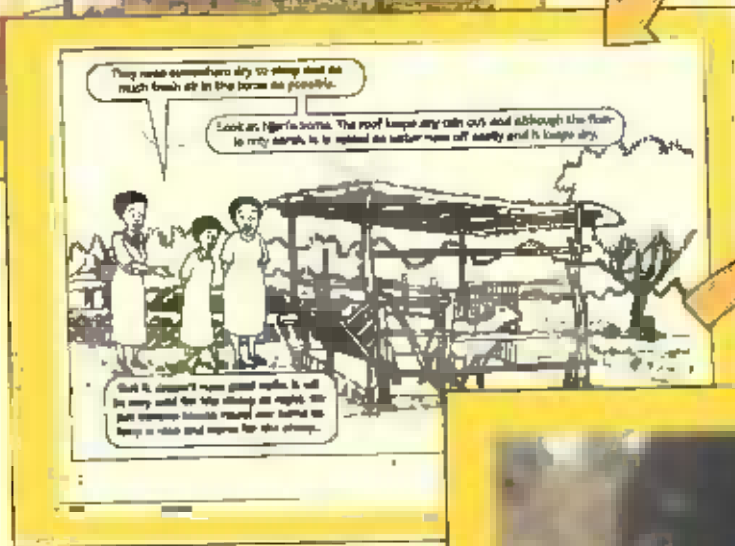


Department For International Development
Renewable Natural Resources Knowledge Strategy

Livestock Production Programme



Output



To

Purpose



Review

Semi-Arid Production System
Purpose 1

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October 1999

Executive Summary

1. The purpose of this review is to gain an overview of how project commissioning, execution and dissemination have contributed towards the attainment of the DFID Renewable Natural Resources Research Strategy (RNRRS) Livestock Production Programme (LPP) Semi-Arid Production System (SAPS) Output-level Objectively Verifiable Indicators (OVIs). Then, to analyse the extent to which the balance and targeting of Outputs has successfully impacted upon Purpose-level OVIs (SAPS Purpose 1 – SAPS1).
2. The review assesses the potential for uptake and impact of these Outputs on the new SAPS Purpose 1 statement given in the recently-produced LPP Renewable Natural Resources Knowledge Strategy (RNRKS) SAPS1 Logframe. General areas for future commissioning of research against this Logframe suggested
3. A total of 10 projects are reviewed that were commissioned under the DFID RNRRS between 1991 and 1996. Projects vary in the subject areas covered and address four out of the five SAPS1 Outputs given in the Logframe.
4. Projects have been prolific in the production of Outputs in the form of scientific journal articles, abstracts, edited international conference proceedings or bulletins. In this way they have been very successful in promoting outputs to peers and thus maintaining the high profile of LPP in the international scientific community.
5. Only one project claimed to have achieved impact upon beneficiaries. The linkup between Project R5926 (Productivity of Draught Animals) and an agricultural engineering company in Zimbabwe (Zimplot) has resulted in widespread adoption of lightweight ploughs by poor households owning donkeys in Zimbabwe and RSA. Albeit with anecdotal evidence of uptake, this project provides a useful model of research/private sector partnerships for effective and sustained promotion of scientific outputs.
6. No projects set format mechanisms in place for monitoring uptake either during the life of the project or beyond. The opinion was that this is the responsibility of LPP.
7. This review draws attention to the ambiguity of the term "stakeholders" used to denote target groups for research outputs. The majority of Project Leaders see National Agricultural Research and Extension Systems (NARES) as the target groups. Their responsibility for promoting outputs therefore terminates with the production of literature suitable for NARES staff. In many target countries, NARES lack the funds to operate effectively so do not represent a viable pathway for transferring outputs to DFID priority beneficiaries – the poor. Projects commissioned under the new RNRKS LPP Logframe should be encouraged to aim beyond Project output-level OVIs and claim part-responsibility for the attainment of the LPP Purpose.
8. Projects should be required to put uptake monitoring mechanisms in place that can intermesh with impact assessment studies planned by LPP and RNRKS. These may need to operate beyond the 3-year life cycle of LPP Projects. To accommodate this may require revised funding strategies to be adopted by LPP.
9. The Review identifies the risk that given impact upon LPP SAPS1 Purpose-level OVIs must be demonstrated by 2005 there is a tendency for research to become more adaptive in nature. The main danger here is that adaptive research frequently addresses very localised problems. Site-specific problems must be avoided in

favour of addressing livelihood constraints that cross regional or national boundaries. The minor threat is that development-oriented research may not appeal to the traditional LPP contractor ie UK universities. Universities are evaluated on the basis of publication record and development research tends not to be favoured by the top-ranking scientific journals. Reduced interest in LPP by contractors may be avoided by changing the contractor base in favour of, for example, international NGOs with an interest in research.

10. The review makes little comment on the validity of the RNRRS LPP SAPS1 Logframe Output to Purpose Assumptions since these have now changed with the revision of the Logframe under RNRKS. However the contribution that the research outputs so far generated make to the new SAPS1 Purpose is questioned. It is shown that whilst the subject areas covered appear superficially to be relevant to poor livestock keepers, limited, specific evidence is provided by the projects on the livelihood significance of their research topics
- 11 Some of the research outputs, particularly in the area of nutrition and disease resistance and simple feeding strategies for crop residues are considered to be at a stage where re-packaging of current outputs could yield useful dissemination material. Project Leaders may not necessarily agree with this statement or be in the best position to develop such material. Dissemination specialists should be sought
- 12 LPP should take stock of project experiences from a wide range of donors where successful uptake of livestock-specific knowledge has been achieved. The aim being to establish guidance notes for promotion of outputs from different levels to research to beneficiaries.
13. Development new research under LPP SAPS1 should take the following questions into consideration:
 - ✓ Are livestock-related opportunities for sustaining livelihoods of the poor identifiable?
 - ✓ Do they have widespread livelihood significance?
 - ✓ Can LPP research help to exploit these opportunities?
 - ✓ Do we know what type of research outputs are required?
 - ✓ Do we know who will use the outputs so that uptake and impact are achieved by 2005?
 - ✓ Do we know how to strike up the most effective partnerships to achieve these outputs?

Effective poverty-screening of project proposals must also be put in place.

14. New research topics should take account of the competitive advantage for research that LPP and its current and potential contractor base. LPP should seek to lead in niche areas identified in collaboration with other donor livestock research programmes.
- 15 LPP might consider how contractors could be encouraged to team-up with the Programme in addressing the need to achieve impact at the Programme Purpose level.

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Background

The goal of the Department for International Development (DFID) is the elimination of poverty in poorer countries. The target is to reduce by half, the proportion of people living in extreme poverty by 2015. Specifically DFID aims to "promote sustainable livelihoods and better management of the natural environment, in order to contribute to the efficient use of productive capacity.

Until 1995 DFID followed a Renewable Natural Resources Research Strategy (RNRRS) which promoted the efficient use of natural resources through science and technology. The limitations to, essentially, top-down technology development in resolving the challenges facing poor countries in their management of natural resources was acknowledged in a review of RNRRS. It was concluded that research in support of a livelihoods-centric development programme needed to provide a much broader range of opportunities that would enable vulnerable groups to achieve their aspirations. Knowledge empowerment was considered more likely to result in longer-term and widespread benefits to the poor than would the previous "technology-fix" approaches.

The RNRRS has now been superseded by the Renewable Natural Resources Knowledge Strategy (RNRKS). RNRKS, running from 1995 to 2005, aims to conduct research only where a clear demand for knowledge generation exists. Demand is considered to exist where:

"A development opportunity or a strategic constraint to the sustainability of rural livelihoods can be described with an explicit measure of the scale and nature of the benefit to be achieved for the creation and use of new knowledge".

And where:

".....representatives of identifiable communities of beneficiaries..... have participated in defining their needs....."

Implicit in satisfying these criteria is the understanding that mechanisms for communication, conditions for successful uptake and indicators for measuring subsequent impact on livelihoods are in place. It is anticipated that research guided by these principles should more closely align with DFID's goal of eliminating poverty.

To ensure attainment of this goal requires that RNRKS Programmes and the individual projects that constitute Programmes are regularly appraised on the basis of uptake and impact of outputs generated. Logical Frameworks (Logframes) for each of the 12 Programmes constituting RNRKS (including the Livestock Production Programme, LPP – see Appendix 1), agreed between DFID and contracted Programme Managers provide indicators (Objectively Verifiable Indicators, OVIs) for measuring the extent to which Programme Outputs contribute to attaining the Purpose. Appraisals, such as this Output to Purpose Review (OPR) provide an opportunity to gauge progress of the Programme against these indicators and also evaluate whether Outputs, Purposes and Assumption statements within the Logframe remain valid.

Objectives of this Output to Purpose Review

To gain an overall view of how project commissioning, execution and dissemination contribute towards the attainment of LPP Output-level OVIs and the extent to which the balance and targeting of Outputs has successfully impacted on Purpose-level OVIs. This is achieved by:

- ⊙ **Synthesizing the outputs of the individual research projects and measuring the progress along a pre-defined uptake pathway (see Appendix 2),**
- ⊙ **Assessing the extent to which the Output OVIs have been achieved:**
- ⊙ **Gauging the degree to which the Outputs achieved have or will contribute to the Purpose (See Terms of Reference in Appendix 3).**

Through this process, the Review evaluates the overall likelihood of recently completed projects contributing to the attainment of Purpose and tests the robustness of relationships and assumptions underpinning the Logframe.

The LPP is divided into seven Production Systems:

- ⊙ Semi arid
- ⊙ High potential
- ⊙ Hillsides
- Tropical moist forest
- ⊙ Forest-agriculture inter-face
- ⊙ Land-water interface
- ⊙ Peri-urban interface

This study is specifically concerned with the **Semi-Arid Production System (SAPS)** for which there are **two Purposes**. The focus here is **SAPS Purpose 1 (SAPS1):**
"Performance of livestock (including draught animals) in semi-arid crop-livestock and livestock production systems improved."

OPRs have recently been completed on other Production Systems by other reviewers: SAPS2, Hillsides, Forest-Agriculture Interface and High Potential.

Ten recently completed projects are considered in this Review of SAPS1. The majority were commissioned under the RNRKS SAPS1 Logframe between 1991 and 1996. The Logical Framework for RNRKS SAPS1 is found in Appendix 4.

Recognising that there has been a significant shift in principles of development guiding the operation of the RNRKS, the Review will consider the combined impact of Outputs against the original RNRKS SAPS1 Logframe. However the Review will go on to assess the potential impact of Outputs on the Purpose statement contained in the RNRKS SAPS1 Logframe. Suggestions are also made on future research themes that could be commissioned under RNRKS LPP SAPS1.

