

# **Cambodia Australia Agricultural Extension Project**

## **Cattle Finishing Technical Implementation Procedure**



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## **1. Description**

<b>Name:</b>	Cattle Finishing
<b>Date:</b>	January 2006
<b>TIP Source:</b>	Murray Maclean. The technology and extension process has been tested extensively in Vietnam, under the Agricultural Diversification Project 2000-2005, and in a small pilot trial in Pursat province in 2005.
<b>Objectives and Benefits:</b>	<p>To improve farmers' livelihoods through finishing local cattle for slaughter for the domestic market.</p> <p>The TIP is aimed at adding value to cattle before slaughter, by feeding them to increase liveweight and meat content. Farmers can make a profit of 600,000 riel over a period of two months by buying, feeding and then selling for slaughter, two local thin cattle, which represents an initial investment of 2 million riel. This technology can be used by farmers who sell cattle as a routine part of farm management, such as when cattle are old or finished their working or reproductive life, or by farmers and traders who can buy cattle specifically for the purpose of finishing them for slaughter.</p> <p>There will be improved relations between, and improved technical and extension skills amongst other stakeholders -Village Animal Health Workers, extension and technical staff.</p>
<b>Technical Suitability Criteria:</b>	<p>Access to key inputs</p> <ul style="list-style-type: none"><li>• slaughter age cattle in thin condition</li><li>• green grass.</li><li>• labour. To fatten two cattle, on average about three hours per day of labour is required for a period of two months. This is time spent at the house, where the cattle are kept and in the field cutting and collecting grass. This is a guide only, as the labour requirement can vary greatly, largely depending on the location of the grass and water and method of transport. If grass is purchased, rather than collected, this will decrease labour requirements but increase cash costs. Additional labour is required for</li></ul>

buying and selling the cattle. This can also vary greatly, depending on local marketing arrangements.

- concentrate feeds (such as soybean meal, corn powder, cassava powder, rice bran, broken rice, salt, urea, calcium/phosphorus supplements, multivitamin feeds). There are several options for options for the type of concentrate fed, so the type of concentrate can be adapted to local price and availability of the various ingredients.
- parasite medicines to treat cattle at the start of the finishing period.

Access to a market for finished cattle.

This TIP is targeted to richer farmers or cattle traders who have enough capital to buy and fatten two head of cattle. However it can be adapted by any farmer who sells cattle that are due to be slaughtered.

Farmers need about 2 million riel to buy and finish two head of small local cattle. If the farmers have cattle already, they need about 450,000 riel to buy the feed and medicine to fatten two local cattle. These costs will vary according to the size and value of cattle.

Farmers that already have cattle, need about 225,000 riel to buy the medicine and feed to finish one head of local cattle.

## 2. Technical Guidelines

### (1) Summary of Technical Guidelines

- i) Buy two slaughter age cattle in thin condition that have good health and a quiet temperament, at the right price.
- ii) Treat cattle with parasite medicine to kill internal and external parasites, and inject cattle with a multivitamin medicine.
- iii) Feed cattle a combination of green grass and concentrate feed, and provide free access to clean water.
- iv) Check progress in weight gain and condition.
- v) Sell cattle at the right price

### (2) Notes on Technical Guidelines

- i) **Buy two slaughter age cattle in thin condition, which have good health and a quiet temperament, at the right price.**

#### *Background*

Many cattle in Cambodia are slaughtered in thin or medium condition. This is because

- breeding and working cattle are often kept by farmers until they are very old and in thin condition
- farmers often sell cattle during long dry seasons when the cattle are thin, and there is not much feed left
- lack of a cattle finishing system and the skills, knowledge and inputs needed to establish such a system. Current cattle finishing is limited to opportunistic small-scale finishing on grass often in areas near slaughterhouses.

The slaughter or export of cattle in thin or medium condition is an economic loss because most of these cattle could be fattened profitably before being slaughtered.

#### *Types of cattle to buy*

Cattle bought for finishing should be below the optimum sale condition. In Cambodia, farmers commonly describe cattle as being in thin, medium, or fat condition. Therefore, cattle in either thin or medium condition can be bought, but on average the most profit can potentially be made from thin cattle.

Entire males, castrated males, or females can be bought. Cattle without any teeth should not be bought. Cattle of any breed can be bought. Cattle should be healthy. Healthy cattle have a bright eye, and are eating well.

Cattle of any age can be bought for finishing, but young cattle are usually too expensive to fatten for slaughter because their value for breeding will be higher than their meat value.

Cattle of nervous temperament should not be bought for finishing. This is because they become stressed when managed closely by farmers, resulting in low feed intake and low growth. Nervous cattle do not relax in the presence of people.

