

QUANG NGAI RURAL DEVELOPMENT PROGRAM (QNRDP) - PHASE 2

Interim Report (Second Mission)



VIET NAM-AUSTRALIA

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Acronyms

ACIAR	Australian Centre for International Agricultural Research
ADP	Agricultural Diversification Project funded by World Bank
DARD	Department of Agriculture and Rural Development
DPI	Department of Planning and Investment
EC	Extension Centre
ED	Extension Department
GDP	Gross Domestic Product
HCMC	Ho Chi Minh City
LSS	Livestock Systems Specialist
LWT	Live Weight
ND	Newcastle Disease
PMU	Program Management Unit
QNRDP	Quang Ngai Rural Development Program
TOR	Terms of Reference
VBARD	Vietnamese Bank for Agriculture and Rural Development
VBP	Vietnamese Bank for the Poor
VND	Vietnamese Dong

1 Introduction

This is the report of the second input of the Livestock Systems Specialist (LSS) from the period 2-9 November 2002. It incorporates a background description of the process of establishing a system whereby poor farmers can get improved income from cattle finishing, and incorporates as Annexes, three components of a Draft Module for cattle finishing extension, namely Extension Guidelines, Recording and Reporting Documents and Technical Guidelines. This is for comment and review by QNRDP staff. The LSS can build on this or modify in light of the comments. The report also contains a pre-amble to the development of a pig finishing module, and suggestions for potential service providers for the extension activities.

1.1 Background

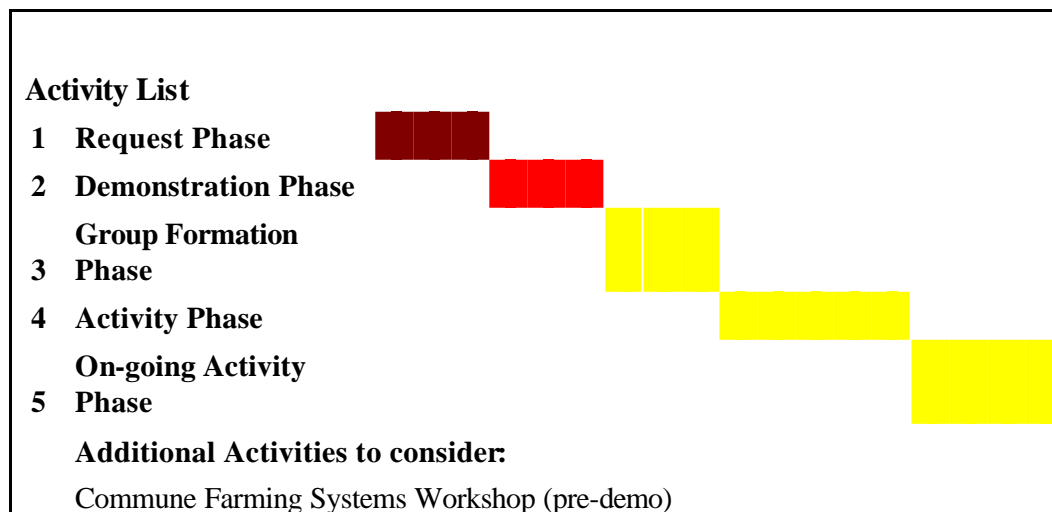
Farmers in the selected Phase 1 communes identified cattle production as a source of increased income. Cattle finishing using local concentrates and roughages is a technology which has the potential to achieve increased incomes for farmers. QNRDP is implementing cattle finishing demonstrations in three communes of Quang Ngai. These demonstrations are due to finish in mid-late November. This is the first experience of QNRDP in cattle finishing extension, and later extension activities will be based on lessons learnt.

2 Establishment of cattle finishing

The process of establishing a system whereby poor households (HH) can increase incomes from cattle finishing is likely to involve several steps (see Figure 1).

- 1) **Request Phase.** HH express interest in improving income from cattle raising.
- 2) **Demonstration Phase** where farmers are exposed to the technology and gain exposure to the skills and knowledge they require to be successful at cattle finishing. The farmers will learn some of these knowledge and skills during the demonstration phase and, and some other skills will be developed later.
- 3) **Group Formation Phase** whereby farmers learn how to form into groups if they wish to do so. Incentives for group formation may be a grant input to an agreed activity plan, as well access to technical and operational support from within or external to the group (e.g. technical support, finance management traing etc). The Group is identified as a cattle finishing group, and is eligible for assistance with this activity only. The Group presents an agreed *Activity Plan* to QNRDP.
- 4) **First Activity Phase.** Group members fatten cattle by accessing inputs (credit, cattle, feeds, medicines) and marketing cattle, either as individuals or as a group, linked to external entities through a variety of mechanisms (individual, group bargaining, contracts etc). The value of any QNRDP grant inputs would be recovered with interest into a Group-owned account.
- 5) **Ongoing Activity Phases** with decreasing direct QNRDP support until group activities are fully sustainable with local resources.