The Semi-Arid Production System

People occupying the semi-arid lands of Africa, Asia and Latin America are vulnerable to the vagaries of low and erratic rainfall and soils of low inherent fertility. Livestock keeping is an important livelihood strategy of the poor in such unpredictable environments. In poor communities occupying semi-arid areas of East India and East Africa, for example, it is not unusual for in excess of 80% of all households to own livestock (data from the International

Livestock Research Institute and the DFID East India Rainfed Farming Project) Livestock are assets that enhance the value of the natural resource base and provide a means by which poor people can cope with the stresses and shocks which impact hardest upon poor rural people in semi-arid areas.

Justification for the proportionally large expenditure of funds by LPP on research in semi-arid areas (43% of total funds for 1998/99) stems from the fact that 40% of the world's poor livestock keepers are found in arid or semi-arid lands (Livestock in Development, 1999).

Semi-arid livestock production is typically well integrated with cropping either in the form of sedentary, mixed-farming or through traditional contractual arrangements between nomadic/semi-nomadic herders and crop producers. Livestock species in semi-arid areas are dominated by ruminants and poultry. They typically exploit low quality feeds that fluctuate dramatically in seasonal supply. Livestock disease control depends to a large extent upon the exploitation of indigenous veterinary knowledge since the personnel and infrastructure to supply health care is at best weak but more often non-existent in these areas.

LPP SAPS Purposes

The broad scope for increasing the contribution of livestock to livelihoods of the poor in semi-arid regions through knowledge generation is recognised by LPP through the adoption of two Purposes:

Purpose 1 Performance of livestock (including draught animals) in semi-arid crop/livestock and livestock production systems improved

And

Purpose 2 Optimal strategies adopted for the sustainable management of livestock on semi-arid rangeland

Purpose 1 deals with keeping of livestock in context of the wider production system. It indicates that interventions to improve livestock productivity must be developed and evaluated at the production systems level and result in overall benefits to the system. The Purpose makes distinct reference to "crop/livestock systems" and to "livestock systems" highlighting that whilst the majority of livestock are kept in association with crops, groups of people exist in cropping areas who depend solely upon livestock. These people, mainly pastoral groups, stigmatized by sedentary communities, are marginalised within crop farming areas. For these, livestock make an even greater contribution to livelihoods and as such are critical targets for LPP SAPS1 research outputs.

Given that livestock are crucial to the poor, this makes SAPS a strategically important area for LPP. With population expansion occurring in densely populated high potential areas the influx of people (and their livestock) into SAPS is likely to remain a phenomenon of the foreseeable future. LPP has recognised that immigration and population pressure in SAPS is adds further complexity to livelihoods of the poor who already have to contend with heterogeneity in the natural production environment. Consequently, LPP SAPS1 Outputs are five in total, are broad based and, in the main, aim to develop strategies to assist households in coping with uncertainty.

Outputs of the LPP Semi-Arid Production System, Purpose 1

The five Outputs of LPP SAPS1 are given in Table 1 below. Note that Output 1 is included in SAPS 2. Since none of the ten projects reviewed were commissioned against Output 1 no further consideration is given to this in the following sections.

The following section gives background to each of the Outputs and provides some justification to the subjects covered by the ten commissioned projects (a list of these can be found in Table 2).

Table 1. The five outputs of LPP SAPS 1

Programme Purpose

SAPS 1: Performance of livestock (including draught animals) in semi-arid crop-livestock and livestock production systems improved

Output 1: *Appropriate strategies for the allocation and management of common property resources in semi-arid areas identified, developed and promoted (incl. in SAPS 2)*

Output 2: Strategies to optimise livestock production and improve its contribution in the crop/livestock farming system through improved allocation and management of on-farm and locally available resources developed and promoted

Output 3: Seasonal availability and utilisation of local feed resources for livestock production in semi-arid crop/livestock production systems improved and appropriate feed management strategy promoted

Output 4: Nutritive value of feed resources in the semi-arid livestock and crop/livestock system improved and relevant techniques promoted

Output 5: The utilisation of draught animals in semi-arid livestock and crop/livestock systems assessed, the increased potential for on-farm activities identified and appraised, and improved feeding and management strategies developed and promoted

Output 1: Appropriate strategies for the allocation and management of common property resources in semi-arid areas identified, developed and promoted (Included in SAPS 2)

No consideration given to this Output in this OPR

Output 2: Strategies to optimise livestock production and improve its contribution in the crop/livestock farming system through improved allocation and management of on-farm and locally available resources developed and promoted

The effective management of risk is a condition for sustaining the viability of households in semi-arid production systems. Risk-minimisation strategies adopted universally by households in these areas hinge upon diversification of production so that a food supply can be derived from a variety of enterprises. For farmers in marginal areas adoption of livestock enterprises has been shown to stabilise incomes and reduce periods of food deficits.

Research commissioned under Output 2 seeks to enhance the role of livestock in risky production circumstances. Recognising that the resources available to poor households are limited (and may be diminishing for the poorest) the emphasis of the research is upon optimising the use of those currently available. Reduced risk being the principle criterion for optimisation.

Livestock compete with cropping for the major factors of production: land, labour and capital. Although, in semi-arid systems, where grazing land tends to be a common property resource and production strategies of the poor are non-capital intensive, opportunity costs of family labour (influenced by gender roles and other inter- and intra household relations) are the major determinant of household resource allocation decisions. Understanding labour-use with respect to the multiple agriculture production objectives of resource-poor people in SAPS is therefore considered central to attaining Output 2. This is the focus of Project R6536 (see Table 2).

Feed, either derived from common property grazing or crop residues, is characterised as being of variable, but generally low quality. Optimal use of these feeds hinges upon allocating the best feeds to the most critical categories of livestock. For example, if any high quality feed is available it may be best used to feed animals prone to disease (eg youngstock). It is claimed that in some cases farmers may not be able to discern the quality of feeds and so do not make the best use of resources available.

Scientific methods for rapid assessment of feed value a process fraught with problems of relating rapid laboratory assays with on-farm animal intake and performance. Project R6299 seeks to bridge this gap by developing cheap and reliable, animal-based feed assessment procedures intended for use by National Agricultural Research Systems (NARS)

Output 3: Seasonal availability and utilisation of local feed resources for livestock production in semi-arid crop/livestock production systems improved and appropriate feed management strategies promoted

Semi-arid environments with uni-modal or bi-modal rainfall patterns notoriously give rise to boom and bust patterns in livestock productivity due to sharp seasonality in supply of natural herbage and crop residues. In addition to the cyclical patterns of livestock productivity, extended periods of drought induce high levels of mortality and morbidity amongst critical categories of livestock (eg young or pregnant animals). Historically, feed resources research has sought technologies which remove fluctuation in animal productivity by attempting to devise year-round feeding packages. This effort to attain linear and positive growth functions has been singularly unsuccessful and are now considered inappropriate targets for poor livestock keepers.

More recently, strategies in support of these inappropriate production targets have been replaced by research into feeding strategies which use local feed supplies to minimise the impact of feed deficits on mortality and morbidity rates and seek niches to make incremental improvements in the feed supply at critical times of the year. To this end, Projects R6342 and R6140 look at the impact of animal disease (trypanosomosis) on use of feed for digestive/reproductive function whilst Project R5194 considered how common grazing resources can be more effectively used by tethering of goats.

Output 4: Nutritive value of feed resources in the semi-arid livestock and crop/livestock system improved and relevant techniques promoted

Feed resources used by livestock keepers in semi-arid environments are characteristically of low quality for much of the year. Even during the rainy season luxuriant foliage of high

moisture level dilutes nutrient content before rapidly senescing to fibrous biomass of low digestibility. Other, locally-available feeds such as tree fodder can be of greater nutritive value but also tend to contain secondary plant compounds with anti-nutritional characteristics (eg tannins). The use which ruminant animals can make of these feeds depends, to a large extent upon the inherent quality of the feeds and the efficiency of the digestive system. Cognisant of the disease challenge presented in SAPS the only project reviewed under this Output (R5184) examines the interaction between feed quality and intake and the degree of disease resistance this imparts to genetically disease-tolerant cattle.

Output 5: The utilisation of draught animals in semi-arid livestock and crop/livestock systems assessed, the increased potential for on-farm activities identified and appraised, and improved feeding and management strategies developed and promoted

Power for tillage and transport for the poor in SAPS is provided by cattle, camels and equines. The significance of draught animal power in smallholder agriculture is considerable. A recent review of DFID-supported animal draught power research (Morton & Sutton, 1999) identified that around 50% of the world's arable land is cultivated using animals. Despite the fact that draught animals are expected to perform all the normal functions of livestock in providing food, income and a means of savings, because of their use for work this limits the time available for feeding. Research commissioned under Output 5 not only considers how to enable animals to work more effectively but also how management needs to accommodate the greater functionality of this class of livestock.

Project R5198 considered how the productivity of draught animals (cattle and donkeys) might be improved through better feeding and management and Project R5926 adds to this by addressing implement design and how this influences draught animal performance. Project 6166 specifically addresses how draught cattle and donkeys modify their feeding behaviour to compensate for limited time of access to feeds.

Progress against SAPS 1 Output OVIs

Table 2 (page 9) lists the ten projects considered in this Review under SAPS 1. Most projects received all of their funding from LPP. However, the exception to this was Project R5184 "Nutrition and Trypanotolerance". LPP provided partial funding, the European Union DG XII gave the bulk of the finance.

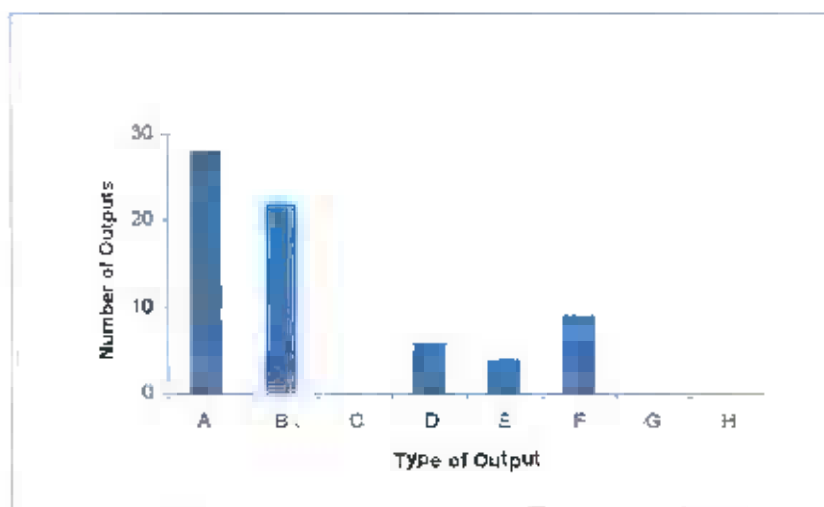
Progress against SAPS1 Output OVIs will be assessed on the extent to which uptake of Programme Activities (Project-level Outputs) has been achieved. This is done by scoring the progress of each project along an uptake "scale" which considers the degree to which Projects have developed useful linkages for delivery and uptake of research and created effective vehicles for dissemination. Table 3 gives the criterion to be satisfied at each stage of the uptake scale. Detailed explanation of the scoring given to each project is given in Appendix 5 and is based upon evidence provided in project documentation and personal communication with Project Leaders.