In general, cows which are 5 or more months pregnant should not be bought for finishing for slaughter.



An mature cow in thin condition ready for slaughter. This cow would be ideal for feeding and finishing.



A mature castrated male in medium condition. This cattle would be suitable for feeding and finishing.

### *Paying the Right Price*

To finish cattle profitably for slaughter, the farmer should pay for the meat value of animal only.

In order to pay the right price for thin cattle, farmers need to be able to estimate meat content. This is often not easy for inexperienced farmers. Experienced cattle buyers can estimate accurately the amount of meat on an animal, but even sometimes they can make mistakes.

Farmers can improve their meat content estimation skills by

- first estimating cattle liveweight through use of a measuring tape
- secondly estimating the percentage of the animal which is meat
- thirdly using this information to estimate the total amount of meat

Farmers then estimate the value of the animal by multiplying the total amount of meat by the current market value of meat (taken as the price of good hind leg meat).

To estimate the liveweight of cattle

- the distance around the girth and from distance from the point of the shoulder to the pin bone should be measured
- then the following formula should be used: Liveweight (kg) = Girth (metres) x Girth (metres) x Length (metres) x 90. A liveweight estimation table is shown in the Annex.

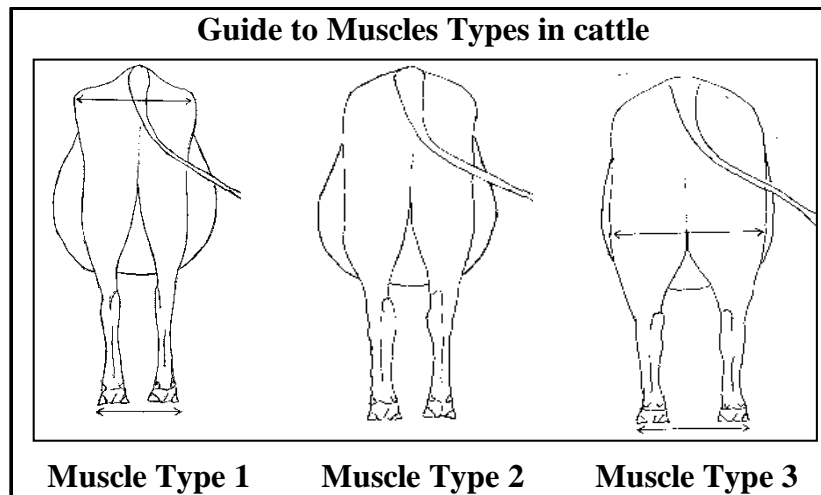


The liveweight of cattle can be estimated by measuring the girth and length of cattle from the shoulder to the pin-bone, and using a formula. This is only a general guide, but is a useful starting point for farmers to learn about cattle liveweights.

Meat content of cattle depends on condition (thin, medium, or fat) and muscling (either Type 1, 2 or 3).

Condition is essentially a function of nutrition. Muscling is mainly a function of breed and sex. Distinguishing between the two takes some experience.

**Figure 1 Guide to Muscle Types in Cattle**



Entire male cattle are better muscled than castrated males, with females the least muscled.

There are three broad common breed types in Cambodia including

- local small cattle or red/yellow colour, common in ricefield areas
- tall white Haryana cattle common in riverbank areas
- crosses between Haryana and local cattle

There are some more heavily muscled Brahman type cattle and their crosses, but they are few in number.

There is considerable variation between and amongst these breeds with respect to muscling. There is a lack of research in this area in Cambodian cattle, which limits current knowledge in this area.

Local breed cattle are generally of Muscle Type (MT) 1, although there are some that approach MT2, especially amongst entire males. Tall, white Haryana type cattle tend to be better muscled than the local red cattle, with a higher percentage of MT 2 cattle. Crossbreds naturally vary from MT 1 to 2. There are very few cattle in Cambodia of MT 3.



A male castrated cattle that has poor muscling and is of Muscle Type.



A mature female of the Haryana type breed that has good muscling and is of Muscle Type 2.

Table 1 is a guide to percentage meat content of cattle by condition and muscle type.

**Table 1 Guide to Meat Content by Muscle Type and Condition**


<b>Guide to Meat Content by Muscle Type and Condition</b>			
	Muscle Type 1	Muscle Type 2	Muscle Type 3
Skinny	22%	25%	32%
Medium	27%	32%	37%
Fat	32%	37%	42%

It is important to be able to distinguish fat from muscle. Fat on animal tends to be rounded and wobbles when the animal moves. Muscle tends to be flat and firm.

