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**AUSTRALIAN AID EXPERIENCE IN THE LIVESTOCK SECTOR  
OF THE LESS DEVELOPED COUNTRIES**

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# EXECUTIVE SUMMARY

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The livestock sector is integral to economic growth and development in the less developed countries. The livestock sector makes important and unique contributions to the welfare of both producers and consumers by providing food, draught, fibre, hides, manure, wealth, status and, often, a basis for religious beliefs.

The productivity of livestock in most developing countries is low, reflected in low economic and financial rates of return. This low productivity is due to a number of factors including the desire for multiple outputs, inferior breeds, poor feed supply and nutrition, poor husbandry techniques, poor health and hygiene, and low levels of investment and management. Consequently food outputs per animal are low, usually reflected in low per caput consumption rates. However, such conventional productivity measures neglect the multiple-output character of livestock where food production is frequently not the prime objective of ownership.

The apparent contradiction between socio-economic importance and low productivity has been the basis for considerable development assistance from many donors over the past 30 years. It has met with only limited success. The livestock sector has proven to be a particularly difficult area in which to achieve economic gains, especially when smallholding or village based farmers have been the target group.

This review analysed AIDAB's experience in the livestock sector. It also examined the performance of some other donors and evaluated Australia's comparative advantages in providing assistance. Areas of potential commercial benefits to Australia were also assessed. AIDAB's contributions to bilateral livestock development programs averaged \$16m per year over the ten years to 1985-86. Activities concentrated mainly in the Asian and Pacific regions. The majority of projects were aimed at improving the social and economic situation of smallholders. Other projects strengthened government research and service institutions and developed processing industries.

Achievements of Australian aid projects in the livestock sector have included:

- Development of improved pastures and forage production.
- Development of improved farming systems.
- Development of infrastructure such as roads, water supplies and buildings, especially in large integrated development projects.
- Physical development of state farms.
- Provision and improvement of genotypes.
- Upgrading of research institutions through equipment, laboratory facilities and technical training.

Improvement of veterinary diagnostic facilities and provision of expertise in disease control procedures.

Processing and marketing of milk and milk products.

Training at all levels.

Overall, Australian development assistance achievements in the livestock sector are at least as good as those of other donor agencies.

Australia appears to have some comparative advantage in the supply of equipment and specific expertise in cattle, sheep, dryland livestock systems, tropical dairy production, applied and adaptive research, training, processing and marketing. Further work to more clearly define Australian comparative advantage should be encouraged by AIDAB.

Australia also has the advantage of proximity to Asian and Pacific regions. Potential commercial benefits to Australia include increased market share of livestock products, feedstuffs, equipment and pasture seeds trade. Projects involving upgrading of veterinary services and quarantine facilities in developing countries also reduce the risk of introducing exotic diseases into the Australian livestock sector by the vigilance role of Australian experts in such projects.

This review concluded that in our aid program:

Australian assistance to the livestock sector in our neighbouring region has been consistent with our aid objectives, including humanitarian, equity and growth issues.

Research has been over-emphasised and often not sufficiently targeted to development needs.

Inadequate attention has been given to training and extension.

Other, less common, weaknesses have been a lack of counterpart commitment, relative weakness of national livestock institutions, inadequate project preparation, documentation and project completion reporting, program inflexibility and lack of ex-post evaluations, long project durations, inappropriate national government pricing policies and land tenure constraints.

Future livestock sector development assistance policy requires attention in the following key areas:

There should be continued support of the livestock sector, but with a focus on areas in which Australia has a comparative advantage over other donor agencies.

Recipient governments' commitment to funding and allocation of other resources is essential for the long-term sustainability of projects.

Livestock agencies in less developed countries often receive low budget priority. Their ability to sustain recurrent cost financing is not strong. Therefore all projects must be cost-effective during implementation and preferably have low recurrent cost requirements.

There needs to be a recognition that livestock in less developed countries are but one component of the farming systems. Therefore an integrated approach is required for projects linking production, processing, marketing and consumption.

There should be more emphasis on pigs and poultry in the South Pacific, and less emphasis on cattle, especially in smallholdings.

- **More emphasis is required on training and extension, especially early in project implementation.**
- **Applied research needs greater attention to focus on adaptation and adoption of technology.**
- **There needs to be recognition of long-term funding requirements for genetic improvement programs.**
- **Standardized guidelines for appraisal, monitoring and evaluation procedures for livestock projects need to be established in AIDAB.**

# LIVESTOCK SECTOR PROFILE

*In the last ten years Australia's contribution to livestock development in the less developed countries has included the following:*

- Total expenditure \$200m (in current dollars) or \$20m/year, 1976/7 - 1983/6

- 62 projects undertaken
  - 55 primarily livestock
  - 7 livestock as one of several components

- Average duration of projects 5.7 years
  - Maximum 14 years,
  - minimum 1 year

- Average cost of projects \$1.8m
  - 14 projects greater than \$1m

- Expenditure by regions
 

South East Asia	63%
South Asia	15%
South Pacific	12%
North Asia	10%

- Expenditure by 5 main countries
 

Indonesia	47%
China	9%
India	8%
Philippines	8%
Burma	7%

- Other countries assisted by Australia include:
  - Bangladesh, Btanan, Egypt, Ethiopia, Jordan, Laos, Malaysia, Mauritius, Nepal, Niue, Pakistan, Philippines, Seychelles, S. Korea, Solomon Islands, Somalia, Sri Lanka, Tanzania, Thailand, Tonga, Tuvalu, Uganda, Vanuatu, Vietnam, W. Samoa, Zimbabwe.

- Types of projects included
  - Smallholder production (60%)
  - Institutional development (29%)
  - Processing (11%)

- Main achievements included
  - Development of improved pastures and forage production
  - Development of improved farming systems
  - Development of infrastructure such as roads, water supplies and buildings

Physical development of state farms

Provision and improvement of genotypes

Upgrading of research institutions and laboratories

Improvement of veterinary diagnostic facilities and provision of expertise in disease control procedures

Processing and marketing of milk and milk products

Training at all levels

- AIDAB's overall achievements have been considerable and at least as good as those of other donors

- Lessons included

Livestock projects should be viewed as an integrated component of the agricultural production system with livestock having a multi-purpose role.

Livestock projects are complex, long-term and require careful design and monitoring

Projects must be assured of recipient government commitments. Recurrent cost requirements must be manageable and preferably low

Livestock projects can make a substantial contribution to the welfare of both producers and consumers

Smallholder livestock production projects should be integrated with existing farming systems

South Pacific projects need to include pigs and poultry

Training and extension require more emphasis

Research should be of applied nature and emphasize adaptation and adoption of technology

Genetic improvement programs need long-term funding commitments

AIDAB requires operational guidelines for appraisal, monitoring and evaluation procedures for future livestock projects

## TRADE AND COMMERCE PROFILE

*Considerable trade and commercial benefits can accrue to Australia through its aid program in the livestock sector of less developed countries. These benefits can emanate from various sources, including:*

• *Sales of live animals for food*

direct slaughter (beef cattle to Malaysia, Saudi Arabia, Brunei and sheep to Saudi Arabia and other countries of the Middle East)

feedlot fattening prior to slaughter (beef cattle to Malaysia, Philippines, Indonesia)

*breeding*

beef cattle to Philippines and Indonesia

dairy cattle (Friesian x Sahiwal [AFS] and Australian Milking Zebu [AMZ] to Malaysia and Thailand)

frozen semen, mainly AFS to Thailand

sheep to Malaysia and Fiji

• *Sales of animal food products*

meat, milk and milk products, eggs and egg products, other processed animal foods

• *Sales of non-food products such as hides, leather, deer velvet*

• *Sales of veterinary and diagnostic equipment, vaccines and health-care agents*

*Sales of animal feedstuffs, both for ruminants and monogastrics*

• *Purchases of imported livestock products at competitive prices for use by Australians*

• *Research, training and experience gained by Australian scientists located in LDC institutions in the monitoring and control of*

exotic diseases, such as foot-and-mouth disease, which have the potential to severely damage Australian livestock industries

endemic diseases whose reduction increases the benefits generated by Australian live animal exports

*Key areas where increased benefits can be obtained are:*

- Improved after sales service
- Increased quality control and standardisation in export of animals and products
- Establishing long-term commitments, confidence and mutual respect with trading partners in LDCs

*The total value of exports of Australian livestock products in 1987/88 is estimated at \$5.7 billion. Over five years to 1991/88 the growth in the export value of Australian livestock products has been 18% per annum compound*

• Australian exports of livestock products to less developed countries which have rising real disposable incomes are likely to increase in the future. This export growth will be due both to population growth and income-induced consumption growth.