Conclusions from this detailed exercise are presented as general issues in the next section.

Table 3. *Criteria for Stages in the Programme Output Uptake Pathway*

Stage	Criterion
A	Generation of relevant research results
B	Formal/informal agreement with target institutions
C	Development of appropriate research-based products through adaptation/packaging
D	Promotion of products into target institutions
E	Adaption of products by target institutions
F	Application and replication of results in target institution programmes
G	Promotion of technology or behavioural change amongst end-users by target institutions
H	Adoption of technology by end-users and generation of economic benefits & developmental impact

Figure 1 Distribution of outputs produced by LPP SAPS1 Projects



Key (after Thorne, 1999)

- A. Papers in refereed journals, book chapters, edited international conference proceedings or bulletins.
- B. Scientific abstracts, oral presentations, posters, non-edited conference proceedings.
- C. Internal reports
- D. Newsletters, technical leaflets, lecture presentations.
- E. PhD Theses F. M.Phil / MSc / BSc Theses.
- G. Miscellaneous (radio/TV presentations, videos, oral presentations to non scientific audiences).
- H. Computer software (including databases)

Note: "C"-outputs which include LPP Quarterly Reports, Annual Reports, Project Completion Summary Sheets and Final Technical Reports produced by Project were not counted here since they do not constitute a means to widespread dissemination

Table 2. List of Projects (by Output) considered in this Output to Purpose Review

Output	Project Number	Short Title	Country Focus	Project Leader	Project Dates	Cost	Final technical Report available
2	R6299	Intake of poor quality roughages	UK	D. Romney, NRI	4/95 - 3/98	185,068	✓
	R6536	Women's activities in crop-livestock systems	Tanzania	C. Okali, UEA	4/96 - 3/98	63,936	X
3	R5194	Tethering of small ruminants	Tanzania	E. Owen, Reading	10/91 - 3/96	108,207	✓ (as thesis)
	R6138	Evaluation of forages for milk production	Zimbabwe	T. Smith, DR&SS	4/94 - 3/96	16,050	✓
	R6140	Nutrition, reproduction and trypanosomiasis infection	Gambia	P. Holmes, Glasgow	8/94 - 7/97	71,554	X
	R6342	Digestion and trypanosomiasis interactions	UK	G. Wassink, Glasgow	4/95 - 4/96	18,670	✓
	R5184	Nutrition and trypanotolerance	Gambia/ Burkina Faso	M. Gill, NRI	1/93 - 3/96	97,607	✓
	R5168	Feeding draught animals	West Africa	A. Pearson, Edinburgh	1/93 - 31/96	99,480	✓
	R5926	Productivity of draught animals	Zimbabwe	✓ Ellis-Jones, Silsoe	1/94 - 3/97	213,775	✓
	R6166	Feeding cattle and donkeys	Ethiopia/ Zimbabwe	A. Pearson, Edinburgh	1/94 - 3/97	58,230	✓

General issues pertaining to attainment of LPP Output OVIs

The major difficulty in conducting this OPR is that documentary evidence for uptake and impact at the level of Programme Output is generally lacking for all Projects. The reasons for this may be:

1. Projects are not charged with the responsibility of measuring uptake or impact at Project Purpose level (Programme Output Level). This is considered to be the responsibility of LPP Management.
2. Even if responsibilities are considered by some Project Leaders to extend to Project Purpose-level OVIs, development relevance and impact are not among the criteria used to professionally evaluate academics in the UK so minimal effort can be invested in impact assessment.
3. Project Leaders' understanding of the term "stakeholders" used in 3 out of the 4 LPP Output OVI's may differ from those of LPP and RNRKS. This ambiguity leads to Projects being convinced that they have had impact upon counterpart staff in NARS whereas LPP may intend the term stakeholder to include beneficiaries as the target community.
4. Even if attaining uptake and development impact is of personal interest to researchers LPP funding is insufficient to follow this up beyond the life of the project.

Unless Project Leaders are empowered by LPP to take ownership of the "big picture", uptake of LPP Outputs is likely to remain of low priority and impact reporting, anecdotal. To accelerate the transition from strategic research to extension message projects must be screened not only for their poverty relevance but how convincing their partnerships are with delivery agents. In short, the culture of "chasing Project Output OVIs" which pervades the research-contractor community should be discouraged. Instead, the internalisation of impact assessment at Project Purpose-level made a requirement.

All Projects were considered to have reached at least Stage D in the Uptake Pathway. A glance at Figure 1 (page 8) shows why uptake is only considered to have proceeded as far as "promotion of products into target institutions". By far the most numerous output of projects was the learned journal article, abstract or paper in conference proceedings (see Appendix 6). In other words all Projects had been successful in disseminating outputs to others in the academic community. That may be laudable from the perspective of professional development but not progressive in terms of attaining the goal of LPP within the timeframe available.

Three projects could claim that their outputs had been adopted by target institutions (Stage E) but only one Project (R5926) could report adoption of technology by beneficiaries. The impact that has been reported by this project has been anecdotally confirmed by this OPR.

It is concluded that even though some of the the Projects commissioned are considered relevant to poor livestock keepers in SAPS they are still a considerable distance from delivering useful knowledge to beneficiaries. This finding will have considerable bearing on the degree to which LPP Outputs are progressing towards the Programme Purpose.

Progress towards Programme Purpose (SAPS 1)

- Purpose 1: Performance of livestock (including draft animals) in semi-arid crop-livestock and livestock production systems improved

The point was made earlier that SAPS1 seeks to enhance the performance of livestock within the context of the overall production system. OVIs at the Purpose level are slightly contradictory. Some measure the performance of livestock *per se* within the system. However there are others that consider systemwide impact of livestock eg impact upon cultivated area (through animal traction) and crop yield (through manure use).

The SAPS 1 Logframe suggests that DFID will commission a study in 2007 to measure impact. The reviewer suggests that impact assessment might be better conducted incrementally over a number of years leading up to this end date.

Given that the section above concluded that outputs were still some distance from achieving the desired impact on beneficiaries the following section aims to assess whether there is sufficient evidence to suggest that the Purpose is *likely* to be achieved.

Progress against Purpose-level OVIs

The Purpose-level OVI stated in the Logframe is sub-divided as follows:

"By 2007, in two nominated target areas where primary demand exists:

- *Returns to use of concentrated feeds increased by 10%*
- *Feed conversion ratio improved by 10% in crop-livestock production systems*
- *Offtake-rate of ruminant livestock owned by small-holder farmers/herders increased by 5%*
- *Area cultivated per livestock unit increased by 15%*
- *Total crop yields in areas cultivated by livestock increased by 10% "*

The reviewer is not aware that LPP have set in place any systematic monitoring of these indicators. The following sections will assess the relevance of the Project portfolio to these OVIs and the likelihood that promotion of Outputs will satisfy the OVIs

OVI 1a: Returns to use of concentrated feeds increased by 10%

The "Holy Grail" of tropical animal nutrition research is to ascertain how strategically using low levels of concentrated feeds can have a disproportionate impact on animal production. There is a large body of evidence in temperate agriculture that strategic use high quality feed resources can have significant impact (greater than 10%) on animal production parameters such as reproduction rate and milk yield. Simple feeding interventions that can counter a rise in disease prevalence or cope with peak

demand for animal traction should have appeal to poor livestock producers. However, since research in the LPP portfolio looking at 1) the relationship between trypanosomosis and nutrition and 2) draught animal nutritional requirements is still somewhat upstream it is unlikely that this OVI will be achievable within the timeframe stated.

OVI 1b: Feed conversion ratio improved by 10% in crop-livestock production system

Conventionally, feed conversion ratio measures the transformation of nutrients into animal product: meat or milk. This is an incongruous OVI because it assumes that livestock are kept primarily for the yield of these two products. Given that poor livestock keepers also keep livestock for a variety of other reasons eg draught power, capital asset and manure etc, this OVI is somewhat inappropriate as a measure of resource-use efficiency.

It is hard to see how the nutrition-related research products in the SAPS1 portfolio can be expected to have significant impact upon on-farm feed conversion ratios. The nutrition experimentation used simple, uniform diets fed over sustained periods. This is a far cry from the farm situation where feeds fluctuate dramatically from day to day. It is unlikely therefore that the Programme Outputs will measurably impact upon this indicator. It should however be noted that LPP is currently funding nutrition research based on more realistic feeding scenarios and production objectives under other Production Systems.

OVI 1c: Offtake rate of ruminant livestock owned by smallholder farmers / herders increased by 5%

This contentious OVI has been debated in many quarters and is not generally regarded as a useful measure of performance in smallholder production systems. Offtake rate can be affected by a multitude of factors unrelated to improvements in productivity. Offtake rates in pastoral systems may arise as the result of emergency sales under drought and disease challenge. Offtake rates can rise seasonally when cash is required for school fees. Offtake as a production target, may be an anathema in cultures where livestock accumulation is an indicator of wealth or adherence to religious doctrines.

Personal experience of the semi-arid production systems in West Africa suggests that where animal health care is available in trypanosome-endemic areas farmers will accumulate livestock. There is no apparent reason why LPP's quest for nutritional interventions to control parasitaemia should not also permit more farmers (including poorer households with no access to conventional veterinary inputs) to pursue a policy of livestock accumulation. Similarly the development of goat-tethering techniques and the strategic use of feeds for animal draught power create opportunities for stock accumulation even under situations of high land use pressure.

While the projects commissioned appear to be developing strategies consistent with the objectives of poor livestock owners, the impact may be diametrically opposite to that anticipated by this particular OVI. Again, the probability of currently available project outputs having significant impact upon this OVI (positive or negative) are limited because of the upstream nature of the research conducted.

OVI 1d: Area cultivated per livestock unit increased by 15%

Enabling poor households, that traditionally use **donkeys** for **transport** and **secondary cultivation**, to employ the same animal for **primary tillage** could result in opening more land for **crop production**. However, if the **area cropped** is already **limited by land pressure** or **availability of inputs** then the use of **donkeys in primary cultivation** may have the **(equally important) effect of reducing drudgery or removing the cost of hiring draught oxen**. As such, this is a very narrow (production-focused) indicator for successful uptake of animal draught power.

There is a **body of evidence** to suggest that **nutrition can influence the work performance of draught oxen**. Research has shown that the **area cultivated per family member** was **25% greater** where animals were used for **cultivation** (Pingali, Bigot and Binswanger, 1987). The **marginal benefit derived from cultivating with a well-fed animal compared to an underfed animal** cannot be ascertained from the project research results available to this OPR.