The following figure shows an example of a calculation of farm-gate cattle value.



**Figure 2 Example Calculation of Cattle Value**



Example Calculation of Cattle Value	
Item	
Breed	Local
Sex	Female
Age (years)	8
Condition	Medium
Muscle Type (1-3)	1.0
Weight (kg)	180
Meat Content (%)	27.0
Meat Content (kg)	49
Meat value (riel/kg)	15,000
Animal Value (riel)	729,000

As with any marketing activity, the price will depend on a range of factors such as relative bargaining power. Search, transaction and transport costs if any are also important issues. In general, cattle buyers should try to put themselves in a situation of strong market power, and try to keep search, transaction and transport costs to a minimum.

ii) **Treat cattle with parasite medicine to kill internal and external parasites, and inject cattle with a multivitamin medicine.**

Cattle in Cambodia can be affected by a range of internal parasites (e.g. roundworms, Fasciola) and external parasites (ticks, lice, flies). While not all cattle are affected by these parasites, cattle that are to be finished should be treated to be sure they are free of these parasites.

The best medicine to use is Ivermectin-plus. This kills the most important internal parasites, including the liver parasite Fasciola. This medicine must be injected under the skin.

Cattle should also be injected with multivitamin medicine at the same time as the ivermectin is injected. This will ensure that cattle have enough vitamins and can help to increase appetite.

iii) **Feed cattle a combination of green grass and concentrate feed, and provide free access to clean water.**

The objective of feeding is that cattle gain weight quickly, and that the weight gain consists primarily of muscle (meat) which is of high value, rather than fat, which is of low value.

Cattle can be fed a ration of only good quality green grass, but growth rates will probably be limited to about 400 grams/day. This means that finishing a thin local breed cow for slaughter will take 100 days, assuming weight gain of 40kg will take the animal from thin to fat condition.

Cattle fed a ration of good quality green grass and with a highly digestible concentrate feed high in energy and protein will grow more quickly, to the order of 800 grams/day.

This means that finishing a thin local breed cow for slaughter will take 50 days, assuming weight gain of 40kg will take the animal from thin to fat condition.

Actual growth rates will vary greatly depending on breed, condition, muscling, temperament, and general management.

Although the relative profitability of the two systems depends on the relative values of feeds, labour requirements, interest costs, and marketing systems, in most cases the ration of good green grass and concentrate feeding is more profitable.

There are few planted forages and pastures in Cambodia so most available green feed is native pasture.

A range of different types of concentrate feeds can be fed to cattle for finishing. Some examples are shown in the following table.

**Table 2 Concentrate Options for Finishing Cattle**

Concentrate Options						
Ingredient	Concentrate					
	1	2	3	4	5	6
<b>Fish Meal/Soybean</b>	0	0	10	5	0	5
<b>Corn</b>	50	75	0	25	50	20
<b>Rice bran</b>	50	25	0	0	0	0
<b>Cassava powder</b>	0	0	90	65	50	70
<b>Urea</b>	3	3	3	3	3	3
<b>Salt</b>	1	1	1	1	1	1

Example: In Concentrate Option 2, 75 parts of Corn should be mixed with 25 parts of rice bran and 3 parts of urea and 1 part of salt. If concentrate without fishmeal is fed, a calcium/phosphorus supplement will likely increase cattle growth. A multivitamin/mineral powder should be added to the concentrate.

With respect to these ingredients

- Fish meal and soybean are essentially high protein sources. Fish meal has the added advantage of being high in calcium and phosphorus.
- corn and rice bran are energy sources with medium protein content
- cassava powder is a source of energy with very little protein
- urea is a source of nitrogen which can be used for protein production in the animal
- salt increases appetite and feed taste as well as being useful for body growth

The urea used in this ration is the same as urea used for fertiliser. If cattle eat urea in large quantities, they can die because it is a poison. Therefore the amount of urea should

never be higher than shown in this ration. The farmer must make sure that cattle cannot eat any pure stores of urea.

The various ingredients of the concentrate should be very well mixed before being fed. This is particularly important that the urea is well mixed in with the rest of the feed.



The ingredients for the concentrate feed should be weighed before mixing. The concentrate feed should be weighed before feeding to the cattle.



Green grass can be collected or purchased .

The availability and price of the various concentrate ingredients varies across location and farming systems of Cambodia. The feed efficiency of any concentrate rations which do not include fishmeal, will be increased by the use of a calcium/phosphorus supplement. Few of these are currently available, and those available have originated in Thailand or Vietnam. Where available, they should be used according to packet recommendations.