• Australian imports of livestock products in 1987/88 is estimated at \$A400 million

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# 1. BACKGROUND

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## 1.1 Livestock and Development

The livestock sector is integral to economic growth and development in the less developed countries. It contributes about 10-15% of the gross domestic product (GDP) in most developing countries, especially in Asia and the Pacific. The contribution of livestock to GDP is not only as food but also as draught, fibre, hides, manure and wealth. Key indicators of future growth and development of the livestock sector are the rate of population growth and income levels, and trends in urbanisation. Analyses of the combined effect of all these factors (Sarma and Yeung, 1985) indicate a demand growth of about 3% per annum for livestock food products in most developing nations. Hence the development of livestock industries in neighbouring

developing nations has important implications for future Australian development assistance policy.

Livestock productivity (primarily meat and milk) in developing countries is significantly lower than that in developed countries. While 60% of the world's cattle, buffalo, sheep and goats are in developing countries, they produce only 32% of beef and buffalo meat and 4% of sheep and goat meat. In addition, while over half of the world's pigs and poultry are in developing countries, these countries produce less than a third of pig and poultry meat (Table 1).

Trends in world livestock production indicate an average annual growth of 3.3% for meat, 1.6% for milk, and 3% for eggs over the period

**Table 1 Livestock Populations and Product Outputs per Person for Developed and Developing Countries in 1979.**

Region	Human Population (m)	Livestock Population (m)				Output per Person (kg)		
		Cattle and Buffalo	Sheep and Goats	Pigs	Poultry	Meat	Milk	Eggs
World	4376	1336	1540	762	6444	31	106	6.2
Developed	1155	427	541	327	3103	76	310	15.6
Developing	3221	909	999	435	3341	15	33	2.8

Source: Based on data presented in Sarma and Yeung (1985).



**Table 2 World Meat, Milk and Egg Production and Growth in Developed and Developing Countries, 1961-65 to 1973-77 (averages).**

Product/ Country Group	1961-65 (m t)	% of World Total	1973-77 (m t)	% of World Total	Growth <sup>(1)</sup> (%/yr)
<b>Meat</b>					
World	81.8		120.1		3.25
Developed	54.0	66	79.2	66	3.25
Developing	27.8	34	40.8	34	3.26
<b>Milk</b>					
World	357.3		432.6		1.61
Developed	288.2	81	339.1	78	1.36
Developing	69.1	19	93.5	22	2.55
<b>Eggs</b>					
World	16.7		23.8		3.01
Developed	11.9	71	16.2	68	2.60
Developing	4.8	29	7.6	32	3.94

<sup>(1)</sup> Growth rate 1961/65 to 1973/77.

Source: Sarma and Yeung (1985) and FAO Production Yearbook (various years)

1961-1977 (Table 2). Increases in per capita output have been much slower in developing countries as a result of higher human population growth, although milk and egg production increased more in absolute terms than in developed countries during this period. Projected declining growth in livestock production in developed countries in response to a slowing in population growth, contrasts with a projected increase in both production and consumption in developing countries as a result of rising population and wealth creation (Periase, et al. 1969).

The role of livestock assumes even greater significance in developing countries when non-conventional products are valued. Conventional economic measures omit the contribution of draught, manure and other

products to agricultural GDP (D. Doer, 1982). Livestock raising is often related to status, the maintenance of a divisible capital reserve and religious beliefs. These roles apply principally to smallholder and subsistence production systems which are commonly located in areas targeted by development agencies.

Recent increasing prosperity, particularly in South East Asia, has led to increased demand for livestock products. In the monogastric industries, this has stimulated commercial production enterprises usually located near large urban centres in Asia and the Pacific. In ruminants, intensive and semi-intensive production systems are being established to meet demand for red meat in urban areas, particularly in Indonesia, Philippines, and Thailand.

The contribution of livestock to development in Asia and the Pacific has been at both producer and consumer levels. Livestock development has focussed on producers in poorer areas where livestock are usually an integral part of the agricultural production system. Farmers benefit from increased availability of livestock products, self-employment, status and increased productivity using large ruminants for draught. Consumers benefit from the increased availability of food products. Livestock development policies in Asia and the Pacific tend to emphasise large ruminants, smallholder production and development of poor areas.

## 1.2 The Review

Development agencies may consider livestock as a sector or a subsector of agriculture. Viewed as a sector, it includes livestock production, processing and primary marketing (e.g. live animals, raw milk), and sometimes includes the marketing of processed livestock products. As a subsector of agriculture, livestock is considered a part of the agricultural production system, which usually does not include processing. This fundamental difference in definition may cause difficulties in country programming of assistance to livestock.

This review focuses on AIDAB's experience in livestock as a sector. It thus covers subsistence, smallholder and largeholder production, processing and institutional development activities specific to livestock. AIDAB's development activities in this sector have generally been intended to:

- increase smallholder incomes and subsistence productivity through improvements in nutrition, health, breeding and management;

- develop or improve livestock processing facilities; and

- introduce new animal species or products to existing production systems.

The review was conducted by Dr S. Chandra (AIDAB), Dr J.L. Falvey (MPW Australia), Dr N. Fogarty (Department of Agriculture, NSW) and Mr B. Costello (AIDAB).

The objectives of the review were to assess AIDAB's experience in the livestock sector, to examine the main project objectives and constraints on achieving them and to identify approaches for the future direction of Australian assistance in the sector. These objectives were achieved by analysing available documentation concerning AIDAB livestock projects, interviewing key AIDAB officials and managing agents, assessing Australia's commercial interests and comparative advantages in the livestock sector and reviewing experiences of other international development agencies.

The recently compiled Livestock Database which listed some 133 individual projects funded by AIDAB over the last ten years was assessed. Difficulty was encountered with inconsistencies in the data and identification of "projects" as many of the individual database projects refer to separate allocations for the same activity. These were grouped together into 62 projects of which 26 with accessible information were analysed in terms of their objectives, successes, problems in institutional, economic, social and technical terms, budgetary allocation and duration. A list of the 62 projects is given in Annex 1, Table 1. The experiences of other development agencies were reviewed from literature.

The review analyses AIDAB's experience, highlights issues specific to livestock, isolates key points and presents conclusions and recommendations. These recommendations are intended to assist in the development of AIDAB's future policies in the livestock sector.

## 1.3 AIDAB and the Livestock Sector

### 1.3.1 Policy Objectives

AIDAB's livestock sector projects have tried to improve the economic and social conditions of people in developing countries. Most projects have targeted the poorer farmers of Asia, who commonly incorporate livestock in their production systems. Australia's strong livestock sector has provided expertise and goods to service these projects. Only recently have Australia's commercial interests been incorporated in aid objectives.

### 1.3.2 Assumptions of Involvement

AIDAB's involvement in livestock projects has been based on the following implicit assumptions:

- (i) *increased individual animal productivity is desirable:* technically oriented projects have aimed to increase production per animal as distinct from increasing total system outputs.
- (ii) *Australia has a comparative advantage in livestock:* it has been assumed that Australia's strong livestock industry constitutes a comparative advantage in terms of expertise and production efficiency.
- (iii) *Australia's experience is adoptable to the needs of developing countries:* projects commonly entail transferring Australian technology, such as improved pastures, to other environments and conducting applied research to adapt the technology to local requirements.
- (iv) *production improvements can be extended to smallholders:* projects have assumed that adoption of new practices on a wider scale will take place once they are demonstrated on government farms or project sites.

(v) *improvements in livestock production provide flow-on benefits to communities in economic and social terms:* the goals of projects assume a direct relationship between increased livestock production and community welfare.