The degree to which the **research on nutrition of draught animals will achieve this OVI** will also depend upon how **feasible the feeding interventions actually are under farm conditions** (see above). For example, **Project R5198 suggests supplementation during the cropping season – a recognised “hungry period” for households following the dry season**. The proposal that **high quality feed should be conserved by poor households over the dry season when animals are nutritionally stressed for use in the subsequent cropping season** is questionable.

OVI 1e: Total crop yield in areas cultivated by livestock increased by 10%

This **OVI suggests that impact of animal traction on crop yields occurs as the result of more timely crop operations such as ploughing, planting and weeding**. This is a very difficult indicator to measure. Research elsewhere has shown that it is not possible to **dissociate the “mechanical benefits” of using draught animal power from inputs often associated with draught power projects such as fertiliser, seeds, credit and extension**. From the limited field-studies conducted (Pingali *et al*, 1987) it is suggested that **the yield effects of draught power alone do not justify investment in draught animals unless this is accompanied by arable area expansion**. Hence, efforts to measure this OVI may not be as useful an investment for LPP as compared to the much simpler measurement of OVI 1d.

General comments on Purpose-level OVIs

The OVIs are too “production-oriented” to be wholly relevant to the poor who keep livestock for a multitude of different reasons and may not prioritise or be able to expand the cultivated area. Uptake and impact assessments commissioned by LPP will need to **take into account these wider objectives**¹.

The reviewer is not aware that LPP has itself set in place monitoring of these OVIs but appears to rely on the **data-gathering systems of target countries and institutions as the means of verification**. The danger here is **two-fold**. In many cases these data collection systems are not overly reliable and the **quantitative parameters monitored**

¹ This may not be an issue at this stage given that the SAPS1 logframe has undergone substantial re-writing and now takes into account the “non-tangible” benefits of keeping livestock

may not be useful in assessing the overall livelihood impact of LPP-developed interventions

The OVIs state the level of increased productivity required, where and by when, but do not specify the number and type of persons that should benefit from the impact of the research. This may reflect the ideology underlying the RNRRS. Lack of focus on livelihood impact is rectified in the RNRKS LPP SAPS1 Logframe

Factors hindering attainment of Purpose

Fundamental to the attainment of the Purpose is the validity of the Output-level Assumption statements in the Logframe. The SAPS1 Logframe states that the Purpose will be achieved if it is assumed that:

Outputs are adaptable to a variety of economic and social Conditions (Assumption 1):

And that,

Target institutions invest resources in the uptake and application of research products (Assumption 2)

Assumption 1: Outputs are adaptable to a variety of economic and social conditions

This statement implies that outputs are currently in a form of interventions that are deliverable to beneficiaries in a variety of socio-economic circumstances. The discussion above highlights that outputs from the majority of projects are still of an intermediate nature, intended for delivery to others in the research community for testing and adaptation. The outputs as they stand could be described as "adaptable". Unfortunately, there is no evidence of mechanisms in place to encourage this adaptive research by others.

The Assumption statement also highlights the confusion between the terms "stakeholder" (used in the SAPS 1 logframe), "target institutions" and "beneficiaries". Assumption 1, as stated, refers to the suitability of Outputs to a wide range of beneficiaries² whereas Projects appear to deliver products to target institutions³. Morton (1995) also draws attention to this confusion. It still pervades the LPP contractor-community five years later.

Assumption 2: Target institutions invest resources in the uptake and application of research products

This is critical to the uptake and delivery of Outputs. It is assumed that target institutions are effective, functioning and in a position to modify and promote research outputs. It is striking to learn in personal communication with Project

² Beneficiaries are those poor people who gain social, economic or environmental advantage from the activities of the target institution.

³ Target institutions are those formal or informal institutions which take up the products of research or transfer knowledge. Target institutions may sometimes be the end users of the research products. The target institutions utilise the results of research to achieve developmental impact.

Leaders that the capacity of target institutions to promote uptake is unknown or is acknowledged to be weak. Further, Project Leaders think that this weakness is likely to persist into the foreseeable future.

In the case of the ten projects under review nine did not attempt any significant extension activities. Project R5926 (Productivity of Draught Animals) is the exception to this. R5926 initiated research activities by establishing linkages with the private agricultural engineering sector. By the termination of the project this enabled not only knowledge promotional activities to continue but also provides a means by which uptake can be measured (ie company sales statistics).

The RNRKS SAPS1 Logframe (Appendix 7) acknowledges that dissemination systems are weak in target countries. A prerequisite of any newly commissioned research is that means for sustainable dissemination are identified and promotion is included as a key component of Project activities.

Addressing the RNRKS LogFrame

In line with DFID's pro-poor development mandate, RNRKS Programmes are now charged with the generation and application of knowledge that is of direct benefit to the poor. The revised LPP SAPS1 Purpose statement reads:

Benefits for poor people generated by application of new knowledge on the management of livestock in semi-arid crop/livestock production systems

This major change in emphasis of the Logframe has significant implications for the future focus of the research and how that research is conducted. It also influences how the Programme capitalises on the work previously commissioned under RNRKS. The following section will address this issue:

Can we capitalise on previous research investments on SAPS1 for poverty elimination?

To answer this question we must look at the type of outputs currently available from the ten projects to see whether they are 1) relevant to the poor, 2) exist in a form that can be directly disseminated to poor livestock keepers, 3) need alternative packaging so that they can be extended to the poor or 4) require further investment in research.

Is the research relevant to poor livestock keepers?

Superficially, most of the research topics: use of donkeys in animal traction, strategic feeding for disease control, goat tethering strategies and methodologies for targeting women in livestock development projects are pro-poor. Whereas the introduction of planted fodders for smallscale dairy producers in Zimbabwe and improved feeding systems for draught oxen are less appropriate for poor producers who may not own cattle and are more than likely use common property fodder sources.

Closer scrutiny makes this question more difficult to answer since few of the projects are set within a livelihoods' context. For example, whilst we know that the prevalence of trypanosomiasis may preclude poor households from keeping livestock we do not know whether feeding is already used as a disease control strategy in wealthier households or is considered feasible as a control strategy in poor households. Similarly, no information is provided on scope for expansion of

cultivation for the poorest producers using donkey traction and who is likely to lose employment if donkeys are employed for weeding? Contextualisation of the research already conducted is therefore to be an important next step before deciding which research outputs are useful. LPP needs to decide whether it is comfortable with adopting the top-down process of looking for a "home" for a technology. Obviously this is not an ideal situation, but one resulting from the varying agenda of a number of different LPP Managers over recent years.

What form are the outputs currently in?

Seven out of the ten projects reviewed are strategic and so the outputs (mainly journal articles and technical reports) currently have little value to ultimate beneficiaries. Instead, intermediate target institutions, the NARS, are identified as the users of outputs. Of the three projects remaining, two ("Tethering Small Ruminants" and "Evaluation of Forages for Milk") have delivered adaptive research outputs to the extension services. Here promotion activity has halted with the termination of project funding. The Project on "Productivity of Draught Animals" has gone further and, through partnerships with the private agricultural engineering sector, produced outputs that are at present being used by farmers in southern Africa.

Do the outputs require alternative packaging before dissemination to beneficiaries?

This question is considered by amalgamating the ten research projects into four thematic areas:

Trypanosomiasis/nutrition interactions: The research has not produced feeding recommendations. This is not a problem since prescriptive feeding advice may not be relevant to the poorest producers in any case. However, it has shown that improved nutrition results in less extreme expression of disease symptoms and can assist trypanotolerant cattle to self-cure. There is merit then in extending these general findings to beneficiaries. Appropriate dissemination formats and pathways should be sought for research outputs.

Draught animal power: The research reviewed has essentially two elements: adaptive: improving implements and strategic: targeting feeding interventions to draught animal requirements. The adaptive component has already been successful in disseminating implement technologies to poor farmers. The promotional approaches taken were highly effective and worthy of replication. The strategic research ultimately plans to deliver a "feeding standards manual" to extension personnel. Given that the feeding strategies of the poor tend to be opportunistic, the extent to which a tool to plan draught animal diets will be of use to beneficiaries is questionable and should not be prioritised as a dissemination activity.

Nutrition research. This has generated a methodology for on-station assessment of forage quality, methods for improved tethering of goats and improved forages for dairy production. Since the impact of forage evaluation methods rely on uptake by NARS, translation into feeding packages and promotion to poor farmers the uptake pathway is not only weak but the timescale to delivery too long. It is advised that no further investment is made by LPP into the promotion of feed evaluation techniques. This is especially so given that uptake by beneficiaries is expected by 2005. Unless it can be demonstrated that the use of planted fodders serves to directly benefit the poor livestock keeper, efforts to promote such technologies should be assigned to

other organisations with a competitive advantage in this type of research (eg the ACIAR Smallholder Forage Project operating throughout southern Africa).

Outputs from the Goat Tethenng Project include an extension leaflet that remains in draft form following the termination of the project. LPP has funded projects under other Production Systems looking at simple feeding strategies. An opportunity exists for amalgamating these outputs on feed management into a manual to inform development practitioners such as NGOs on a range of strategies for best practice for grazing crop residues, tethenng strategies, re-feeding techniques and stall feeding.

Methodologies for more precise targeting of development projects to vulnerable categories: In communication with the Project Leader of "Womens' Activities in Crop/Livestock Systems" (R6536) it seems that the main output of this project was another project (R7039) funded by the Natural Resources Systems Programme Socio-Economic Methodologies (NRSP SEM) "Analysing changing gender relations for monitoring and evaluation in the renewable natural resources sector". The Project Leader suggests that although R6536 produced no written outputs on methods for integrating gender considerations into development projects these will be forthcoming from R7039. It is recommended that the LPP Manager contact NRSP to find out any outcomes of R7039 that may have particular implications for livestock research and development. Commissioning the promotion of this type of work in the form of guidance sheets to the LPP research-contractor community may assist in the better design or evaluation of projects conducted under LPP in the future.

In general It is apparent that the research communities' attitude to making recommendations to farmers based on the outcome of short-term research is extremely conservative. The three-year project cycle of RNRKS is considered too short for transfer of strategic research findings through adaptive testing to extension recommendations. However, this review has found that even projects which take adaptive research as their starting point terminate without promotion of findings to beneficiaries (Project R5926 is the exception to this). This indicates that time (and budgetary) limitations are as much as a constraint to dissemination as is the reluctance of the contractor to make broad recommendations to farmers.

Future Directions?

Access to knowledge and information is integral to the development of both human and natural capital. However, DFID's sustainable livelihoods perspective sees technology generation as just one component of diverse agricultural knowledge and information systems that would encompass many other public sector, NGO and civil society interfaces. For future research commissioned under LPP to be deemed successful from the SRL perspective it will need to demonstrate that the creation and use of new knowledge has measurably changed the lives of a significant number of poor people. In order to achieve this it is critical that the research is demand-led (see definition in Appendix 8) and that the livelihoods of beneficiaries and their knowledge systems are clearly defined.