The total amount of ration (green feed and concentrate) given to finishing cattle varies according to their bodyweight. In general, finishing cattle can eat an average of 2.5-3% of their bodyweight in dry matter. For practical purposes, we can assume that fresh green feed is 20% dry matter and the concentrate is 90% dry matter. Therefore a 200kg animal can eat a total of about 30 kg of fresh green feed in one day.

The general principle of cattle finishing is to give the cattle as much feed as they can eat. However, the concentrate feed should not, as a general rule, be more than about 70% of the diet. This means that the total amount of concentrate per day should be of the order of 1.5-2% of bodyweight of the cattle.

At the start cattle should be given a complete ration of green grass, and the concentrate is introduced slowly over a period of 7-10 days. This is to avoid cattle getting upset digestive systems from too rapid an increase in the concentrate, and also to reduce waste as it takes time for cattle to get used to eating the concentrate feed. As a guide, cattle be given 0.5% bodyweight (e.g. 1 kg for a 200kg animal) on day two of finishing and this can be increased steadily to 1.5-2% bodyweight (3-4kg for a 200kg animal) over the 7-10 day period. A Feeding Guide is shown in the Annex.

In practice, there is a very large variation between cattle in the rate at which they adjust to the concentrate, and the manager needs to keep a close watch on the cattle during this period. Sometimes adding water to the concentrate will increase cattle intake of the concentrate. Sometimes mixing the concentrate in with the green feed can hasten intake of the concentrate. A simple metal or plastic container such as is commonly used in kitchens for washing dishes is acceptable to be used as a container for the concentrate.

Cattle should have access to clean water at all times. This should be provided in a simple plastic or metal container.

Individual cattle should have access to their own green feed and concentrate. This allows the farmer to monitor closely the progress of each animal and see if there are any differences or problems in intake.

**iv) Check progress in weight gain, and condition.**

The farmer should check the weight of each animal each week by using the measuring tape and formula, but also just as importantly by visual assessment.

There should be a clear visual improvement in condition after 2 weeks. This can be observed primarily by looking at the condition of the skin and coat. The coat of the cattle should become more shiny and smooth. If none of this is happening, the farmer should consider selling the cattle as they may be not suited to cattle finishing.

**v) Sell cattle at the right time and price**

Farmers should check that cattle are continuing to put on muscle not fat. If the animal is putting on fat, then it is time to sell the animal, as cattle fat is of little if any value (different to pig fat which has value).

As a general guide, a 60 day finishing period should be considered as an average period for finishing local cattle from thin to final slaughter weight.

At sale time, the farmer should use the same methods as when he bought the cattle. This includes weight, meat content and value estimation using the measuring tape and estimates of condition and muscling. This will strengthen bargaining power with the buyer.



This local breed female is ready for slaughter at the end of a six week fattening period. When the animal is ready for sale, the girth is full, the ribs cannot be seen and the bones

### 3. Economic Benefit

Farmers have several options with respect to cattle marketing. They can either

- not fatten cattle at all, but keep them on traditional diet until sale
- fatten cattle with green grass
- fatten cattle with green grass and concentrate

With each option, farmers may be marketing cattle which they have raised themselves, and already own, or they may buy cattle either with cash or credit.

In the case that farmers have decided to fatten with green grass and concentrate, there can be several technical outcomes depending on types of cattle bought, quality of green grass available, quality of concentrate feeds, rate of intake of concentrates, and subsequent growth rates.

In addition, there can be a large variation in financial outcomes due to factors including

- changes in meat and cattle prices between the time of buying and selling
- farmer ability to accurately assess cattle value
- relative market power of buyer and seller at time of cattle purchase and sale
- variation in transaction costs of purchase and sale
- cost and availability of labour, for green grass collection as well as cattle management
- cost of finance for cattle purchase if required
- cost of concentrate feeds

An economic analysis is shown that compares

- one farmer buying and finishing two cattle on grass alone, which is termed a low input finishing system
- one farmer buying and finishing two cattle on green grass and concentrate, which is termed a high input finishing system

In both systems the type of cattle, and start and final weights are the same, and all unit costs are the same. Manure produced from the two systems is considered similar in quantity and quality, and is not taken into account in the analysis, although it does represent a benefit to farmers in both systems. The analysis shows that total profit of the two systems is similar, but the high input system receives the profit in half the time - 60 days as opposed to 120 days.