Figure 1: Overall workplan of establishing system of poor farmers making improved income from cattle finishing



2.1 Cattle finishing for poor households

Cattle finishing technology has many potential advantages for poor people: high return in short cycle, relatively low risk. On the other hand it is capital intensive and requires skills and knowledge that many poor people probably do not already have. i.e. budgetting, choosing rations, cattle selection, management and marketing. The need for credit, and attitude to risk adds another obstacle for poor farmers.

As a technology, cattle finishing is probably more readily taken up by entrepreneurial farmers who have the capacity to fatten several cattle at a time, giving economy of scale and allowing for rapid build-up of experience.

To enable poor farmers to gain benefits from this technology means a targetted approach that step-by-step gives them the required skills and access to inputs, with external support for some period. Therefore the above steps 1) to 5) are likely to be implemented in the QNRD to achieve this.

In Step 3) the farmers have basically two options:

- a) Individual family cattle purchase and management with group and external e.g. project support.
- b) Conduct an **"outgrower phase"**. A farmer can be a part of a contract outgrower cattle finishing system, whereby the project buys cattle which are distributed to the poor farmers who fatten them under contract, with close project support, and project supplying all concentrate feed and medicines. Farmers supply labour, housing, roughages. The advantage of this system is it gives the farmers an opportunity to learn hands on about cattle finishing (planning, budgetting, technology) with close support, in a similar fashion to the demo farmer in the demonstration phase. This may be a useful intermediate step to ensure that farmers have all the necessary skills before they make the big step of buying and managing their own cattle. Field days would be organised during the outgrower phase for farmers within the group, or even farmers outside the group. In this way, the outgrower system is a form of expanded demonstration step.

The situation of the farmers, in the upland commune indicates that cattle finishing may not be suitable due to a range of factors, related to the remoteness and poverty of the area. This may be biased by the fact that ingredients (corn and molasses) in concentrates used in rations in the current demos are not readily available. But even if more locally available feeds such as cassava are used (see Technical Guidelines on Feeding), uptake may still be low. The first report of the LSS recommended to review the usefulness of the cattle finishing demonstrations in the upland commune as part of an overall study to devise a livestock strategy for the area, which may be markedly different from that in the lowland.

In relation to cattle finishing per se, farmers with cattle to sell in upland areas can benefit due to a better market for their store cattle. They will need to know the value of their cattle and develop their capacity to bargain, and they may be able to add some value to their cattle before sale, by feeding them for a short time, and treating them for parasites. In other words, the store producers need to understand and respond to the market specifications for store cattle which includes breed and health.

3 Module for cattle finishing

The module for cattle finishing is largely concerned with the **Technical** and **Extension Guidelines**, and **Recording and Reporting Documents** related to the **Demonstration Phase** as described above. The Module consists of a set of guidelines that will inevitably be modified and updated during implementation to suit local conditions, and QNRDP policies and processes as they evolve.

The Draft Module has three major components, as shown in Table 1.

Table 1: Components of the module

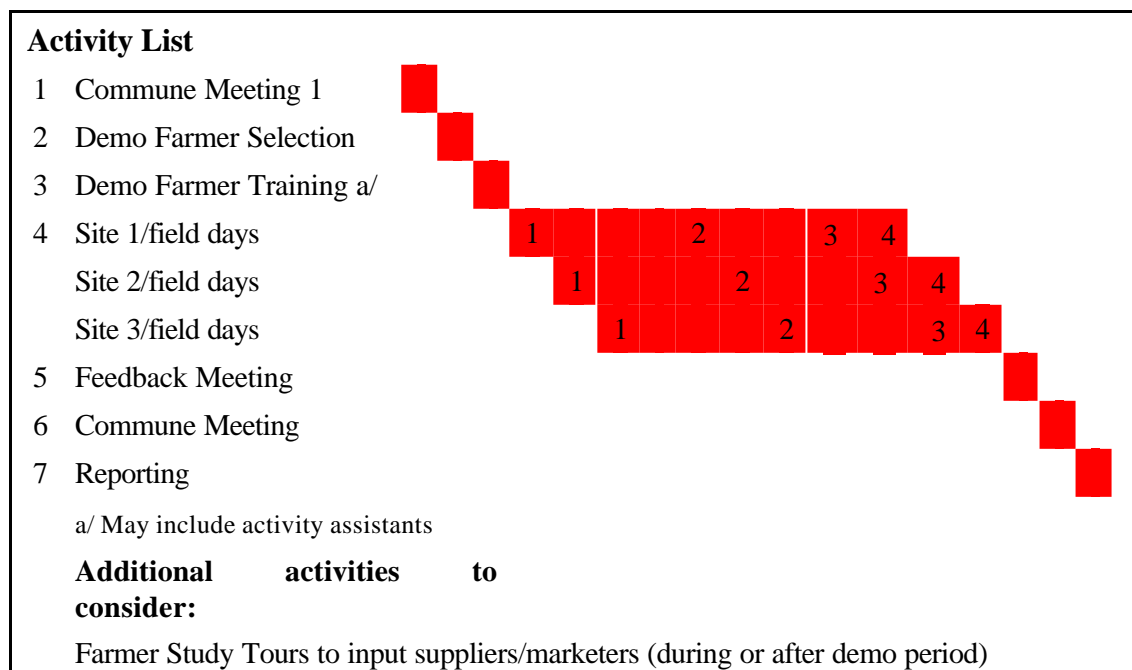
1	Extension Guidelines
2	Recording and Reporting Documents
3	Technical Guidelines