To gain maximum uptake and impact LPP contractors need to strike more effective partnerships with organisations that can provide the livelihood context of the research, have credible linkages with the poor in agricultural communities and act as a sustainable conduit for knowledge exchange with target communities. With fiscal restrictions on government institutions these partner organisations are more likely to

be found in the private and NGO sectors or in the communities of beneficiaries themselves.

Establishment of **effective** partnerships with "new" partners will require traditional LPP contractors to **modify their objectives and approaches to research**. Methods for community engagement in the **research process** may also be very different and an element of "letting go" will be required of Project Leaders. There may be concern amongst certain quarters of the UK academic community that this re-alignment of partnerships to encompass those with a development agenda may push the emphasis of research towards the adaptive end of the spectrum. Where university departments are rated on the quality of their research outputs this obviously lowers the appeal of bidding for LPP contracts. If this is the case, perhaps LPP should be actively seeking alternative contractors to service "alternative" research.

More adaptive research may be required in order to meet the needs of partner organisations and the communities they serve. Supporting more adaptive research runs the risk of **tying LPP into site-specific issues** where local impact will be measurable but in comparatively few households. LPP must use its budget to address issues of supra-national relevance through **activities** that ensure widespread access to technology beyond the boundaries of the households involved directly in the research.

LPP should also make sure it has competitive advantage in the research areas it plans to address and that by funding work in these areas is adding value to the efforts of other donor agencies.

New Research

In identifying where further research should be commissioned under RNRKS LPP SAPS 1 the following questions need to be taken into account:

1. Are livestock-related opportunities for sustaining livelihoods of the poor identifiable?
2. Do they have widespread livelihood significance?
3. Can LPP research help to exploit these opportunities?
4. Do we know what type of research outputs is required?
5. Do we know who will use the outputs so that uptake and impact is achieved by 2005?
6. Do we know how to strike up the most effective partnerships to achieve these outputs?

Taking into account the two, new SAPS Purpose 1 Outputs:

- ➔ Strategies to sustainably improve the production and productivity of livestock species of relevance to the livelihoods of resource-poor people in semi-arid crop/livestock systems, developed and validated
- ➔ Strategies to improve the production and productivity of livestock maintained by resource poor people living in semi-arid environments promoted and disseminated

The reviewer is confident that the following topics satisfy bullet-points 1 and 2 above, but leaves LPP Management and the Livestock Programme Advisory Committee (LPAC) to decide how these topics fare under points 3 to 6. The topics are presented in order of decreasing priority recognising that if impact is required there is a need to focus activities under LPP SAPS1.

Access and use of common property feed and water resources. Poor livestock keepers in semi-arid environments depend heavily upon common property grazing and water resources for maintaining herds and flocks. LPP SAPS 2 has previously commissioned research into this area and plans to fund "new initiatives in common property resource allocation". SAPS 2 has tended to look at the competition between wildlife and grazing livestock for fodder and water. There are however major common property issues at stake in semi-arid agricultural systems covered under SAPS1. As systems intensify the poor are becoming increasingly marginalised in their access to crop residues and fodder growing on public land. Privatisation of water is also occurring. Landless livestock keepers in intensively cropped areas are not as obvious as their transhumant counterparts receiving attention under SAPS 2 but are ubiquitous across dry-land farming systems. The plight of these people, to whom livestock are equally as important as to transhumant pastoralists, require urgent attention under SAPS 1.

Mitigating the consequences of emergency marketing of livestock. Drought and disease outbreaks inevitably hit hardest upon the poor livestock owner who is forced to sell a large proportion, if not all, of his or her animals at a time when prices are lowest. Wealthier livestock owners will also suffer losses but usually not with the same dire impact upon livelihoods. Improving the livelihood resilience of livestock-dependent households in semi-arid environments may be attained by improving the efficiency of local markets. If livestock can realise full market value then more regular sales can be encouraged. Regular turnover of stock reduces the risk of destitution in the face of unexpected natural calamity. Offering poor people alternatives to investment in livestock may also reduce risk. Population expansion and agricultural intensification in SAPS may offer new marketing opportunities for the poor. Research needs to identify these and how they operate.

Mechanisms for exchange of knowledge with poor livestock keepers in SAPS
This recommendation may be pre-empted by the recent LPP call for concept notes to address the new SAPS 1 Output 2. However, the conclusions already drawn in this OPR suggest that most of the research commissioned to date under SAPS 1 is either not intended or ready for dissemination to beneficiaries. Commissioning projects serviced by the "established" LPP contractor-community who have only recently taken on board the need to identify dissemination pathways is risky given the institutions lack track record. LPP need to be especially cautious given that the time limit on delivery is short. With budgetary restrictions, the need to fund generic research and the fact that other donors continue to fund technology generation in SAPS, LPP may choose projects which seek to identify the principles that underpin mechanisms for effective knowledge exchange in SAPS.

Scavenging poultry. Historically (and globally) livestock research in SAPS has had a cattle bias. By comparison, poultry have been ignored. This is despite being owned by almost everyone (particularly the poor and other vulnerable social groupings) in all semi-arid regions of the world. Again this recommendation for research into poultry has, to a certain extent, been pre-empted in the recent call for LPP Concept Notes. However, there is a danger that because of their higher profile in other, more land-constrained, production systems (particularly peri-urban) the opportunity to examine the contribution of poultry to livelihoods may be overlooked.

A cross-production-systems examination of the role of poultry in livelihoods is therefore recommended.

Disease and nutrition interactions. LPP should consolidate its investment in the area of trypanosomosis and nutrition interactions by linking any further applied research in this area with other work commissioned under other Production Systems (and/or the RNRKS Animal Health Programme) on interactions between helminthosis and nutrition. The point has been made above that no effort was made to contextualise the research and this activity should be made a priority. This work needs to find out what farmers already know. It should ask if farmers already see better feeding as a means of dealing with disease, who practices these techniques, what techniques are being used and for which animals?

Conclusions

Although the poverty elimination was not the main driving force behind RNRKS that guided the commissioning of research projects under LPP SAPS1, the general thematic areas covered by the ten projects are considered relevant to poor livestock keepers in SAPS. Despite this the Reviewed decided that it would be unreasonable to judge the impact of the projects against the goal of poverty eliminations. Judgement has therefore been restricted to the degree to which Programme Outputs have been promoted to and have been taken up by beneficiaries (simply defined as farming communities in SAPS in target countries).

Assessment of projects on this basis has been hampered by the fact that no monitoring apparatus has been put in place by either the projects themselves or by LPP. In the absence of concrete information to the contrary it is expected that promotion of outputs to and uptake by poor livestock keepers has been negligible because:

- × Research is too upstream for outputs to be of immediate use to farming communities,
- × Outputs are in formats intended for partner NARS and the scientific community at large,
- × NARS are increasingly facing financial constraints and cannot take on adaptation of outputs from upstream research projects,
- × National extension services do not function effectively because of the same financial limitations

It should be made clear that whilst this can be said of 90% of the projects reviewed, one project (R5926) stands out as the exception to this. It provides a useful model of public/private sector link-ups that can accelerate and sustain the process by which research outputs are delivered to the client

It is recommended that the approach taken by Project R5926 be reviewed in more detail to assess whether it could serve as a model for design of other LPP projects.

Sixty per cent of the LPP SAPS1 portfolio reviewed conducted upstream research. It is not suggested that strategic research has a limited role to play within RNRKS and its goal of knowledge generation for poverty elimination. (The opposite extreme where adaptive research is conducted with few farmers can produce outputs of very

localised value only). The reviewer is simply pointing out that upstream research must be demand-led, set in the context of livelihoods and be conducted with partners that have capacity for promoting uptake of the outputs to large numbers of beneficiaries in target countries

LPP should take stock of project experiences from a wide range of donors where successful uptake of livestock-specific knowledge has been achieved. The aim being to establish guidance notes for promotion of outputs from different levels of research to beneficiaries

It is an unfortunate reality that the LPP contractor-community (mainly UK university-based) is unwittingly distancing itself from serving the development objectives of RNRKS Programmes. Whilst university assessment procedures insist on measuring research performance on the number of learned journal articles produced by staff annually the creation of beneficiary-impact media is likely to remain the "very poor relation". It must not be assumed that given the incentive current contractors could or would produce the desired impact through more appropriate promotion of their outputs. It may be that LPP needs to shift the composition of its contractor base in order to address new needs.

DFID/RNRKS should discuss the limitations of the university research assessment procedures with the relevant higher education authorities. At the same time, LPP may need to broaden the skills available from its contractor-base to account for the new needs arising under the Programme. This will involve identifying the skills required and taking on new contractors.

There is still a tendency for projects to seek NARS and government extension services as their main in-country partner. The reality of the situation is that without such linkages research activities may not obtain official clearance. The drawbacks to linking up with financially-constrained government organisations have been well documented elsewhere and so will not be re-iterated here. However, it is worth reflecting that the Assumption statement in the RNRKS LPP SAPS1 logframe: "target institutions (will) invest resources in the uptake and application of research products" was in fact a "killer assumption" standing between the research outputs and their promotion to beneficiaries (*this assumption now longer exists in the RNRKS LPP SAPS1 Logframe – see Appendix 7*)

New modes of in-country operation must be established which are not constrained by linkages with moribund organisations that traditionally grant "the licence to operate". If research projects join up with DFID bilateral programmes this may preclude the need for these traditional partnerships and at the same time ensure that research is demand-led.

It is not be unfair to say that many LPP research contractors consider their contractual responsibilities to extend only as far as the Output OVI-level of the individual project Logframes. The evidence of this mindset is that project Logframes are often filled to the level of the Purpose Narrative Summary only. From that point onwards it is common to find the statement "to be completed by LPP Manager". If the goals of RNRKS are to be achieved it is important that Project Leaders see their contractual obligations as rising to the "bigger picture"

LPP might consider how contractors could be encouraged to team-up with the Programme in addressing the need to achieve Impact at the Purpose level. The current tendency of Project Leaders to "chase OVis" at the Project Output-level must be discouraged.

The review considered whether the outputs generated under RNRRS LPP SAPS1 were suitable for promotion under RNRKS LPP SAPS1. The conclusion was that there were definitely outputs that could be promoted but:

- ✓ an "after the event" livelihoods contextualisation of the research is required to identify which particular aspects of the research portfolio are relevant to the poor in SAPS,
- ✓ detailed research findings underlie more general principles of good husbandry – these principles must be distilled out and packaged in beneficiary-friendly media;
- ✗ original research contractors may not be best placed to do either of these.