**Table 3 Comparison of Low and High Input Cattle Finishing Systems**

Comparison of Low and High Input Cattle Finishing Systems								
Item	Low Input Feeding System (green grass as sole ration)				High Input feeding System (green grass and concentrate)			
	Unit	Unit Value (riel)	No. Units	Value (riel)	Unit	Unit Value (riel)	No. Units	Value (riel)
<b>Costs</b>								
Buy Cow 1	kg	3,750	200	750,000	kg	3,750	200	750,000
Buy Cow 2	kg	3,750	200	750,000	kg	3,750	200	750,000
Medicine	kg	20	0	0	kg	20	400	8,000
Green Grass	kg	100	5,340	534,000	kg	100	1,335	133,500
Concentrate	kg	700	0	0	kg	700	433	302,820
				<b>2,034,000</b>				<b>1,944,320</b>
<b>Income</b>								
Sell Cow	kg	5,250	245	1,286,250	kg	5,250	245	1,286,250
Sell Male	kg	5,250	245	1,286,250	kg	5,250	245	1,286,250
				<b>2,572,500</b>				<b>2,572,500</b>
<b>Profit</b>				<b>538,500</b>				<b>628,180</b>
<b>Labour days</b>	days			45	days			23
<b>Profit/labour day</b>	riel/day			<b>11,967</b>	riel/day			<b>27,919</b>
<b>Interest on Capital @ 3% per month for two months</b>				<b>122,040</b>				<b>116,659</b>
<b>Profit minus interest</b>				<b>416,460</b>				<b>511,521</b>

Technical Details		
Cattle Breed	Local	
Sex	Female	
Age (years)	8	
Pregnancy Status	Non-pregnant	
Health Status	Good	
Temperament	Good	
Adapt to concentrate feeding	Adapts quickly	
	<b>Start of Fattening Period</b>	<b>End of Fattening Period</b>
Condition	Thin	Fat
Muscle Type (1-3)	1.0	1.0
Weight (kg)	200	245
Meat Content (%)	25	35
Meat Content (kg)	50	85.75
Meat value (riel/kg)	15,000	15,000
Animal Value (riel)	750,000	1,286,250
	<b>Low Input Feeding</b>	<b>High Input Feeding System</b>
Average Daily Gain (kg/day)	0.38	0.75
Total Weight Gain (40kg)	45	45
Total Days	120	60

#### **4. Extension Guidelines**

The extension guidelines describe a commune level extension program.

These guidelines can be adapted to larger implementation areas (e.g. district, province).

##### **(1) Institutional Arrangements**

The participants in the extension program are

- i) Provincial Office of Animal Health and Production staff. A staff member at this level is responsible for overall coordination of the extension program.
- ii) Livestock staff of the district agriculture office, under contract to manage the program activities in the commune. The district staff directly conducts the field days. The chief of the district agriculture office will also have a supporting role.
- iii) Village Animal Health Workers. VAHWs attend planning and conclusion meetings, attend all field days. They assist in selection of key farmers and participant farmers. They provide animal health services at the start and through the finishing period. The VAHWs have a contract for their services.
- iv) Local authorities at commune and village assist with the program activities.
- v) Concentrate feed suppliers.
- vi) Cattle traders. This includes both cattle buyers and slaughterhouse owners and managers. These stakeholders should be encouraged to attend all demonstration activities.
- vii) Key Farmers who have a contract to manage the cattle finishing site of two cattle. The Key Farmer supplies two cattle suitable for finishing, the area for cattle finishing, green grass, and labour for cattle management and record keeping. The project supplies the concentrate ingredients, 10 kg weighing scales, measuring tapes, technical guidelines and recording documents for the demonstration site, and a demonstration site management fee, which covers the purchase of feed and water bins in addition to management costs. If there is more than one cattle finishing demonstration site per commune, key farmers can make cross-visits to other demonstration sites.
- viii) Participant farmers who attend the cattle demonstration site field days. A group of 15 farmers should attend three field days held at the cattle demonstration site. These farmers should either be farmers who have current or recent experience in cattle finishing, or farmers who have several cattle, and have funds to invest in cattle finishing.

## (2) Workplan

The workplan extends over a period of about four months and includes planning, demonstration, implementation and review and evaluation stages. The exact month of the year in which the program will be implemented will vary from commune to commune depending largely on the availability of green feed, and the general agricultural calendar.

**Table 4 Workplan for Cattle Finishing Extension**

Workplan for Cattle Fattening Extension												
Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Commune Meetings												
Site Selection												
Key Farmer Selection												
Key Farmer Training												
Field Days												
District Manager Monitoring												
Provincial Manager Monitoring												

### i) Commune Meeting 1

This meeting is attended by district and provincial staff, commune authorities, cattle traders, and VAHWs in the commune. The objective of the meeting is that participants understand the technology and extension process and decide on the number and location of cattle finishing demonstrations. At this meeting there is

- a technical component in which participants are given an overview of technical and financial aspects of cattle finishing and the current situation of cattle finishing and marketing in the province, district and commune. Participants discuss their experiences with cattle finishing and marketing.
- organisational component describing the program activities.