(vi) *livestock markets and infrastructure will develop from production increases:* projects have commonly focussed on production rather than marketing and have assumed that markets are available or will develop.

(vii) *improvements made during project implementation are sustainable post project:* projects have assumed that activities will continue after Australian assistance finishes and that the gains demonstrated with Australian inputs will be maintained without external support.

(viii) *livestock can be addressed as a discrete component of farming systems:* projects have targeted livestock as a part of integrated farming systems and excluded assistance to other parts of the system.

(ix) *recipient government livestock policies are consistent with expected project outputs:* project design assumes appropriate livestock policy formulation and implementation.

(x) and, more recently, that *some commercial benefits may accrue to Australia from exports of livestock and related products and services.*

Each of these assumptions has been considered in the assessment of AIDAB's experience in Section 2 and evaluated in Section 5 (Conclusions).

### 1.3.3 Size of the Program

Since 1976 AIDAB has funded some 62 bilateral livestock projects. Fifty-five are primarily livestock focussed while seven of

these projects have livestock as one of several components. Annual expenditure from 1976/77 to 1985/86 on these livestock projects, including a proportional value of livestock components, is presented in Table 3, with further details in Annex 1, Table 1. Total bilateral expenditure on livestock to 1985/86 has been \$129m with further forward commitments for continuing projects of \$50m, giving a total commitment of \$179m in current dollars. Expenditure on livestock has represented about 7% of total bilateral project aid flows over the last five years.

In 1987 AIDAB had 23 on-going and new livestock projects. Figure 1 shows the location, title, size and durations of these projects. Forty per cent of the projects are scheduled to finish in 1987.

Livestock projects completed before 1987 are shown in Figure 2. There are 45 completed livestock projects which had an average duration of 5.7 years and an average cost of

\$1.8m. However, only 14 projects (31%) were larger than \$1m with one very large project of \$33.8m (Animal Research and Development, Indonesia).

AIDAB also provides inputs to livestock development through multilateral organisations although those targeting livestock have declined substantially in 1986/87. Total expenditure over the past nine years was \$4.5m. AIDAB support to NGO projects involving livestock have been allocated \$1.3m over the past six years. Two other arms of the Australian aid program, ACIAR and IDP, have contributed \$4.4m and \$1.2m respectively to livestock research and training over the past five years. Additionally, \$1.8m have been made available via the Philippines Sector Inputs Program in 1986/87 which may rise to \$4m in 1987/88.

Total livestock expenditure (in 1985/86 dollars, based on annual deflators used in budget calculations) has varied from \$13m in

Table 3 : Expenditure for Livestock and Total Bilateral Aid Projects 1976/77 to 1985/86

Year	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86	TOTAL <sup>1</sup> EXPEND	TOTAL <sup>2</sup> APPROVED
	Total Livestock <sup>3</sup> (\$m)	9.4	13.7	12.5	9.6	10.4	9.0	10.7	13.6	13.9	15.9	128.6
No of projects	21	26	30	25	31	42	36	36	33	28	62	
Total Bilateral <sup>4</sup> Project Aid (\$m)	na	na	208	234	261	129	153	187	218	203	-	-
Livestock exp as a % of total bilateral expenditure	na	na	6.0	4.1	4.0	7.0	7.0	7.3	6.4	7.8		

<sup>1</sup> Total expenditure to 30th June 1986 including expenditure prior to 1976/77 for projects extant in 1976/77.

<sup>2</sup> Includes total approved expenditure for continuing projects in 1985/86.

<sup>3</sup> Includes assumed livestock proportion of seven component projects.

<sup>4</sup> Includes Capital Project Assistance and Project Aid.

FIGURE 1: Ongoing and new livestock projects - 1987

No.	Country	Project	\$m	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Project	Managing Agent				
1	China	Mingfang Development	0.3																				1	1	Haswell (to World Bank)			
2	Indonesia	Busa Tenggara Timur	37.2																					1	1	IFIL		
3	Indonesia	Bogor Agricultural University	16.4																						1	1	IFR	
4	Indonesia	Sanjaya River	32.1																							1	1	INR
5	Indonesia	Musa Tenggara Agricultural	5.8																							1	1	IFIL
6	Jordan	Jordan Farming	4.8																							1	1	ISARIC
7	Thailand	Central Rangisods	0.4																							1	1	ISARIC
8	Thailand	Prince of Songkla University	0.4																							1	1	ISARIC
9	Burma	Manalay Dairy Development	11.2																							1	1	ISARIC
10	China	Zhangji Dairy Development	3.8																							1	1	INR
11	China	Poultry	4.1																							1	1	INR
12	China	Livestock Development Yunnan	7.4																							1	1	INR
13	Ethiopia	4th Livestock Development	0.9																							1	1	ISARIC
14	Ethiopia	Valayou	10.7																							1	1	INR
15	Ethiopia	Butten Sheep Industry	1.2																							1	1	INR
16	Indonesia	Research Institute Rallivet	20.8																							1	1	INR
17	Indonesia	Pasture and Forage	8.6																							1	1	INR
18	Laos	Livestock Development	6.3																							1	1	INR
19	Laos	Livestock Feed Production	2.2																							1	1	INR
20	Pakistan	Sheep and Goat Industry	0.4																							1	1	INR
21	Bolivia	Livestock Development Authority	2.2																							1	1	INR
22	Venezuela	South Santa Joint Venture	1.0																							1	1	INR
23	V. Samoa	Beef Study	0.1																							1	1	INR

KEY  
 No - No Project Review undertaken  
 NR - No Managing Agent Employed by AINRA.

TABLE 2 Livestock projects completed prior to 1987

No.	Country	Project	\$a	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	Project Review	Final Report	Managing Agent
1.	Malaysia	Agricultural Research & Development Institute	0.360																		1979	1983	ICSIRO
2.	Niue	Renovation of Cattle under Coconuts	0.050																				
3.	Solomon	Cattle Under Trees	2.000																				Department of Agriculture
4.	Bangladesh	Dairy Cattle Extension	5.300																		1980	1982	University of Queensland
5.	Nutan	Sheep Industry and Breeding	0.400																				NSW Department of Agriculture
6.	Bhutan	Beef Cattle Farm & Dairy Cattle	0.400																				A.E. (AIDAB)
7.	China	Animal Quarantine	0.030																				A.E. (AIDAB)
8.	China	Sheep Breeding for Improved Wool	0.066																				INA
9.	Egypt	Equipment for Artificial Insemination Centre	0.020																				INA
10.	Fiji	Veterinary Staff and Equipment	0.040																				INA
11.	India	Fodder Seed Production	2.100																				Dept. of Agriculture/Hassall
12.	India	Indo-Australian Cattle Breeding	6.200																				Dept. of Agriculture, Victoria
13.	India	Indo-Australian Sheep Breeding	4.300																				
14.	Indonesia	Soils, Agronomy & Animal Production	0.500																				Dept. of Agriculture, Victoria
15.	Indonesia	Animal Research & Development (FARDB)	33.800																		1980, 85	1984	Univ. of New England
16.	Indonesia	Livestock Research Advisory Unit (CRIAS)	0.800																				ICSIRO
17.	Indonesia	Eastern Islands Provincial Diagnostic Laboratory	1.200																				AIDAB (A.E.)
18.	Indonesia	Animal Quarantine	0.020																				AIDAB (A.E.)
19.	Indonesia	Malignant Catarrhal Fever	0.100																				AIDAB (A.E.)
20.	Indonesia	Foot & Mouth Disease Assistance	6.200																				James Cook University of North Queensland
21.	Indonesia	Animal Virus Institute	0.200																				AIDAB/CSIRO
22.	Korea	Sheep Farm	1.700																				
23.	Malaysia	Asean Quarantine Project	0.060																				
24.	Malaysia	Sungei Karalungan Cattle	0.000																				
25.	Malaysia	Beef Cattle Management	0.300																				