Poverty elimination in SAPS can be assisted by researchers generating useful livestock-related knowledge. Livestock systems research areas that are pro-poor have been suggested in this review – some of these build on previous efforts under RNRRS LPP SAPS1. However, it is essential in building the SAPS1 research portfolio to address the goals of RNRKS (to be achieved in 2005) that:

- ✓ Effective poverty screening of concept notes and project memoranda is carried out by LPP reviewers;
- ✓ Contractors with a broader outlook and range of skills are sought;
- ✓ In-country partners with a poverty elimination agenda and the means to sustainably promote outputs after the termination of the project are brought on board;
- ✓ Mechanisms to facilitate uptake and impact assessment are put in place by LPP now.

Finally, with only five years left for RNRKS to show developmental impact, it is suggested that LPP considers focusing its effort on fewer activities where it has competitive advantage and where it adds value to the activities of other donor agencies and NGOs. A core strategy of basic poverty-specific themes addressed by fewer, larger and longer duration projects might be considered by LPP and the LPAC as a means to this end

LPP might consider enhancement of its strategy to 2005 through 1) closer consultation with livestock research programmes of other donors and 2) needs assessment with the larger non-governmental development agencies such as Oxfam, CARE etc.

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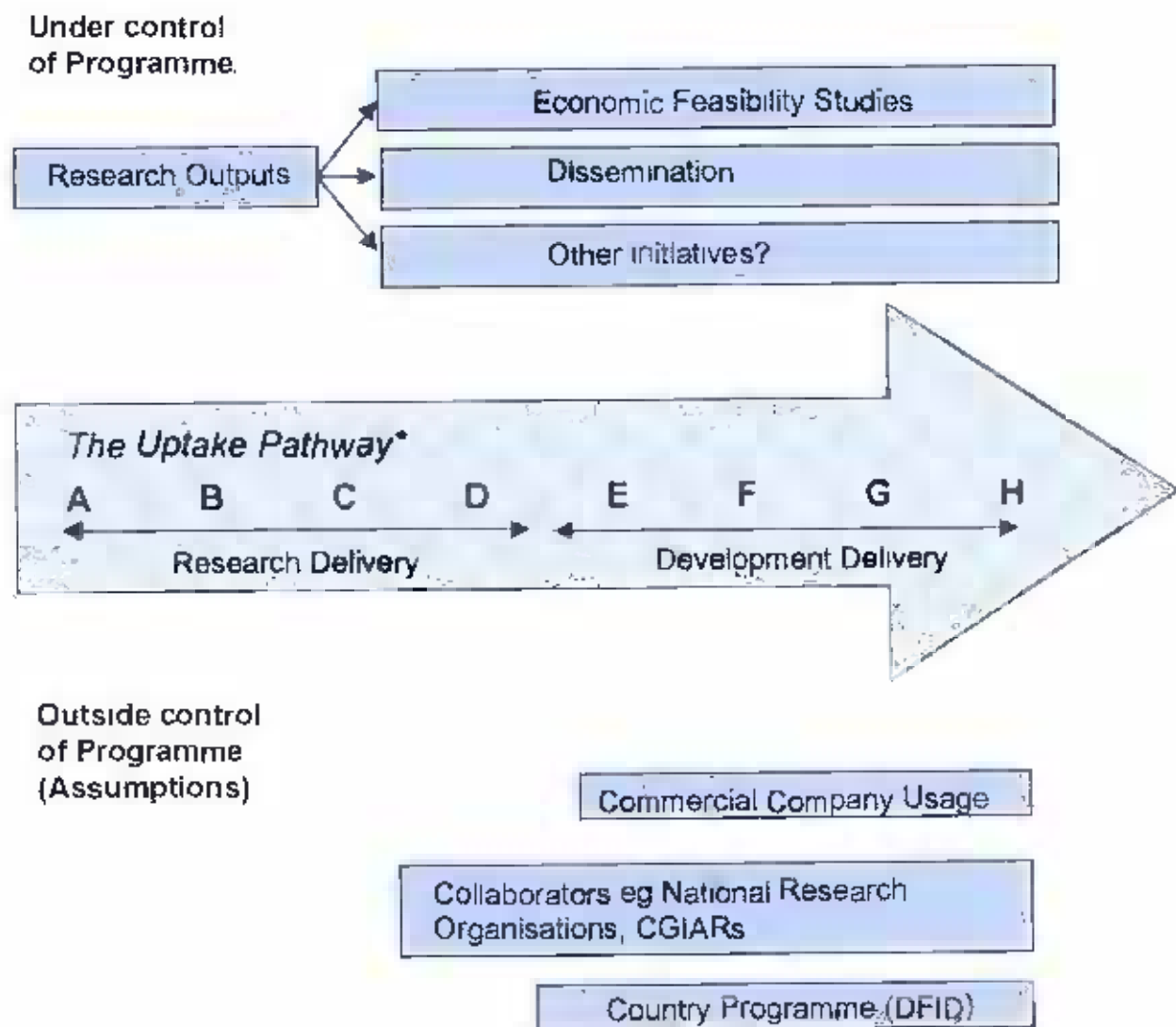
APPENDIX 1

RNRKS Programmes

- Crop Protection Programme
- Crop Post-Harvest Programme
- Plant Sciences Programme
- Forestry Programme
- Animal Health Programme
- Livestock Production Programme
- Aquaculture Programme
- Fisheries Management Programme
- Fish Genetics Programme
- Fish Post-Harvest Programme
- Flexibility Fund

Appendix 2

Uptake Pathway of Programme Outputs (showing delivery organisations and initiatives)



*The Uptake Pathway

A - Generation of relevant research results

B - Formal/Informal agreement with target institutions

C - Development of appropriate research-based products through adaptatio/packing

D - Promotion of products into target institutions

E - Adoption of products by target institutions

F - Application and replication of results in target institution programmes

G - Promotion of technology or behavioural change among end-users by target institutions

H - Adoption of technology by end-users and generation of economic benefits ie developmental impact

APPENDIX 3

TERMS OF REFERENCE

The terms of reference for this contract are as follows:

In general,

To synthesise the outputs of all completed projects in the semi-arid 1 production system (approximately 10) and indicate how they have contributed to achieve the prescribed outputs of the Livestock Production Programme as indicated in the attached logframe.

In particular,

1. To log, collate and synthesise the research outputs of relevant completed LPP projects which address the purpose of the semi-arid production systems, purpose 1,
2. To grade each completed project in its A-H uptake pathway trajectory (see guidance in Fig 1);
3. To advise the LPP Manager on the need to commission further research projects in order to satisfy the objectively verifiable indicators prescribed for the four outputs of the semi arid production system
4. To advise the LPP Manager on dissemination and other activities in order to further promote the research outputs already achieved.

ANNEX 4 - RNRRS Livestock Production Programme

SEMI-ARID PRODUCTION SYSTEM - PURPOSE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
GOAL:			
Productivity and productive potential of semi-arid production systems increased through improvement in supply and value of animal products and improved contribution of livestock to crop production	In targeted NRD core and niche countries - Real value of livestock sector increased by 10% between 2005 and 2010. - Output of national livestock herd increased by 20% between year 2005 and 2015	- National agricultural surveys and statistics - FAO Annual reports. - Evaluation of RNRRS. - National Reports to Regional Organisations.	
PURPOSE 1:			
1 Performance of livestock (including draught animals) in semi-arid crop-livestock and livestock production systems, improved	1 By 2007 in two nominated target areas where primary demand exists - Returns to use of concentrate feeds increased by 10%. - Feed conversion ratio improved by 10% in crop-livestock production system - Offtake rate of ruminant livestock owned by small-holder farmers/herders increased by 5%. - Area cultivated per livestock unit increased by 15%. - Total crop yield in areas cultivated by livestock increased by 10%	- Reports of target and institutions - National production statistics - Evaluation of livestock production programme - Research programme reports - Monitoring against baseline data	- Climatic conditions remain favourable - Enabling environment (policies, institutions, markets, incentives) for widespread adoption of new technologies and strategies
OUTPUT 1:			
1.1 Included in semi-arid system Purpose 2			
OUTPUT 2:			
1.2 Strategies to optimise livestock production and improve its contribution in the crop/livestock farming system through improved allocation and management of on-farm and locally available resources developed and promoted.	New and improved strategies accepted by stakeholders and implemented in two target/complementary target countries by 2005.	- Research programme reports. - Reports of target and collaborating institutions - Reports from relevant government departments and NGOs - Reports from linked development projects.	- Outputs adaptable to a variety of economic and social conditions. - Target institutions invest resources in the uptake and application of research products
ACTIVITIES:			
1.2.1 Review current farmer practices for allocating and managing resources for livestock and their impacts on environmental indicators.	Review completed in two target areas by 2001.	- Project reports - Journal publications. - Visit reports - Reports of target and collaborating institutions	- Availability and access to information ensured. - Farmers willing to cooperate. - Environmental indicators available
1.2.2 Investigate resource use competition (manure, crop residue and tree foliage allocation) and potential effects on system sustainability	Projects initiated in two selected countries by early 1998.	- Project reports - Journal publications - Reports of target and collaborating institutions	- Availability and access to information ensured - Interest and support from co-operating institutions
1.2.3 Develop improved strategies to enhance manure quality, management and availability for crop production.	Strategies developed and used by farmers in two selected areas by 2004	- Project reports - Journal publications. - Reports of target and collaborating institutions	- Availability and access to information ensured. - Interest and support from co-operating institutions - Gaps in knowledge do not invalidate usefulness of strategies

