adapt existing social, political and juridical structures, instead of imposing controls derived from unacceptable, external models.

## INDIGENOUS KNOWLEDGE SYSTEMS

Veterinary beliefs and practices among Quechua Indians of Peru form another subject of comparative SR-CRSP sociological research. Andean

ethnoveterinary concepts and practices run the gamut from supernatural, Incaic ones such as 'evil winds' and invading spirits, through 16th-century Spanish notions like 'hot' versus 'cold' diseases, to naturalistic explanations like dirty corrals, contaminated drinking water, and loco-weed poisoning (McCorkle 1982a).

These and other native descriptions of animal ills and their clinical signs, causes, cures, and prophylaxes have been 'translated' into the scientific terminology of western veterinary medicine, and their accuracy assessed. Inter-relating folk and scientific systems of veterinary vocabulary, theory and practice is an important part of efforts to improve animal health and, with it, herd productivity and herd owners' economic and nutritional well-being (McCorkle, 1986a).

In order to communicate useful knowledge from the Western, scientific world to native stockraisers, developers must first translate this knowledge into the appropriate ethnoscientific idiom. Otherwise, as SR-CRSP social scientists have documented, new techniques run the risk of being feared, misunderstood and misapplied by the very people they are designed to benefit. Moreover, some ethnoveterinary techniques have real therapeutic and prophylactic value. For example, there is evidence that a number of items in the indigenous Andean pharmacopoeia are effective in assuaging diarrhoea or preventing parasitic infection. SR-CRSP researchers are therefore experimenting with local medicinal herbs, so that peasants themselves can prepare cheap but workable home remedies for some of the most economically destructive livestock diseases (Fernandes, 1986). This bottom-up approach illustrates the usefulness of ethnoscientific research in focusing development efforts on cost-effective and truly 'appropriate' technology (McCorkle, in press).

#### SOCIOLOGY IN AGRICULTURAL R & D

With nearly a decade's involvement in SR-CRSP, UMC sociologists have had their attention drawn towards the role of social sciences in international agricultural development - what might be termed 'the sociology of sociology in R & D'. Topics addressed include the substantive social science contributions to the design and imple-

mentation of agricultural research, development, and extension programmes in ldes (Campbell *et al.* 1981; Nolan 1985b); statuses and stereotypes of the social analyst on multidisciplinary development teams (McCorkle and Gilles 1987); communications across disciplines engaged in farming systems research (Esslinger and McCorkle 1986); and professional, ethical, and equity concerns relating to social science participation in development (Stanford and Campbell 1984).

Sociologists working in the SR-CRSP have found that one of their main contribution is in relating the specialised researches within the technical sciences to the dynamic and complex human ecologies they are designed to benefit. The sociology of agriculture takes as its central concern the impact on human well-being of proposed technical interventions. This aspect is illustrated by the social and ethnographic analyses of indigenous range and veterinary management systems described above.

Another contribution from social scientists has been to monitor the equitable distribution of development benefits. In a technically-oriented research team, the social scientist may serve as the project's 'conscience minder', although sometimes this role is seen more as one of 'nay-sayer'. Such issues of role interpretation in turn relate to communications gaps between development disciplines. UMC researchers have worked to identify such gaps and to suggest concrete strategies for bridging them.

More recently, McCorkle and others of the Project team have taken the lead in compiling information and editing an anthology on social science contributions to the CRSPs generally. 'How have we made a difference?' is the question to which answers are sought. Systematising studies of the origin and organisation of the CRSPs are underway in an effort to understand the CRSP concept as a unique model of international agricultural R & D.

#### PUTTING PRINCIPLES OF COLLABORATIVE PUBLISHING IN PRACTICE

If the socially sensitive insights and research results of efforts like the SR-CRSP Sociology Project are to have any impact on the global community of development scientists, research administrators,

and policy-makers, they must be systematically reported and disseminated. To this end, a programme-wide technical report series has been established in which any SR-CRSP scientist and even collaborating non-CRSP colleagues can publish in the language of their choice. (Spanish language contributions have not been itemised in this review, but PDM readers should be aware that the SR-CRSP series also includes many Spanish language titles.) To date (spring 1987), the series totals some 90 reports completed or in progress. Additionally, most sites have established an interdisciplinary, in-country working paper series.

Technical reports are permanently housed with the US Department of Commerce's National Technical Information Service. To ensure broader dissemination, the Sociology Project has taken the step of housing its reports (30 of the 90) with the Commonwealth Agricultural Bureaux, ODI's Pastoral Development Network and other relevant outlets.

In addition, individual programme components may also encourage special publications by host-country collaborators. For example, in conjunction with the Range Management Project of Texas Technical University, the UMC Sociology Project provided a subvention for a scholarly text in Spanish. This was co-authored by two Peruvian scientists (Tapia Nunez and Flores Ochoa 1984) and has enjoyed wide distribution both in Peru and the US. Two other publishing projects in Peru have received support from the Sociology Project, and are in progress. In the US three scholarly anthologies are underway, highlighting the findings and achievements of both US and host-country social scientists.