FIGURE 2 Livestock projects completed prior to 1987

No.	Country	Project	\$m	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	Project Review	Final Report	Managing Agent	
26.	Malaysia	Poultry Vaccination	0.100																		No			
27.	Mauritius	Construction of Piggeries	0.100																		No	No		(Cash Grant)
28.	Nepal	Livestock Development	1.600																		No	1985		Dept. Agriculture, WA
29.	Pakistan	Dairy Farm & Milk Plant Extension	1.300																		No	No		AIDAB - A.E.
30.	Philippines	Dairy Husbandry Training Course	0.400																		No	1983		Old Dept of Primary Indu
31.	Seychelles	Supply of Cattle	0.300																		NA	NA		INM Dept of Agriculture
32.	Solomon	Cattle Development	2.700																		1977	No		Ministry of Agriculture,
33.	Sri Lanka	Cattle Expert, Animal Husbandry	0.400																		No	No		AIDAB/A.E.
34.	Tanzania	Integrated Livestock & Development	0.100																		No	1978		ES. McGowan & Associate
35.	Thailand	Pasture Improvement & Livestock Development	1.600																		No	No		US. Old.
36.	Tonga	Pasture & Livestock Development	0.090																					
37.	Tuvalu	Piggery Improvement	0.010																		No	No		P.R.T
38.	Uganda	Livestock Sector Consultancy	0.100																					
39.	Vanuatu	Phytosanitary Services	0.200																		1982	No		Dept. of Health
40.	Vanuatu	Pastures, Cattle & Sector Study	0.600																		1985	1985		Hassall
41.	Vietnam	Dairy Products Factory	2.600																		No	1979		Asia Dairy Industries (H
42.	Vietnam	Cattle Development	1.600																		No	1980		Aust. Ag. Consultants &
43.	N. Samoa	Farm Manager's House, Vaca Dairy	0.002																					
44.	N. Samoa	Importation of Beef Cattle	0.400																					
45.	Zimbabwe	Livestock Sector Study	0.008																		1981	No		A.E.

KEY

- No - No Project Review, or final report undertaken
- NA - No Managing Agent employed by AIDAB
- \* - Information not currently available
- P.R.T. - Pacific Regional Team
- A.E. - Aid Expert

1981/82 to \$28m in 1977/78, averaging \$20.2m. As a proportion of the total bilateral projects budget, livestock expenditure has shown an average decline of 2.8% per year over the ten year period. This is due partly to changing emphasis from South Asia.

Possible growth areas for livestock projects are Development Import Finance Facility (DIFIF) and South Pacific Joint Venture (SPJV) scheme. Two livestock projects are currently being considered for DIFIF funding although no livestock projects have previously received support.

### 1.3.4 Geographical Focus

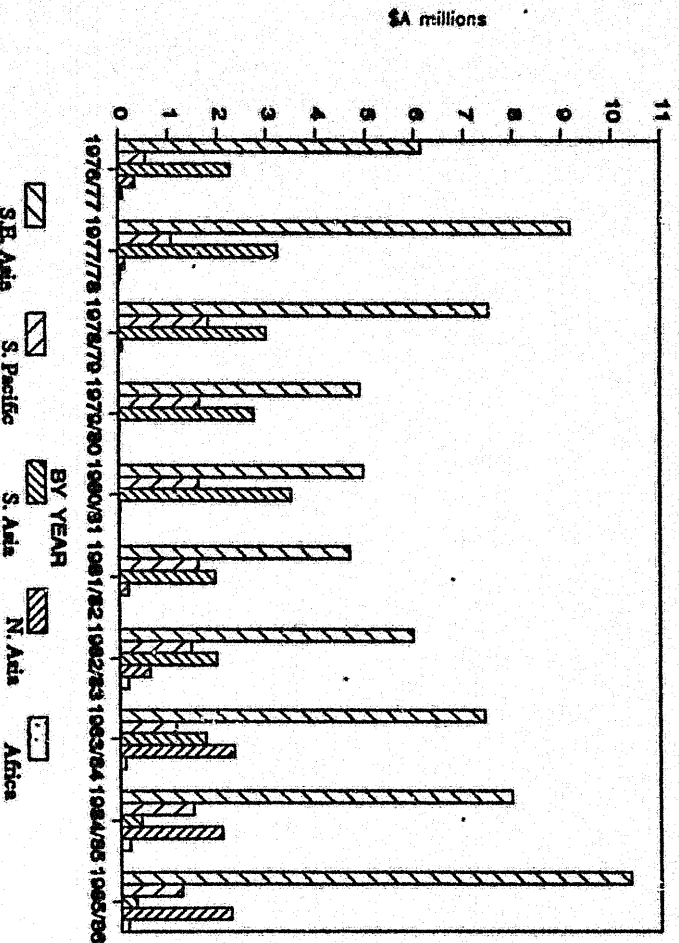
AIDAB's livestock projects have been predominantly located in the South East Asian Region which has received some 63% of total expenditure on livestock projects. Expenditure in the other regions was: South Asia 15%, South Pacific 12%, North Asia 10% and Africa

less than 1%. Indonesia has received some 47% of total expenditure on livestock projects. Other major recipient countries in order are China (9%), Fiji (8%), India (8%), Burma (7%), Laos (5%), Solomon Islands (3%), Bangladesh (3%) and Vietnam (3%). Thirty-eight per cent of projects have been located in South East Asia (20% in Indonesia), with 24% in South Asia and 20% in the South Pacific. The proportions of budget expended by region over the ten years from 1976/77 are presented in Figure 3.

South East Asia is the major region of activity with the proportion of annual expenditure on livestock projects increasing from 49% in 1980/81 to 73% in 1985/86. Indonesia remains the major country with expenditure on livestock projects exceeding \$5m over the last three years. New projects in Burma and Laos have increased the proportion of total livestock expenditure for South East Asia in recent years. Expenditure has declined sharply in

Figure 3 : Expenditure for Livestock Projects

By Region 1976/77 to 1985/86





South Asia from a peak of 35% in 1980/81 to only 2% in 1985/86. Over the same period expenditure in North Asia (China and South Korea), has increased from less than 1% to 6%. The proportion of expenditure in the South Pacific increased to the early 1980s (16-19%) but has declined to about 5% over the last four years. Ongoing projects are located in Indonesia (5), China (3), Fiji (2), Jordan (1), Burma (1), Ethiopia (1), Laos (2), Pakistan (1), Solomon Islands (1) and Vanuatu (1). Expenditure on these ongoing projects is concentrated in Indonesia, China, Burma and Laos. In addition new livestock projects have been initiated in China, Indonesia, Vanuatu and Western Samoa.

### 3.5 Types of Activities

AIDAB livestock projects can be categorized as: institutional development, smallholder production, or processing. This classification allows analysis of past projects and assessment of future proposals, including fields where Australia's comparative advantage may be identified.

**Institutional Development** includes the creation or strengthening of research and other livestock related organisations through the provision of training, expertise and development of facilities. Twenty-nine per cent of projects are included in this category. Examples include the Research Institute for Animal Production, Ciawi, and the Eastern Islands Diagnostic Laboratories in Indonesia. AIDAB expenditure in these projects tends to be higher than in other types of projects because they involve large construction and equipment costs and have long durations.

**Smallholder Production** has been the majority focus (60%) of AIDAB's livestock projects and include mixed farms, livestock producer and central

farm development projects. More recent mixed farm projects acknowledge the role of livestock in the farming system, e.g. the NTT Integrated Area Development Project in Indonesia. Consequently they may be viewed as integrated agricultural development projects which include livestock as one component. Livestock producer projects focus on groups engaged primarily in livestock production or who have sufficient resources (usually land and labour) to produce a surplus from livestock production as an activity separate from subsistence food production, (e.g. the Yunnan Livestock and Pasture Development Project in China). Projects which include development of a central farm as a major component may be included in one of the other groups if beneficiaries have been identified.

(iii) **Processing** includes those projects assisting the development or strengthening of livestock industries on a vertically integrated basis (11%). These are primarily dairy projects, such as the Mandalay Dairy Development Project in Burma. Also included are projects to develop abattoirs and intensive monogastric production and processing facilities. Marketing of the primary commodity such as live animals and raw milk forms part of such projects and marketing of the processed product may also be included. Processing projects commonly require a commercial orientation and may be of increasing importance especially in the enhanced DIFF and SPJV programs.