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1.2.4 Study the role of off farm resources including wage income in livestock production.	Study completed in one target area by 2000.	-Project reports -Journal publications -Reports of target and collaborating institutions	-Availability and access to information ensured -Interest and support from co-operating institutions
1.2.5 Develop resource allocation strategies for improved reproductive performance and survival of livestock	Strategies developed and adopted by farmers in two selected countries by 2004	-Project reports and manuals -Journal publications	-Availability and access to information ensured. -Gaps in knowledge do not invalidate usefulness of strategies
1.2.6 Investigate the effects on household welfare, vulnerability to risk, and gender relations of resource allocation decisions, including choice of animal species.	Investigation completed in two target areas by 2001.	-Project reports -Journal publications. -Visit reports -Reports of target and collaborating institutions.	-Availability and access to information ensured -Farmers/households willing to cooperate -Interest and support from co-operating institutions
OUTPUT 3:			
1.3 Seasonal variations in feed supply/demand quantified, constraints identified, and strategies for matching feed resources and animal requirements understood	Improvement in feed availability in two target countries and appropriate feed management strategies accepted and implemented by 2005 by stakeholders. Seasonal feed deficits reduced by 15% in two target areas	-Research programme reports -Reports from linked development projects -Reports of target and collaborating institutions -Reports from relevant government departments and NGOs -Workshop proceedings	-Outputs adaptable to a variety of economic and social conditions. -Target institutions invest resources in the uptake and application of research products
ACTIVITIES:			
1.3.1 Seasonal variations in feed supply/demand quantified, constraint identified, and strategies for matching feed resources and animal requirements understood.	Identification of constraints and quantification of supply/demand variation by 1999 and acceptable strategies developed in two selected countries by 2001.	-Project reports -Journal publications -Reports of target and collaborating institutions	-Availability and access to information ensured -Interest and support from co-operating institutions -Gaps in knowledge do not invalidate usefulness of models
1.3.2 Introduction and evaluation of new feed resources to strategically fill seasonal gaps, and appropriate management strategies developed (cf R5194, R6136)	New feed resources being utilised by farmers in two selected countries by 2004	-Project reports and manuals. -Journal and network publications. -Visit reports -Reports of target and collaborating institutions.	-Interest and support from co-operating institutions -Availability of supplies of new feed resources to allow evaluation
1.3.3 Development of improved methods of harvesting, conservation and storage of feed resources	Modified methods of feed conservation recommended in two selected countries by 2001.	-Project reports and manuals -Journal publications -Visit reports -Reports of target and collaborating institutions.	-Interest and support from co-operating institutions.
1.3.4 Development of strategies for year-round and seasonal feed allocation for different livestock species in different physiological states based on locally-available feed resources	Acceptable strategies incorporated in two selected countries by 2003	-Project reports -Journal publications. -Reports of target and collaborating institutions	-Availability and access to information ensured. -Gaps in knowledge do not invalidate usefulness of models.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OUTPUT: 4			
1.4 Nutritive value of feed resources in the semi-arid livestock and crop/livestock system improved and relevant techniques promoted	Nutritive value of feed resources improved and techniques accepted by stakeholders and implemented in two target/complementary target countries by 2003. Feed conversion efficiency of ruminant livestock increased by 10% by 2003	-Research programme reports -Reports of target and collaborating institutions. -Reports from linked development projects -Workshop proceedings.	-Outputs adaptable to a variety of economic and social conditions -Target institutions invest in uptake and application of research results
ACTIVITIES			
1.4.1 Methodologies for the evaluation of nutritive value of feed resources developed and tested (cf. R6299)	Methodologies available for use by scientists in developing countries by 2000.	-Project reports and manuals -Journal publications -Reports of target and collaborating institutions.	-Interest and support from co-operating institutions -Methodologies available for testing
1.4.2 Testing of physical, chemical and biological interventions to improve the nutritive value of low-quality fodders	Interventions to improve the nutritive value of low-quality fodders tested in two selected countries by 2003	-Project reports and manuals -Visit reports -Journal publications -Reports of target and collaborating institutions	-Interest and support from co-operating institutions. -Availability and access to information ensured -Interventions available for testing
1.4.3 Evaluation of conventional and novel energy/protein supplements to improve the nutritive value of roughage-based diets for different species of livestock in different physiological states (cf. R5184)	Evaluation of supplements to improve nutritive value of diets completed in five selected countries by 2000.	-Project reports and manuals -Journal publications. -Visit reports -Reports of target and collaborating institutions	-Availability and access to information ensured -Interest and support from co-operating institutions
OUTPUTS 5 AND 6:			
1.5 and 1.6 changed and included in new Output 5			
NEW OUTPUT 5:			
1.5 The utilisation of draught animals in semi-arid livestock and crop/livestock systems assessed, the increased potential for on-farm activities identified and appraised, and improved feeding and management strategies developed and promoted.	Efficiency of utilisation of draught animals increased by 15% in two semi-arid areas by 2005	-Research programme reports. -Reports from linked development projects. -Reports from relevant government departments and NGOs. -Reports of target and collaborating institutions. -Workshop proceedings.	-Outputs adaptable to a variety of economic and social conditions. -Target institutions invest in uptake and application of research results.
ACTIVITIES:			
1.5.1 Assessment of the opportunities for using cows for draught purposes in semi-arid crop/livestock systems	Assessment of use of cows for draught purposes completed by 2000	-Project reports -Journal publications -Reports of target and collaborating institutions. -Visit reports	-Availability and access to information ensured -Interest and support from co-operating institutions -Availability of cows for draught purposes
1.5.2 Needs assessment analysis for the use of draught animal technology in semi-arid crop/livestock systems (cf. R5926)	Assessment of the use of draught animal technology in two selected countries by 1998.	-Project reports -Journal publications. -Reports of target and collaborating institutions. -Visit reports	-Availability and access to information ensured -Interest and support from co-operating institutions.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>1.5.3 Synthesis of knowledge gained to validate feeding standards of draught animals and the development of guidelines on feeding strategies (of R5198, R5166)</p>	<p>Development of guidelines on feeding strategies in two selected counties by 2001.</p>	<ul style="list-style-type: none"> - Project reports. - Journal publications. - Reports of target and collaborating institutions 	<ul style="list-style-type: none"> - Availability and access to information ensured - Interest and support from co-operating institutions - Gaps in knowledge do not invalidate usefulness of models.

Appendix 5 – Scoring of Projects along Uptake Pathway (A-H)

Output 2 OVI: New and improved strategies accepted by stakeholders and implemented in two target/complementary countries by 2005.

The two Projects commissioned under this Output differ greatly in their subject matter. However, both produced improved methodologies for research and development. Project R6299 generated a simplified methodology for feed evaluation for use in national agricultural research systems (NARS). Project R6536 developed strategies for the better gender-targeting of dairy development activities. In the case of these two projects, "stakeholders" are considered to be national and international agencies implementing animal nutrition research and gender-focussed development. In communication with Project Leaders both felt that their Projects had been successful in the promotion and uptake of the methodologies. However using the A to H uptake pathway for project outputs prescribed by DFID the reviewer considers uptake to have progressed as far as shown below:

Project code	Short title	A	B	C	D	E	F	G	H
R6299	Intake of poor quality roughages								
R6536	Women's activities in crop-livestock systems								

Project R6299 generated research results required for validation of the feed evaluation techniques and has published these internationally. Direct efforts to promote the use of these techniques into International Agricultural Research Centres and NARS has been made and personal experience indicates that these techniques are being tested by CGIAR Institutes (ILRI and ICRAF). Discussions with the Project Leader suggests that promotion of the techniques developed under R6299 relied upon personal contact with other animal nutrition research groups. The techniques are still some way from being "mainstreamed" into routine feed evaluation protocols of the NARS.

Project R6536 reports uptake of gender-targeting approaches by two livestock development projects in Tanzania. Personal communication with the Project Leader indicates that whilst these projects are using Outputs from R6536 but no evidence exists for impact upon farming communities served by the development projects. R6536 is yet to produce a Final Technical Report or any other written dissemination output. However, the Project Leader pointed out that the technical direction of NRSP SEM Project R7039 ("Analysing changing gender relations for monitoring and evaluation of the renewable natural resources sector") came from the findings of R6536. Methodologies developed under R6536 are also being used by the Project Leader on a World Bank Project in Nepal. It is also planned that these will be incorporated into MSc teaching material at UEA.

It is unlikely that the two projects covered in this review will contribute to any measurable impact upon poor farming communities in two countries by the 2005. This is partly due to the upstream nature of the research (methodology development), to the fact that the impact so far achieved upon stakeholders is very localised and that promotion of outputs depends upon personal contacts made by Project Leaders.

Output 3 OVs: Improvement in feed availability in two target countries and appropriate feed management strategies accepted and implemented by 2005 by stakeholders. Seasonal feed deficits reduced by 15% in two target areas

The four projects under review in this report were commissioned under two Activities; "the introduction and evaluation of new feed resources" (Activity 1.3.2) and "the development of feed allocation strategies for different species in different physiological states" (Activity 1.3.4). Their progress along the A-H Uptake Pathway for Outputs is as follows

Project code	Short title	A	B	C	D	E	F	G	H
R5194	Tethering of small ruminants								
R6138	Evaluation of forages for milk								
R6140	Nutrition, reproduction and trypanosomosis interactions								
R6342	Digestion and trypanosomosis interactions								

Project R5194 has produced a multitude of written dissemination outputs ranging from internationally peer-reviewed scientific papers through to presentations to regional animal science meetings. Thus, dissemination has been successful in terms of promoting research findings into the national and international scientific community. In terms of more down-stream dissemination material, farmer-level extension material was produced in draft form by the project but never finalised, printed and distributed before the project was completed. Personal communication with the Project Leader revealed that this area of research has however been taken up by the target Institution and has given rise to two more MSc theses and several final year projects by BSc students. The fact that these studies have been supervised by a senior staff member of a national university who also coordinates a regional goat research network suggests that this may have generated more widespread dissemination than the documentary evidence made available to this review would suggest.

Project R6138 had, from the outset, a working relationship with local farmers because the managing institute was already running a smallholder dairy training programme. New forage species on trial were promoted as part of the training. On the face of it, the project has made considerable progress along the uptake pathway. However, its actual impact is likely to be extremely limited because it had contact with only few farmers (2-3 farmers were trained each week). The wealth status of these farmers was also not known. The extent to which improved forages have actually been adopted by "trained" farmers is unclear.

The lag time between the introduction and testing of fodder crops and their uptake by farmers is at best notoriously long and in many cases singularly unsuccessful in the case of the poorest farmers who cannot spare land from the production of staple food crops. Thus it is unlikely that the project will make a significant contribution to the Output OVI "Seasonal feed deficits reduced by 15% in two target areas".

The projects focussing on the trypanosomosis and nutrition (R6140 and R6342) have given rise to dissemination outputs targetting the international research community. No efforts have been made to promote findings beyond target institutions because it is felt by project leaders that more research is required to elucidate the basic relationships between trypanosomosis and nutrition. Project leaders felt that moving towards farm-level recommendations at this stage would be too premature and that the contribution of

these two projects towards attainment of Output 3 OVI is likely to be negligible by 2005 unless further research activity is funded.

Output 4 OVIs: Nutritive value of feed resources improved and techniques accepted by stakeholders and implemented in two target/complementary target countries by 2003. Feed conversion efficiency of ruminant livestock increased by 10% by 2003.

The only project considered in this review (Project R5184) addresses Activity (1 4.3) which sets out to evaluate supplements to improve the nutritive value of roughage-based diets of different livestock in different physiological states. Project R5184 seeks to investigate the linkages between genetic resistance to trypanosomiasis and nutritional status. It could be envisaged that this research when clustered with Projects R6140 and R6342 could ultimately yield important benefits to poor livestock producers in tsetse affected areas who could employ strategic feeding instead of more expensive chemotherapy as a means of disease control. Project R5184 has successfully yielded a range of peer-reviewed research papers (see Figure below) which (as above) are considered too far upstream to yield any impact upon the OVI. However, careful scrutiny should be given to these publications to see if farm-level recommendations can be made. It may be only scientific parsimony that prevents re-packaging of the outputs into a beneficiary-friendly-format that stands between the outputs as they stand and the partial or complete attainment of the Output OVI.