### ii) Site and Key Farmer Selection

Site and key farmer selection are an important step in the extension process, due to the high responsibility being out on the key farmer. Ideally, the key farmer will already have experience in finishing cattle on green grass for the specific purpose of selling the fattened cattle for local slaughter. If such farmers are difficult to find, then any farmer who has cattle whom he plans to sell for slaughter can be used. The district staff need to examine the sites and be sure that there is adequate green grass available, and be clear as to whether the grass will be collected or purchased.

The district staff discuss the key farmer contracts and the key farmers agree. Concentrate options are discussed and agreed upon.

### iii) Key Farmer Training

This is a one day training for all key farmers and VAHWs in the technical and financial aspects of cattle finishing, and management aspects of the demonstration program. Selection criteria for the 15 farmers to attend the field days are discussed and agreed upon.



Key farmers, VAHWs and local authorities select the 15 farmers on the basis of the agreed criteria.

iv) **Field Day 1**

At this field day, attended by the

- cattle and facilities are inspected and discussed. Cattle weight estimation by tape measurement is demonstrated. Condition, muscling, and weight content are discussed. The price of cattle and the current market for cattle and beef is discussed.
- green feed is inspected for quality
- concentrate feed options are described, and the concentrate feed is mixed
- cattle are treated for parasites
- cattle are fed the green feed and the concentrate
- introduction of cattle to concentrate feed is discussed
- a technical and financial plan is made and discussed, including all input costs including labour

v) **Field Day 2**

At this field day, held one month after the first field day

- cattle are inspected for progress, and weight, condition, muscle score and value are estimated.
- key farmer records are presented and discussed
- key farmer discusses strong and weak points of the activity to date
- a technical, financial and marketing plan is discussed

vi) **Field Day 3**

At this field day, held one month after the second field day

- cattle are inspected for progress, and weight, condition, muscle score and value are estimated. Ideally, a cattle trader can be invited to the field day to give an opinion on cattle value.
- key farmer records are presented and discussed
- key farmer discusses strong and weak points of the activity to date
- marketing options are discussed
- technical and financial results are discussed

vii) **District Manager and Provincial Coordinator Monitoring**

The district manager and provincial coordinator should make regular and random visits to the demonstration sites.

viii) **Commune Meeting 2**

This meeting is attended by district and provincial staff, commune authorities, cattle traders, and VAHWs in the commune. The objective of the meeting is that participants understand the technical, financial and extension results of the cattle finishing demonstrations. The participants discuss the strengths and weaknesses of the technology and extension process and make recommendations for future activities.

**5. Equipment/Materials**

The following is a list of materials and equipment needed to implement the TIP.

**Table 5 Materials and Equipment**

District manager book
Key farmer record book
Cattle Liveweight Guide
Local Cattle Meat Content Guide
Cattle Feeding Guide
Measuring tapes
10kg weigh scales

Examples of the district manager book, key farmer records, cattle liveweight guide, meat content guide for local cattle, and feeding guide are shown in the Annex.

**6. Budget**

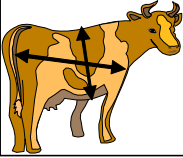
**Table 6 Implementation Budget**

<b>Implementation Budget</b>				
<b>Item</b>	<b>Unit</b>	<b>Unit Value</b>	<b>No. Units</b>	<b>Value</b>
District staff record book	unit			
Key Farmer record book	unit			
District staff contract	unit			
<b>Commune Workshops</b>				
Snacks	person			
Training Materials	LS			
<b>Key Farmer Training</b>				
Measuring Tapes	unit			
10 kg weigh scales	unit			
Snacks	unit			
Training Materials	unit			
<b>Demonstration Sites</b>				
Concentrate Feed	kg			
10 kg weigh scales	unit			
Key Farmer Contract Fee	unit			
Snacks	unit			

## **7. Implementation Sites**

This has been successfully piloted in Pursat province in 2005. A similar program was successfully implemented throughout Central Vietnam from 2001-2003.