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## 2. AIDAB'S EXPERIENCE IN LIVESTOCK

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AIDAB's experience in livestock projects was assessed by an analysis of the 26 projects on which adequate critical documentation was available. The projects chosen were representative of the geographical regions and the type of livestock projects in which AIDAB has been involved. The majority of projects assessed were in South East Asia and South Asia with 15% being institutional development, 65% smallholder production (including 8% integrated development projects) and 20% processing (dairy). Further information on these projects is present in Annex 2. A detailed analysis of AIDAB's livestock projects in the South Pacific is presented in Annex 3. It was necessary to analyse South Pacific projects separately because of the comparatively recent introduction of livestock to these countries, their different roles and the different problems and opportunities for livestock development.

### 2.1 Project Goals and Objectives

Broad goals were stated in 21 of the 26 projects analysed, and almost all specifically referred to livestock. Goals entailed improvement of the national industry. Nine projects included goals associated with improved social welfare. This high incidence of livestock specific objectives probably reflects project design methodology rather than a logical decision to include livestock as the means to achieve broad development goals. Acknowledgement of the need for institutional and social considerations in project design resulted in a trend to greater emphasis on integrated development projects. These projects, aimed at the smallholder, have goals relating to improved production and

income and are less likely to specifically include livestock except as part of the production system.

### 2.2 Efficiency, Effectiveness, Impact and Sustainability

#### 2.2.1 Institutional Development Projects

Projects aimed at developing institutions have generally been effective in improving research capability. This has entailed provision of improved facilities and equipment and a considerable training commitment at all levels. This has resulted in an improved research capability and confidence of counterpart staff with a commensurate increase in research publications at both the Research Institute for Animal Diseases and the Research Institute for Animal Production in Indonesia. A further example is the development of laboratories and diagnostic procedures in the Eastern Islands Veterinary Diagnostic Laboratories Project, Indonesia.

While the research capability has been strengthened the impact of the research has often been limited to the institution or scientific community and has not led to a significant increase in animal productivity in potential target groups. Basic research has often been undertaken rather than applied research aimed at addressing important livestock constraints in the field. This has led to isolation of institutes, such as the Research Institute for Animal Production, Ciawi, Indonesia, from the extension services and farmers. Stronger and higher level linkages are needed between related institutions. This is particularly

important between the Research Institute for Animal Diseases (Balivet) and the regional Veterinary Diagnostic Laboratories in Indonesia.

Large-scale institutional development requires substantial commitment to recurrent funding. This requirement was not often addressed in project design though it can markedly affect sustainability. Inadequate recipient government funding of recurrent costs after completion of projects adversely affects retention of trained staff, maintenance of equipment and effectiveness of ongoing programs.

Projects aimed at strengthening livestock research institutes such as the Research Institute for Animal Diseases and the Research Institute for Animal Production in Indonesia have generally met objectives in construction, training of staff and provision of diagnostic facilities. However, the main objectives could have been met at a much lower cost by reducing project inputs on training and expertise. ACIAR has become involved in these research capacity strengthening activities in recent years and, because of its international agricultural research charter, may be more cost-effective in managing this type of project than AIDAB.

Development of facilities (e.g. laboratories) for integrated development projects, development of state farms and establishment of stud herds and flocks have generally proceeded as designed. Project objectives could have met with lower financial inputs by improved project design. This applies particularly to projects initiated as technology transfer activities. Some of these projects changed emphasis to adaptive research during implementation when it was realized that simple transfer of technology was not practical (e.g. Central Sheep Breeding Project, Hissar, India).

## 2.2.2 Smallholder Production Projects

The majority of AIDAB livestock projects are smallholder based and cover a wide range of activities including the development of state demonstration farms, pasture species evaluation, large-scale integrated development projects, introduction of new livestock species and crossbreeding with the distribution of stock.

Generally smallholder production projects have been effective in terms of technical production and training. Physical development of state farms have been successfully achieved in a number of projects, e.g. the Cattle Breeding Project, Haryana, India. The larger development projects, such as the NT Livestock Development Project, Indonesia, and the Yalavou Beef Project, Fiji, have effectively developed water supplies, roads and other infrastructure to support smallholder settlement. Projects have been effective in identifying superior pasture species (e.g. Yunnan Livestock and Pasture Development, China) and development of techniques for the establishment of improved pastures (e.g. Livestock Development Project, Vietnam). Counterpart training has also been noted as effective in most projects.

Importation of animals has been an integral component of a number of projects such as cattle in the Solomon Islands and sheep in South Korea. Improved breeds have also been imported, generally for cross breeding and distribution to farmers such as the cattle projects in Haryana and Assam, India. Improved animal productivity has been achieved on state farms with crossbred animals rather than purebred animals. Purebred imported stock have performed poorly. There have been low reproductive rates due to infertility (e.g. Central Sheep Breeding Project, Hissar, India) and low survival rates (e.g. Islamabad Dairy Development Project, Pakistan). Imported genotypes have

sometimes been inappropriate, such as large Brahmin cattle on the steep terrain in the Livestock Development Project, Vietnam, and *Bos taurus* cattle in tick environments (e.g. Cattle Breeding Project, Assam, India, and Yunnan Livestock and Pasture Development Project, China).

There has been a major impact of projects on communities involved in large scale developments (e.g. NTT Livestock Development Project, Indonesia), although beneficiaries have usually been limited in number (e.g. about 100 farms developed in the Yalaven Beef Project, Fiji). Improved sheep management methods have been adopted by villagers adjacent to the Yunnan Livestock and Pasture Development Project, China. Increased milk supplies from the Cattle Project, Samchi, Bhutan, have impacted on the adjacent urban population.

Smallholder livestock projects are more likely to be sustainable if they take account of the role of livestock in integrated farming systems and their social and economic roles. Improved pasture development has not been sustainable on communal lands and fencing has not usually been feasible for financial or social reasons (e.g. in NTT Livestock Development Project, Indonesia). Sustainability of improvements depends on adoption and effectiveness of simple technology. Small holder livestock projects require a long term commitment. Training impact may be limited by the availability of skilled staff and their increased career mobility which is enhanced by such training. The need for long term commitment is particularly important for projects involving a genetic improvement component especially when a new industry and species is involved.

### 2.2.3 Processing Projects

Construction work on processing facilities has generally experienced delays because of poor counterpart institutional arrangements, slowness in site acquisition and procurement

problems. The efficiency of projects is high where there is commercial orientation, strong recipient government commitment, an existing industry and demand is already established for the products. In projects where one or more of these parameters is lacking, increased project costs commonly result. Commercial orientation in management of vertically integrated projects requires close monitoring at all stages of the project cycle.

Dairy processing projects have been effective in construction of plant and installation of equipment for handling and processing milk (e.g. Islamabad Dairy Development, Pakistan), despite delays in implementation. Supplies of milk have been increased (e.g. Cattle Project, Samchi, Bhutan) and quality of products improved (e.g. Islamabad Dairy Development, Pakistan) with successful development and marketing of new products (e.g. Dairy Development Project, China). Dairy co-operatives were successfully established in the Islamabad Dairy Development Project, Pakistan, to ensure a supply of milk for processing.

The sustainability of these projects is largely dependent on an equitable pricing policy and the level of plant and industry management. The former, determined by government policy, should provide market-based incentives for adoption of improved production inputs and quality of processed products. The level of management is dependent on effectiveness of training and also on an institutional structure that allows autonomous management and financial control of the processing plant (a constraint in the Islamabad Dairy Development Project, Pakistan). Economic arguments have been used to both support (Gunawardana and Quilkey, 1987) and limit (Remenyi, 1985) involvement in dairy projects.

### 2.2.4 Ongoing and New Projects

There are currently 23 ongoing and newly approved livestock and livestock component

projects (listed in Figure 1). In general, the more recently designed projects have taken cognizance of the issues discussed above, such as the need for consideration of social implications and the general trend towards integrated livestock projects, e.g. the Yunnan Livestock Development Project, China. There are however some projects which do not meet the criteria and may be cause for concern. These projects could benefit from ex-post evaluations.