Project code	Short title	A	B	C	D	E	F	G	H
R5184	Nutrition and Trypanotolerance								

Output 5 OVIs: Efficiency of utilisation of draught animals increased by 15% in two semi-arid areas by 2005

Projects R5198, and to a lesser extent R6166, have been effective in producing learned journal articles, research symposium papers – outputs aimed at the international research community. Project R5198 has actually gone a stage further in promoting outputs through newsletters with a broader readership (see Figure below). These observations concur with those of Morton and Sutton (1999). In their review of DFID-funded draught animal power research they acknowledge the prolific output of journal articles but report very little impact of the research on endusers. They recommend no further strategic work be funded until research outputs to date have been synthesized and disseminated.

In contrast to all the other projects covered in this review Project R5926 appears to have achieved marked developmental impact. This project (aimed *inter alia* at developing lightweight implements for donkeys) linked up with a local metal working company in the development and testing phase of the project. This company (Zimplow) has now taken on the manufacturing of these implements and is marketing them to smallholders throughout southern Africa. Anecdotal evidence suggests that the project has had spin-offs for other DFID funded projects in southern Africa. In this case the donkey-plough technology has been demonstrated on a micro-irrigation project in South Africa.

supported by DFID Engineering and has contributed to an NRSP-funded soil and water conservation project in Zimbabwe.

Out of the 10 projects reviewed R5926 serves as an example of the use to be gained from collaborative partnerships struck between researchers and private sector for little extra cost to the Programme which ensure delivery and uptake of outputs. The degree to these partnerships are feasible when "non-tangible" outputs result from research would however require closer examination.

Project code	Short title	A	B	C	D	E	F	G	H
R5198	Feeding draught animals								
R5926	Productivity of draught animals								
R6166	Feeding draught cattle and donkeys								

Collectively, these projects have successfully drawn research attention to the use of the donkey in Africa. Until recently, this much maligned but ubiquitous draught animal had received pitifully little acknowledgement in its role as the preferred draught animal of the poor. LPP funding of these three projects has contributed to changing that perspective. Whilst the review by Morton and Sutton (1999) may rightly point to diminishing returns on investments in strategic draught animal research involving oxen/buffalo this may not be the case for the donkey.

Appendix 6

Log of Outputs

R5194 - Tethering of small ruminants in Tanzania: purpose & Implications

Romney, D.L., Sendalo, D.S.C., Owen, E., Mtenga, L.A. & Gill, M. The measurement of intake of grazing goats in Tanzania. In: *Proceedings VII World Conference on Animal Production, Edmonton, Canada, Volume 3, 1993*. Abstract 278, 104-105

Romney, D.L., Gill, M., Sendalo, D.S.C., Mtenga, L.A. and Owen, E. The measurement of intake of grazing goats. *Tanzania Society of Animal Production Conference Series, 20 (1993)*, 1994, 123-129.

Romney, D.L., Sendalo, D.S.C., Owen, E., Mtenga, L.A., Penning, P.D., Mayes, R.W. and Hendy, C.R.C. Effects of tethering management on feed intake and behaviour of Tanzanian goats. *Small Ruminant Research* 19, 1996, 113-120.

Sendalo, D.S.C., Mtenga, L.A., Ngapongora, J.M.N., Minde, I., Owen, E., Romney, D.A. and Gill, M. Tethering of small ruminants in Tanzania. The case of Morogoro district. *Tanzania Society of Animal Production Conference Series, 20 (1993)*, 1994, 154-161.

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R5198: Feeding and management strategies for draught animals in sub-Saharan Africa

Alford, R.J. 1994. Working and feeding strategies of draught N'Dama oxen in a Gambian village. MSc thesis, University of Edinburgh.

Bennison, J.J., Clemence, R.G., Archibald, R.F., Hendy, C.R.C. and Dempfle, L. (1998). The effects of work and two planes of nutrition on trypanotolerant draught cattle infected with *Trypanosoma congolense*.

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Dijkman, J.T. 1993. The measurement of draught ruminant energy expenditure in the field. PhD Thesis, University of Edinburgh.

Dijkman, J.T. and Lawrence, P.R. 1996. The energy expenditure of cattle and buffaloes walking and working in different soil conditions. *Animal Science* (in press).

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R6166: Effects of feed quality and time of access to feed on feeding behaviour and nutrient intake of tropical cattle and donkeys

D.G. Smith (1997) Effect of feed quality and time of access to feed on feeding behaviour and nutrient intake of tropical cattle and donkeys, PhD thesis, University of Edinburgh.

R5926: Improving the productivity of draught animals in sub-Saharan Africa

Bwakura, T. 1994. *Characterisation of the Zimbabwean donkey (Equus asinus): its management, foraging behaviour and body characteristics*. Thesis submitted in partial fulfilment of the requirements for a MSc degree. Department of Animal Science, Faculty of Agriculture, University of Zimbabwe, December 1994. 98 p.

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R6299: Intake of poor quality roughages and the effect of feeding forage mixtures

F. Cadario 1996. Use of *in vitro* gas production technique for predicting *in vivo* apparent digestibility and voluntary intake of feedstuffs for sheep. *MSc dissertation*, Reading University.

D. Hurst 1998. The effects of supplementation and chop length on voluntary food intake and digestibility of meadow hay and barley straw in wether lambs and assessment of the relationship between short term intake rate and *ad libitum* intake

and digestibility of the forages. *Integrated Science Project. Course-193. BSc dissertation, Wye College, University of London.*

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APPENDIX 7

RENEWABLE NATURAL RESOURCES KNOWLEDGE STRATEGY (RNRKS) LOGICAL FRAMEWORK - LIVESTOCK PRODUCTION PROGRAMME

1. SEMI-ARID CROP/LIVESTOCK PRODUCTION SYSTEM 1

Goal	Indicators of Achievement	Means of Verification	Risks and Assumptions
<p>Livelihoods of poor people improved through sustainably enhanced production and productivity of Renewable Natural Resources systems</p>	<p>Measures of change in capabilities, assets and activities</p>	<p>DFID commissioned external reviews of Programme impact.</p> <p>FAO and other datasets</p>	<p>Political stability maintained</p>
<p>Purpose 1</p> <p>Benefits for poor people generated by the application of new knowledge on the management of livestock in semi-arid crop/livestock production systems</p>	<p>By 2005, in two nominated countries where primary demands exist in Eastern/Southern Africa and South Asia, evidence of one or more of:</p> <ul style="list-style-type: none"> • Increased sustainable production of livestock and/or their products by resource-poor farmers • More reliable, cheaper, safe livestock products for the poor consumer • Reduced drudgery in crop/livestock systems • Improved employment opportunities • Increased capital assets for poor households 	<p>National & local surveys of production, employment, food markets, nutrition.</p> <p>DFID evaluations</p> <p>CGIAR reports</p> <p>FAO reports</p>	<p>Enabling environment, (policies, institutions, markets, incentives) for widespread adoption of new strategies and practices exists.</p> <p>Poor people invest benefits to improve livelihoods</p> <p>Climatic conditions are not atypical</p>

<p>Outputs</p> <p>1. Strategies to sustainably improve the production and productivity of livestock species of relevance to the livelihoods of resource-poor people in semi-arid crop/livestock systems, developed and validated</p>	<p>1.1 By 2000 improved understanding of the contribution of livestock to livelihood strategies</p> <p>1.2 By 2003 improved allocation and management of on-farm and locally available resources for livestock</p> <p>1.3 By 2004 improved seasonal availability and utilisation of local feed resources</p> <p>1.4 By 2000 new techniques to improve the nutritive value of feed resources</p> <p>1.5 By 2003 improved feeding management and utilisation of draught animals</p>	<p>LPP Annual Reports</p> <p>External Output to Purpose Reviews</p> <p>Final Technical Reports</p> <p>Evidence-based reviews</p>	<p>Mechanisms/resources enable target institutions to take up and apply new knowledge.</p> <p>Promotion of technologies is maintained in the longer term</p> <p>Enabling environment exists for widespread adoption of new knowledge</p>
<p>2. Strategies to improve the production and productivity of livestock maintained by resource poor people living in semi-arid environments, promoted and disseminated</p>	<p>2.1 By 2001 uptake pathways identified to optimise adoption of knowledge generated in 1.1-1.5 above</p> <p>2.2 By 2002, new knowledge adopted by target institutions</p> <p>2.3 By 2003, local target beneficiaries adopt knowledge</p> <p>2.4 By 2004, end-users in two target countries (among Tanzania, India, Zimbabwe, Uganda, South Africa and Kenya) aware of knowledge programme outputs</p>	<p>Target institution reports</p> <p>Dissemination publications and other products</p>	<p>NARs and other in-country partners able to effectively collaborate</p> <p>Researchers able to conduct activities in target countries</p>

Activities (indicative)	Indicative budgets (x £000s)
1. Adequate funds made available so that current projects and programme development activities brought to contract conclusions	1999-2000 488 2000-2001 296 2001-2002 127 total 911
2. New projects and activities commissioned to achieve programme outputs	
3. New (and existing) knowledge effectively packaged and disseminated	
4 Cost-efficient management systems in place	

APPENDIX 8

DEFINITION FOR DEMAND-LED RESEARCH

DEMAND

Demand for research can be said to exist where the following criteria are satisfied:

- i) A development opportunity or a strategic constraint to the sustainability of rural livelihoods can be described with an explicit measure of the scale and nature of the benefit to be achieved from the creation and use of new knowledge.
- ii) The livelihood system of an identifiable community of *beneficiaries* can be described, representatives of which have participated in defining their needs. There is mutual understanding between researchers and beneficiaries.
- iii) One or more *target institutions* has been identified and has explicitly agreed to be partners in the uptake and application of new knowledge. Such institutions may include *inter alia*:
 - DFID Departments and their advisers
 - National RNR Research and Extension Systems.
 - Multilateral and Bilateral Development Agencies.
 - International Financial Institutions.
 - Developing Country Government Resource Management and Policy Departments and associated public sector institutions
 - NGO either national or international, formal and informally associated with the CGIAR
 - RNR producers and producer organisations.
 - The private (commercial) sector.
 - An instrument of an international convention, etc.
- iv) The research project objectives fall within the regional or country priorities of DFID, or can be clearly identified within partner countries' National Development Plan priorities.
- v) The new knowledge to be created should have a strategic value and capable of adoption more widely.

TARGET INSTITUTIONS

The *target institutions* are those formal or informal institutions which take up the products of research or transfer knowledge. Target institutions may sometimes be the end users of research products. The target institutions utilise the results of research to achieve developmental impact.

BENEFICIARY

The *beneficiaries* are those poor people who gain social, economic or environmental advantage from the activities of the target institution. They may be identified in, for example, the household, the village community or the global community.