### Annex 1 Cattle Liveweight Guide

		Girth (m) x Girth (m) x Length (m) x 90 = Liveweight															
		Length															
		100 cm	102 cm	104 cm	106 cm	108 cm	110 cm	112 cm	114 cm	116 cm	118 cm	120 cm	122 cm	124 cm	126 cm	128 cm	130 cm
Girth	120 cm	130	132	135	137	140	143	145	148	150	153	156	158	161	163	166	168
	122 cm	134	137	139	142	145	147	150	153	155	158	161	163	166	169	171	174
	124 cm	138	141	144	147	149	152	155	158	161	163	166	169	172	174	177	180
	126 cm	143	146	149	151	154	157	160	163	166	169	171	174	177	180	183	186
	128 cm	147	150	153	156	159	162	165	168	171	174	177	180	183	186	189	192
	130 cm	152	155	158	161	164	167	170	173	176	179	183	186	189	192	195	198
	132 cm	157	160	163	166	169	172	176	179	182	185	188	191	194	198	201	204
	134 cm	162	165	168	171	175	178	181	184	187	191	194	197	200	204	207	210
	136 cm	166	170	173	176	180	183	186	190	193	196	200	203	206	210	213	216
	138 cm	171	175	178	182	185	189	192	195	199	202	206	209	213	216	219	223
	140 cm	176	180	183	187	191	194	198	201	205	208	212	215	219	222	226	229
	142 cm	181	185	189	192	196	200	203	207	211	214	218	221	225	229	232	236
	144 cm	187	190	194	198	202	205	209	213	216	220	224	228	231	235	239	243
	146 cm	192	196	200	203	207	211	215	219	223	226	230	234	238	242	246	249
	148 cm	197	201	205	209	213	217	221	225	229	233	237	241	244	248	252	256
	150 cm	203	207	211	215	219	223	227	231	235	239	243	247	251	255	259	263
	152 cm	208	212	216	220	225	229	233	237	241	245	250	254	258	262	266	270
154 cm	213	218	222	226	231	235	239	243	248	252	256	260	265	269	273	277	
156 cm	219	223	228	232	237	241	245	250	254	258	263	267	272	276	280	285	
158 cm	225	229	234	238	243	247	252	256	261	265	270	274	279	283	288	292	
160 cm	230	235	240	244	249	253	258	263	267	272	276	281	286	290	295	300	
162 cm	236	241	246	250	255	260	265	269	274	279	283	288	293	298	302	307	
164 cm	242	247	252	257	261	266	271	276	281	286	290	295	300	305	310	315	
166 cm	248	253	258	263	268	273	278	283	288	293	298	303	308	312	317	322	

## Annex 2 Cattle Feeding Guide

Guide to Concentrate Feeding and Cattle Weight Gain														
Initial Cattle Weight	Concentrate fed to cattle (kg/hd/day)								Total amount of concentrate feed (kg)		Target Weight Gain (kg)	Target Final Weight (kg)		
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8						
<b>150 kg</b>	2.6	2.7	2.8	3.0	3.1	3.2	3.3	3.5	=	160 kg	➡	35 - 45	➡	185 - 195
<b>160 kg</b>	2.7	2.9	3.0	3.1	3.3	3.4	3.5	3.7	=	169 kg	➡		➡	195 - 205
<b>170 kg</b>	2.9	3.0	3.2	3.3	3.4	3.6	3.7	3.9	=	178 kg	➡		➡	205 - 215
<b>180 kg</b>	3.1	3.2	3.3	3.5	3.6	3.7	3.9	4.0	=	187 kg	➡		➡	215 - 225
<b>190 kg</b>	3.2	3.4	3.5	3.6	3.8	3.9	4.1	4.2	=	197 kg	➡		➡	225 - 235
<b>200 kg</b>	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.6	=	216 kg	➡	45 - 55	➡	245 - 255
<b>210 kg</b>	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.8	=	225 kg	➡		➡	255 - 265
<b>220 kg</b>	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.0	=	235 kg	➡		➡	265 - 275
<b>230 kg</b>	3.9	4.1	4.3	4.5	4.7	4.9	5.2	5.2	=	244 kg	➡		➡	275 - 285
<b>240 kg</b>	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.5	=	254 kg	➡		➡	285 - 295
<b>250 kg</b>	4.3	4.6	4.8	5.1	5.3	5.6	5.8	5.7	=	273 kg	➡	55 - 65	➡	305 - 315
<b>260 kg</b>	4.4	4.7	4.9	5.2	5.4	5.8	6.0	6.0	=	282 kg	➡		➡	315 - 325
<b>270 kg</b>	4.6	4.9	5.1	5.4	5.6	5.9	6.1	6.3	=	291 kg	➡		➡	325 - 335
<b>280 kg</b>	4.8	5.1	5.3	5.6	5.8	6.1	6.3	6.4	=	301 kg	➡		➡	335 - 345
<b>290 kg</b>	4.9	5.3	5.5	5.8	6.0	6.3	6.5	6.5	=	311 kg	➡		➡	345 - 355
<b>300 kg</b>	5.1	5.4	5.6	5.9	6.1	6.5	6.7	6.8	=	319 kg	➡	➡	355 - 365	

**Note:** During the first week of feeding, concentrate should be introduced slowly and aim to be at the level shown by the end of the first week.