## 2.3 Issues Arising from AIDAB Experience

Livestock play an essential role in many communities as part of an integrated farming system. They provide various products and services including meat, milk, eggs, draught power, manure, hides, fibres and wealth and also fulfil social and religious needs. Livestock productivity is often low because of the varied purposes for which they are kept and their reliance on waste and by-products from other agricultural production. Changing inputs to any part of the production system affects all components of the system and livestock cannot be treated in isolation. Improved livestock productivity may be achieved by better nutrition, but this is often only possible at a cost of reduced area for food and other crops. This is particularly important with dairy cattle which have a very high nutrient requirement and often require fodder crops to be grown on productive land, e.g. Don Kin Dairy Project, China. On the other hand, previously unused rugged hill country was successfully developed with improved pasture to introduce a sheep industry into South Korea.

Early AIDAB projects were technically oriented with research and training components. More recently projects have taken into account the economic and social roles of livestock. Better project design, which acknowledges the extra lead time that may be

required for training and development of institutional infrastructure and links, is required. Specific inclusion of training, extension emphasis, monitoring and post-evaluation activities should be made at the design stage.

### 2.3.1 Issues Highlighted from Project Analysis

A number of issues were identified in the analysis of the 26 AIDAB projects presented in Annex 2. These include:

- high emphasis on research and development
- under-emphasis on extension and training
- inadequate counterpart commitment and funding
- weakness of livestock departments
- unclear institutional arrangements
- poorly defined recipient government policy
- non-specific project objectives
- inadequate project preparation
- inflexibility during project implementation
- inadequate project monitoring
- unavailability of trained staff and career structures
- difficulties with live animal procurement, delivery and survival
- over-estimation of technical and economic performance in design
- long project durations
- inappropriate government pricing policies
- land tenure constraints
- low effectiveness of credit schemes.

Many of these issues apply generally to AIDAB projects and they are being addressed through revised project formulation guidelines.

### 2.3.2 Issues Specific to Livestock

Issues specific to livestock drawn from the above sections can be categorised as follows:

- role of livestock
- geographical focus
- livestock development planning

- project design and monitoring
- research and development
- livestock extension
- duration
- species.

**(i) Role of Livestock**

Livestock are an integral component of the farming system and provide a range of outputs including draught power. This should be recognised in project design and particularly in integrated development projects. Introduction of a new animal species needs to take into consideration the social, environmental and economic implications as well as competition for resources with existing species and cropped areas.

**(ii) Geographical Focus**

There is a considerable emphasis on livestock expenditure in South East Asia and in particular, Indonesia. This is appropriate in terms of Australia's interest although the low involvements of AIDAB in other South East Asian countries appears inconsistent with Australia's comparative advantage and stated development objectives, and the regional importance of the sector.

**(iii) Livestock Development Planning**

Livestock development planning has not previously been supported by AIDAB. Livestock policies are commonly poorly developed and may not reflect appropriate targets and choices for government. Inputs to livestock policy development and planning is an area where greater emphasis by AIDAB could lead to significant and cost-effective improvements in livestock development. Such projects should be addressed in an institutional development mode involving training and provision of Australian expertise.

**(iv) Project Design and Monitoring**

Design issues specific to livestock concern the failure to acknowledge the importance of social, economic and institutional factors and over-estimation of performance, prices, and adoption rates. Project identification requires an objective assessment of various project intervention options. Design requires appointment of a team comprising disciplines identified as important to the project goals with specific inclusion of project monitoring and post-project evaluation. Early livestock projects appear to have been conceived, designed and implemented by livestock specialists with consequent under-emphasis of other factors. Other issues concerning project design will be adequately addressed by the Livestock Operational Guidelines which should be adopted for all livestock and livestock-related projects.

**(v) Research and Development**

AIDAB has supported livestock research through strengthening of central research organisations and through applied research programs in smallholder and development projects. Limitations of impact especially at the field level, and sustainability of large institutional development research projects such as the Research Institute for Animal Production, Indonesia, suggest that AIDAB should reduce emphasis on such projects, particularly costly construction components. Developmental research has often become necessary after project implementation as problems became apparent. These research activities are generally not included in the project design but may assume a major component of the project as occurred in the Central Sheep Breeding Project, Hissar, India. An area that remains neglected in project design is research into social systems, values and norms of producers and an assessment of their response to proposed technologies.

(vi) *Extension*

Extension and institutional development have been under-emphasised in all project types. This is related to the generally poor institutional capabilities common to livestock departments in developing countries. The need to disseminate information and encourage widespread adoption of improved techniques is implicit in most project objectives and requires emphasis in project design and implementation. Integration of project extension activities with the development of institutional capacity to provide extension services also needs to take social aspects and their complexity into account, including the role of women in livestock management.

(vii) *Duration*

Livestock projects tend to be long (mean of eight years for projects with an expenditure greater than \$1m) and are often extended

beyond their initial project period. This is related to the types of projects, such as institutional development, and to the technical innovations required in projects involving livestock importation and crossbreeding programs. The biological nature of life cycle constraints of large animals also require long term project commitment.

(viii) *Species*

AIDAB projects have concentrated on cattle projects oriented to beef and dairy production. Monogastric industries have been under-emphasised, particularly in smallholder projects. The strong private sector involvement in intensive monogastric industries may limit major aid involvement in this subsector.

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## 3. EXPERIENCE OF OTHER DONORS

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### 3.1 Asian Development Bank

The majority of ADB financed livestock projects have concentrated on cattle and smallholders in the South Pacific, South Asia and Indonesia (ADB 1983a). ADB strategy for livestock emphasises three project areas; the South Pacific, densely populated regions utilising draught animal based industries, and countries moving towards mechanised agriculture. Livestock is accorded a high priority because of its role in expanding employment, increasing animal protein in diets, reducing reliance on fossil fuels (draught), using waste feed resources, providing manure and replacing imports. Declining national herd sizes at a time of rising agricultural production and livestock product consumption in countries such as Indonesia, Philippines and Thailand, is considered justification for projects related to draught power, beef and milk production.

ADB is committed to smallholder projects but recognises that large commercial projects should also be considered. Major project areas include infrastructure, draught animals, pigs, poultry, goats and sheep, milk production, institutional support, research and training. The inherent weakness of most Asian/Pacific region livestock institutions is also noted. Few livestock projects have been reviewed due to their long duration (ADB, 1983b,c). However, common problems which related predominantly to the South Pacific, are technical errors, over-estimation of production parameters, poor record keeping, inadequate site selection, inadequate quality control of imported cattle, and cattle pricing and distribution policies.

### 3.2 World Bank

The World Bank (1985) has reviewed 41 livestock projects and 165 livestock component projects based on smallholder production systems. Bank lending to livestock has decreased markedly since 1980 after a steady increase over the previous two decades. Components of projects were, in decreasing order of incidence: credit, livestock purchase, on-farm infrastructure, pasture improvement, fodder development, technical assistance and farmer training. Animal species in order of investment were: beef cattle, dairy cattle, dairy-beef, sheep, poultry, pigs and goats. A large number of livestock investments were considered economic successes except in Southern and Western Africa. ERRs averaged 7.2% for livestock projects and 14% for component projects. Mixed smallholder/largeholder livestock projects showed the highest ERR (11.6%) with largeholder and smallholder projects being 6.2% and 0.3% respectively.

Principal determinants of economic success of projects were:

- appropriateness of technological packages
- economic attractiveness to producers
- institutional capabilities
- qualified technical personnel
- government commitment
- political and economic stability
- clear producer property rights
- producer organisations
- realistic project design
- consistent and flexible supervision.



Factors relating particularly to livestock included

- . applied research capability
- . institutional strength and linkages
- . land tenure
- . training
- . government budgets
- . awareness of farming systems
- . policy changes
- . project design.

The report specifically notes the overly ambitious nature of livestock project design compared to other agricultural projects.

The Bank review recommends an increase in livestock development support, especially to smallholders, because of the integral role of livestock in production systems. A recent World Bank livestock sector paper (Brumby, pers. comm.) supports increased livestock development through assistance in national livestock planning and policy, improved coordination of donor assistance, support for the liberalisation of international markets, and emphasis on sustainability of land use and environmental protection.