#### MICROCOMPUTERS AND LDC RESEARCH PRODUCTIVITY

The original intention was that CRSPs should also contribute toward effective institution-building. It has long been recognised that a major impediment to research productivity in LDCs is scientists' inadequate access to modern computing technology. Typically, such

facilities are lacking altogether, or they are organised to serve administrative rather than research needs. In either case, researchers' ability to perform complex statistical manipulations on large data sets is severely limited.

In 1982, the SR-CRSP/Indonesia project began to make significant investments in microcomputer hardware, software and staff training. Compared to mainframes, microcomputers are relatively inexpensive, easy to operate, and less susceptible to climatic 'stress'. In the last five years they have also become much more powerful; they can now handle complex tasks and large data sets with relative ease. Within Indonesia's Central Research Institute for Animal Science (CRIAS), this small investment quickly revolutionised the approach SR-CRSP counterpart scientists took to research and analysis. Instead of travelling to Jakarta and having to wait hours, or even days, for access to a mainframe computer in the Ministry of Agriculture, scientists can now schedule a session on one of the microcomputers installed by the SR-CRSP. Researchers can now accomplish in a day what might previously have taken two weeks. The Indonesian experiment has proved so successful that microcomputers have now been purchased by all SR-CRSP projects. Care has been taken to maximise hardware compatibility across sites to permit sharing of software and data.

Based on this experience, SR-CRSP scientists feel that the microcomputer revolution, which is now well established in the US may prove to be an even bigger agent of change in the developing world. It has already had a major impact on the lives of biological and social scientists working with the SR-CRSP in Brazil, Indonesia, Kenya, Morocco and Peru - and also on the image and work of US social scientists (Guillet 1985).

#### INSTITUTIONALISING SOCIO-ECONOMIC ANALYSIS

When the SR-CRSP was formed, rural sociology and agricultural economics were made an integral part of the programme. As the programme evolved and collaborating host-country institutions were identified, it quickly became apparent that one problem facing US

social scientists on the SR-CRSP was the lack of suitable counterparts in the ldc institutions selected. This was not surprising, since most of these organisations were oriented mainly towards non-economic research on crops and/or livestock.

In practice this has meant that the staff to do socio-economic research had to be trained as part of the programme. Indeed, one of the CRSP's primary objectives is to provide advanced training for both US and host-country students and researchers. To date, formal education undertaken either in host-country or US institutions has been extended for 35 individuals, over a third of whom have been women. Of this investment in human capital, 42% has been at the MSc level and 23% at the PhD level. As host-country counterparts are trained and returned home, they will assume the major responsibility for conducting on-site research programmes. The role of US researchers will then shift to that of consultants/researchers and colleagues. This should be the ultimate goal of any foreign assistance programme.

While there were differences in the welcome extended to socio-economic studies in the five SR-CRSP sites, by 1984 the value of such studies had become apparent to ldc scientists and research administrators. This fact manifested itself in the creation of new socio-economic research units within the collaborating organisations. A good example is the establishment of a socio-economics unit within EMBRAPA's National Goat Research Center in Brazil. Currently the unit is staffed by an agricultural economist who receives support from the SR-CRSP/Winrock Economics Project. A Brazilian sociologist for this unit is expected to be hired in future.

Similarly, in Kenya the research division of the Ministry of Livestock and Development formed a new socio-economic unit, and hired both a sociologist and an economist to work as SR-CRSP counterparts to resident US scientists. These individuals are among those now studying for doctoral degrees at US Universities, sponsored by the UMC and Winrock Projects.

Parallel developments have occurred in Peru. And in Indonesia, UMC and Winrock personnel have worked with the Central Research Institute

for Animal Science to strengthen and expand its socio-economic unit through graduate training, research support, technical assistance, and microcomputer acquisition. While the role of sociology and economics in the SR-CRSP is primarily to provide baseline information and to evaluate interventions in small ruminant production systems, it now seems clear that one of the most important outcomes of the projects will be the creation of units, with well-trained staff, within lde agricultural research organisations. Such units should be capable of providing this same information and feedback as an integral part of future programmes. They may well prove the most important legacy of these projects.

#### NOTES

1. For more information, interested readers may write directly to: SR-CRSP, Department of Rural Sociology, University of Missouri, Columbia, MO 65211, USA. (phone 314-882-6085).
2. The typological research was conducted in collaboration with DCCN researchers Victoriano Caceres, Ivan Pardo Figueroa, and Jose Portugal. Among other Peruvian social scientists not cited in the text but who are also working on related community-level studies are Haydee Duran, Manuel Estofanero, Corinne and Domingo Martinez, Norma Meneses and Ruben Velarde.
3. SR-CRSP veterinary researchers collaborating in this study include Francisco Arevalo, Hernando Bazalar, Zenon Choquehuanca, and Mowafak Salman.

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