### Annex 3 Guide to Meat Content of Local Cattle

#### Examples of Condition Score and Meat Content of Local Breed Cattle



**Breed** Local  
**Sex** Female  
**Age** Mature  
**Muscle Type** 1  
**Condition Score** Fat  
**Meat Content** 32%



**Breed** Local  
**Sex** Male castrate  
**Age** Mature  
**Muscle Type** 1  
**Condition Score** Medium  
**Meat Content** 27%



**Breed** Local  
**Sex** Male castrate  
**Age** Mature  
**Muscle Type** 1  
**Condition Score** Medium  
**Meat Content** 22%

**Annex 4 Example Key Farmer Records**

Cattle Finishing							
Key Farmer Records							
Cattle Finishing Daily Log							
Week and Day	Date	Cattle 1			Cattle 2		
		Concentrate Feed (kg)	Green Feed (kg)	Medicine	Concentrate Feed (kg)	Green Feed (kg)	Medicine
1	1						
	2						
	3						
	4						
	5						
	6						
	7						
2	8						
	9						
	10						
	11						
	12						
	13						
	14						
3	15						
	16						
	17						
	18						
	19						
	20						
	21						
4	22						
	23						
	24						
	25						
	26						
	27						
	28						

Cattle Finishing

Key Farmer Records

Cattle Finishing Daily Log							
Week and Day	Date	Cattle 1			Cattle 2		
		Concentrate Feed (kg)	Green Feed (kg)	Medicine	Concentrate Feed (kg)	Green Feed (kg)	Medicine
1	29						
	30						
	31						
	32						
	33						
	34						
	35						
2	36						
	37						
	38						
	39						
	40						
	41						
	42						
3	43						
	44						
	45						
	46						
	47						
	48						
	49						
4	50						
	51						
	52						
	53						
	54						
	55						
	56						
5	57						
	58						
	59						
	60						
	61						
	62						
	63						



Cattle Finishing											
Key Farmer Records											
Cattle Monitoring											
		Cattle 1					Cattle 2				
Age											
Sex											
Breed											
Condition											
Day	Date	Girth	Length	Liveweight (kg)	Meat %	Value (riel)	Girth	Length	Liveweight (kg)	Meat %	Value (riel)
0											
5											
12											
19											
26											
33											
40											
47											
54											
61											

## Annex 5 Example District Manager Book

District Manager Book								
Cattle Finishing Financial Analysis								
Item	Cattle 1				Cattle 2			
	Unit	Unit Value (riel)	No. Units	Value (riel)	Unit	Unit Value (riel)	No. Units	Value (riel)
<b>Costs</b>								
Buy Cattle	kg				kg			
Medicine	kg				kg			
Green Grass	kg				kg			
Concentrate	kg				kg			
<b>Income</b>								
Sell Cattle	kg				kg			
<b>Profit</b>								
<b>Total feeding days</b>								
<b>Labour days</b>	days				days			
<b>Profit/labour day</b>	riel/day				riel/day			

District Manager Book				
Concentrate Feed				
	Ingredient	Amount (kg)	Cost (riel/kg)	Cost (riel)
1				
2				
3				
4				
5				
	Total			

Technical Details Cattle 1		
Cattle Breed		
Sex		
Age (years)		
Pregnancy Status		
Health Status		
Temperament		
Adaptation to concentrate feeding		
	<b>Start of Fattening Period</b>	<b>End of Fattening Period</b>
Condition		
Muscle Type (1-3)		
Girth (m)		
Length (m)		
Weight (kg)		
Meat Content (%)		
Meat Content (kg)		
Meat value (riel/kg)		
Animal Value (riel)		
Average Daily Gain (kg/day)		
Total Weight Gain (40kg)	0	
Total Days	120	

Technical Details Cattle 2		
Cattle Breed		
Sex		
Age (years)		
Pregnancy Status		
Health Status		
Temperament		
Adaptation to concentrate feeding		
	<b>Start of Fattening Period</b>	<b>End of Fattening Period</b>
Condition		
Muscle Type (1-3)		
Girth (m)		
Length (m)		
Weight (kg)		
Meat Content (%)		
Meat Content (kg)		
Meat value (riel/kg)		
Animal Value (riel)		
Average Daily Gain (kg/day)		
Total Weight Gain (40kg)	0	
Total Days	120	