### 3.3 Other Agencies

The EEC (1984) review of livestock development projects in Africa indicated varied results. Projects assisting with initial recurrent budget costs of livestock departments seldom succeeded in achieving subsequent departmental budgetary allocations. Projects aimed at development of traditional livestock production, including health, failed to provide acceptable levels of benefits. The high level of technical success from health protection programs contrasted with the lack of sustained impact because of poor follow-up programs. The success of capital intensive livestock production required private sector involvement. Slaughterhouses were seen as links to markets and as successful projects,

provided they were based on simple, sturdy infrastructure and equipment and were integrated with the private sector. On-farm successes were restricted to draught/fattening projects forming part of agricultural modernisation operations.

The EEC notes that:

- . aid and government budgetary allocations to livestock are often far below the sector's contribution to GNP
- . livestock projects pay less cognizance to smallholder producers' returns than do cropping projects
- . livestock departments are outdated and act as monopolies for some health services
- . livestock related policies such as those concerning prices, taxes and input supply are not consistent with producers' needs
- . on-farm production system projects are often overlooked in favour of capital intensive production systems
- . livestock project design is seldom questioned even when severe problems are encountered during implementation
- . research and training have neglected the producer and the role of livestock in the farming system.

Winrock International (De Boer, 1982) notes that livestock research results are slow to be adopted in Asia because livestock are maintained for various purposes and research usually focusses on only one purpose in isolation. They conclude that there is a need for small changes within the farming system and that pre-project research, small scale projects and a farming systems approach are most appropriate for assistance.

A Netherlands (n.d.) review of development cooperation of 94 beef and dairy projects in nine countries found problems with adaptability of breeds, poor husbandry methods, ill-suited equipment, single-product output designs and poor economic and social analyses in projects.

### 3.4 Relevance to AIDAB

The experiences of the BEC relate primarily to Africa and those of the World Bank cover a wider geographical area than that with which AIDAB is concerned. ADB and Winrock experience in Asia and the South Pacific is of greater direct relevance. Points common to those elicited from analysis of AIDAB's experience include:

- A concentration on cattle projects has resulted in inadequate attention to other livestock species and enhancement or introduction of marginal industries.
- Low levels of financial and resource commitments to livestock development by recipient governments which leads to difficulties in implementation and sustainability.
- The rising priority of milk production in Asia has not been widely acknowledged or supported by international development agencies although government resources may have been allocated to this subsector.
- Failure to acknowledge the role of livestock in farming systems has led to limited project impact because of low adoption rates of livestock specific technology in isolation from the farming system.
- Livestock research has not focussed at the applied technical and social level and has been inappropriate to farming systems.

- Projects introducing new industries, particularly cattle in the South Pacific, have not recognised in their design the long-term input required.
- Project design, including technical and economic assessments, has been inadequate and not allowed sufficient flexibility to overcome implementation problems.
- Livestock policy and planning has been inadequate in many countries and donor agency inputs have been minimal.
- Investment in livestock development has not, until recently, anticipated the future requirements of developing countries to ensure availability of livestock products under conditions of declining supply and increasing demand. Declining supply is associated with agricultural mechanisation while rising demand is associated with increasing urban affluence. Such disequilibriums in supply and demand can lead to the slaughter of breeding herds, as has been the case of cattle in the Philippines.

AIDAB experience, which shows the importance of the sector and the success of some project interventions, notably those associated with applied research components, training, livestock components in integrated farming systems, processing and market orientation, is consistent with the experience of other agencies engaged in livestock development.

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## 4. POLICY CONSIDERATIONS

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### 4.1 Comparative Advantage

Australia's comparative advantage in livestock has been assessed by AMLRDC (1986) for the purposes of promoting industry research. They note specific areas of importance in Australian expertise such as in pastures, livestock breeding and production, livestock nutrition, livestock marketing and meat processing. An historical analysis using Tyers et al (1986) Revealed Comparative Advantage Indicator Model suggests that the only Australian industries with a comparative advantage were those supplying food aid. Unprotected industries tend to be selected in the model because of the economic focus of the analysis, including consultancy services (restricted to ASEAN and the South Pacific), unprocessed foods, animal fibres and live animals.

Australia is claimed to have a comparative advantage in dryland agricultural systems including livestock (Austrade, 1987). This is based on the apparent success of Australian exports and our dryland agricultural regions. No specific consideration of differences in farming systems and applicability and appropriateness of this experience in terms of investment, manpower ratios and social acceptance in developing countries is presented.

From these reviews and discussions with industry experts it would seem that Australia has a comparative advantage in the supply of equipment for livestock and expertise, particularly relating to cattle and sheep husbandry in dryland production systems, applied and adaptive research in these fields,

tropical dairy production and livestock development planning. Australian livestock personnel are regarded highly for their adaptability to project requirements, service in remote areas where livestock production is often promoted, and their independence in technical knowledge. Australia also has a comparative advantage in the Pacific and South East Asian region because of geographical proximity and experience in countries of the region. Reorientation of AMLRDC research funding to commercial application of research has two implications for the aid program; the first is a possible increase in availability of individuals previously engaged in production-oriented research that is no longer supported by AMLRDC, the second is the creation of additional expertise in commercial application of research, particularly in processing and new technology fields. The latter implication is also relevant to commercial objectives of the aid program.

### 4.2 Commercial and Trade Implications

IFPRI research (Mellor, 1986) has projected major changes in the livestock sectors of developing countries. Expansion of livestock product imports in recent years is expected to stimulate domestic livestock production capitalising on the lower labour costs of developing countries in the short-run.

Increments in production above that sustainable from waste and by-products will require concentrate feeds, particularly cereals. This trend has been noted in the World Bank's livestock sector analysis for China. IFPRI

suggests that the means of stimulating such development includes skills enhancement, research into industry and technical production efficiency and market system development. Rising non-farm income and demand for food products in Asia and the Pacific is projected to require substantial imports of livestock feed and products. It can be argued that the provision of assistance to develop livestock industries in such circumstances could be linked to sales of cereals and other livestock feed and, possibly to imports of Australian meat to supply the luxury-end of expanding markets for meat in the Asia and Pacific regions.

Australian exports of livestock and livestock products to developing countries in Asia and Pacific indicate that major traded commodities are meat and preparations, dairy products (and eggs) and leather/dressed fur. Arguments that livestock product markets may be lost as a result of assisting the development of developing country livestock industries may be applicable to dairy products while Australia continues to produce a surplus unsaleable at high prices. However, if the projections of IFPRI are correct, presence in the livestock industry of a developing economy may allow Australia access to unfilled market niches.

Reference to possible commercial benefits, including purchase of pasture seed and inoculant, solar and electric pumps, genetic material and replication of the project in other provinces are included in the Livestock Development in Yunnan, China. A further commercial benefit to Australia may be gained from experience in exotic diseases and their containment through assistance with disease surveillance and control laboratory services in the region. However commercial considerations for Australia have not been assessed in AIDAB livestock projects until recently and this has not been used to select projects for assistance.

### 4.3 Policy Implications

Implications drawn from the experience of AIDAB and other agencies and analysis of Australia's comparative advantage and commercial benefits from livestock projects indicate their general congruence with development assistance policy objectives.

Successful outcomes from assistance to the livestock sector indicate the desirability to shift emphasis in some project modes. In particular, institutional development projects would benefit from increasing emphasis in areas of livestock policy, planning and extension services. Research inputs should be oriented to applied research approaches. Australian involvement in recipient country extension services should involve institutional development rather than field extension activities. Australia's comparative advantage in institutional development lies in training and provision of expertise more than in building construction and large-scale equipment supply. Increased emphasis on policy, planning and extension would enable projects to be more cost-effective and sustainable.

Smallholder production projects need to emphasise the role of livestock as an integral part of farming systems. This implies that projects aimed at assisting smallholders should not be restricted to livestock alone, nor should they exclude livestock, when they are part of the production system. Increased emphasis on integrated smallholder projects, including livestock, requires adherence to specific project preparation guidelines and improved monitoring of implementation. Future project designs should ensure that marketability of expected increases in production is considered and supported, including the integration of smallholder producers with commercial finishing operations as is developing in Laos and Western Samoa for cattle and Thailand for satellite pig and poultry production units.

Projects including genetic upgrading based on importation of livestock and crossbreeding and possibly the use of artificial insemination, need to consider the long generation interval for most species, especially cattle. These projects require a commitment of at least 10 years with emphasis on development of capability to sustain selection and distribution programs. Where such a commitment cannot be made, genetic upgrading on this basis should not be included in projects. Smallholder production projects have been the major form of Australian assistance and this emphasis should be maintained in budgetary terms.

Processing projects require a shift in emphasis to ensure they are based on a viable market. This requires the project design to include due reference to each of the components of production, processing and markets. Projects which concentrate on processing in isolation from production are not considered as being in the livestock sector. Australia's comparative advantage and commercial interest appear to be met if exports of livestock feed, meat products and livestock production equipment can be gained through Australia's association with the livestock industry of the recipient country.

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## 5. CONCLUSIONS

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### 5.1 Livestock in the Aid Program

Livestock projects are an important component of the aid program with current annual expenditure of \$16m in AIDAB bilateral projects and an additional \$3.5m in other forms of aid, such as ACIAR. Livestock projects have also made significant contributions to other sectors, notably infrastructure and general agricultural development. Consideration of livestock in rural development is consistent with their role in integrated farming systems, common in poorer regions to which much aid is directed. Analysis of AIDAB experience and that of other development agencies in livestock confirms the appropriateness of continued commitment to the sector with some changes in emphasis.

The following conclusions are derived from the experience of AIDAB and other agencies in relation to the implicit assumptions of AIDAB's involvement in the livestock sector (Section 1.3.2).

*Assumption (i): Increased individual animal productivity is desirable*

This assumption is valid in the main except where social and, in some cases, economic requirements are based on the need for a divisible asset. Such needs should be assessed during project feasibility analysis.

*Assumption (ii): Australia has a comparative advantage in livestock*

Australia's comparative advantage in livestock extends across many fields but cannot be

assumed to be sector wide. Such advantage exists in: technical production related to dryland extensive systems (provided environmental experience gained in recent decades is included), technology transfer system development, applied research methodology, training, processing and marketing and, in some cases, intensive monogastric industries.

*Assumption (iii): Australia's experience is adaptable to the needs of developing countries*

Australian technology is potentially adaptable through local applied research activities. However, adaptability to social and local economic requirements often can limit the uptake of technically suitable innovations. Australian expertise appears to be adaptable to different production systems and social conditions. Inclusion of social analysis with technical, institutional and economic analysis is essential in project preparation phases.

*Assumption (iv): Production improvements can be extended to smallholders*

This assumption has not proved valid for AIDAB projects due to poorly developed extension services in many developing countries and a lack of project emphasis on strengthening extension agencies through human resource development and information dissemination services. Future projects should include targeting the involvement of extension agencies and specific inputs to strengthen extension systems.

**Assumption (v):** *Improvements in livestock production provide flow-on benefits to communities in economic and social terms*

Improvements in production that are sustainable post-project probably have provided benefits to livestock owners and local consumers in smallholder production systems and in processing projects. However, insufficient information is available on this and other impact assessments of AIDAB projects. Ex-post evaluation of representative projects is necessary to provide such information.

**Assumption (vi):** *Livestock markets and infrastructure will develop from production increases*

This assumption does not appear to be valid where production increases are limited to relatively small areas producing insufficient total volume to affect local markets and development of market infrastructure. Projects emphasising processing and marketing, with inputs into production, have stimulated production. This illustrates the importance of an integrated approach to development of marketing, and if appropriate, processing, in conjunction with production projects to achieve a wide impact.

**Assumption (vii):** *Improvements made during project implementation are sustainable post-project*

The principal determinants of sustainability are a sound economic basis and social and institutional compatibility with project objectives. An adequate capacity and commitment to recurrent funding is required by the recipient government.

**Assumption (viii):** *Livestock can be*

*addressed as a discrete component of farming systems*

Smallholder projects in which livestock is a component of an integrated farming system generally have a greater and more sustainable impact than when livestock is treated as a discrete component. Future projects should approach livestock as a component of integrated farming systems.

**Assumption (ix):** *Recipient government policies are consistent with expected project outputs*

Livestock policies and strategies are often poorly conceived in most developing countries, particularly where ruminant industries are associated with smallholders and monogastric industries with large private companies. Policies may be inappropriate to suit changing circumstances. Australian projects have generally not addressed livestock planning issues. There is a need to consider institutional development support for such activities.

**Assumption (x):** *Commercial benefits may accrue to Australia from exports of livestock and related products and services*

Commercial benefits are achievable from involvement in livestock development in Asia and the Pacific. Major potential exists in countries where livestock industries are expanding which will create demand for imported feedstuffs. Meat exports may also be increased through income-driven demand unmatched by domestic supply. Equipment for livestock usage also has an export potential.

## 5.2 Main Issues for AIDAB Management

- (i) Livestock development is consistent with aid objectives, encompassing humanitarian, equity and growth issues.
- (ii) AIDAB's livestock sector projects have produced many successes with overall achievements at least as good as those of other agencies.
- (iii) Institutional development projects supported by AIDAB should provide major benefits through training and expertise rather than investment in construction and expensive equipment. In some large projects there may be opportunities to co-finance with other donors.
- (iv) Institutional development projects in applied research (including ACIAR), policy, planning and extension are compatible with Australia's comparative advantages and successful project outcomes.
- (v) In smallholder production projects livestock should be included as a component of integrated agricultural development projects, including the role of draught power in production systems in South East Asia.
- (vi) Marketing systems and infrastructure are important pre-determinants of success for all production-oriented projects.
- (vii) Processing projects have been successful and sustainable when production, processing and marketing improvements are all considered in the project and there is an equitable incentive-based pricing policy in place.
- (viii) Because of long biological cycles and generation intervals for most animal species, livestock projects require long-term funding commitments for all production related activities.
- (ix) Differing roles of livestock between South Pacific and Asia require different approaches to development, especially in terms of budget, duration, training and level of technology. Projects in the South Pacific should be smaller, phased over long periods, include in-country training and concentrate on medium-level technology. South East Asian projects may be larger, include some overseas training and consider high-level technology in some projects.
- (x) Governments of developing countries do not usually allocate appropriate levels of resources to the development of the livestock sector.
- (xi) Policies and strategies related to livestock in developing countries are often inadequately formulated and impede development. The main problems are usually in marketing and pricing policies.
- (xii) Declining populations of large ruminants in South East Asia will lead to reduced meat supply. Increasing incomes and urban affluence would create added demand for livestock food products.
- (xiii) Training inputs to livestock may be better provided prior to other major project inputs.
- (xiv) Project identification, design and monitoring have been of variable quality and require specific methodologies.



### 5.3 Recommendations

It is recommended that:

- (i) AIDAB continue to provide support to the livestock sector, but with a focus on areas in which Australia has a comparative advantage over other donor agencies.
- (ii) Projects not assured of appropriate recipient government support in the long-term not be approved.
- (iii) The Livestock Operational Guidelines should be used for all livestock projects and that monitoring systems, including the timing for ex-post evaluations, be established during project design.
- (iv) AIDAB provide institutional development support in livestock planning, extension and applied research fields, and that such support focus on provision of expertise and training.
- (v) AIDAB projects in smallholder production systems address livestock as one component of the farming system.
- (vi) AIDAB increase emphasis on projects incorporating marketing of products, with an integrated approach to production, processing, marketing and consumption.
- (vii) South Pacific projects include monogastric species, especially in smallholdings, and recognise the special constraints of the region.
- (viii) Training related to livestock receive emphasis in all project types prior to or early in implementation.
- (ix) Support for livestock research emphasise applied research programs where the focus is on adaptation and adoption of technology.
- (x) Projects on genetic improvement and introduction of new species only be considered when a long-term funding commitment is assured.

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