The Draft Module does not include staff training modules or specific recommendations.

3.1 Extension guidelines

The Extension Guidelines are centred around the activities of the demonstration phase (see Figure 2), and are found in Annex 1 of this report.

Figure 2: Demonstration phase



The following Guidelines are shown in Annex 1:

- 1-1 Commune Meeting 1
- 1-2 Demonstration Overview

- 1-3 Farmer Selection
- 1-4 Demo Farmer Selection
- 1-5 Demo Farmer Training
- 1-6 Field Day 1
- 1-7 Field Day 2
- 1-8 Field Day 3
- 1-9 Field Day 4
- 1-10 Farmer Feedback Meeting
- 1-10 Commune Meeting 2
- 1-11 Stakeholder List for Demonstration Phase
- 1-12 Demonstration Contributions

Each of the guidelines detail the numbers of demonstrations, sites, participating farmers and so on. There is flexibility in most of these parameters, for example:

- more sites per demo;
- larger farmer groups per demo;
- more field days (for the one group or additional groups); and
- more farmers per field day. High numbers means a lot of awareness but little targeted training.

Decisions on these will depend on some basic training and extension principles, and available budget in relation to the size of the target. Some of the Guidelines are necessarily general in nature e.g. Guideline on Farmer Selection, but they serve to give a framework to some of the processes, which, if defined too closely, would compromise the participatory approach of the project.

QNRDP should also consider additional activities, such as study tours for farmers to see sites related to inputs, production or outputs of the cattle finishing systems, or process-oriented sites such as farmer production groups and so forth. This activity may be conducted in the demonstration phase, or alternatively could be done later e.g. group phase, or could be an integral part of each phase.

The Extension Guidelines contains references to a range of documents and extension materials e.g. demo farmer contracts, record sheets, technical documents, flip-charts, leaflets, signboards, videos etc. that are yet to be produced.

3.2 Record and reporting sheets

The following record and report sheets are shown in the Annex 2:

- 2-1 Farmer Record Sheet
- 2-6 District Staff Report

A Farmer Record Sheet (to be used by the demo farmers and participating farmers) and a District Staff Report Guideline have been produced, since these are critical core documents related closely to how the demonstration is conducted.

The Farmer Record Sheet contains tables for farmers to record the key technical and economic parameters of the demonstration. In addition, it has a table showing the ingredients and cost of a

range of concentrate feeds that can be used for cattle finishing. It also includes the daily record sheet for cattle feeding and management, that is filled in by the Demo Farmer. The participating farmer does not need to fill this in, but should be aware that the Demo Farmer is doing so.

The District Staff Report consists of a summary written section containing details and comments on activities. There is an Annex containing tables for aggregated data which is useful for presenting results at meetings, and for quick reference. There is also a table for evaluating the performance of the three demo farmers, and a District Staff Time-Sheet. In addition, the original data sheets from each of the sites should be attached. These are the records used to enter into the Project Database.

3.3 Technical guidelines

The following technical guidelines are shown in the Annex 3:

- 3-1 Buying Cattle
- 3-3 Health Recommendations
- 3-5 Feeding Recommendations
- 3-9 Selling Cattle
- 3-10 Technical and Economic Targets
- 3-11 Evaluation Mechanism
- 3-12 Suggested applied research activities to strengthen/fine tune the technical recommendations
- 3-12 Suggested Data Collection in the Short Term
- 3-12 Potential second generation technologies

The Technical Guidelines are presented in summary table fashion. The information would need to be presented in different forms and fashions for farmer documents and leaflets, or presentation at field days and staff training courses.

4 Service providers for cattle finishing

The LSS is of the opinion that from a technical point of view the Extension Department (ED) could take on much of the responsibility for the cattle demonstration program, particularly since they are implementing similar activities in the World-Bank funded Agricultural Diversification Project (ADP). At the same time the LSS understands that given the early stage of the project, and the relatively small target area of the project at this stage, QNRDP wishes to minimise the possibility of demonstration failure rate by maintaining control as much as possible themselves. Given that the mandate of the project is to test a process of community consultation linked to income generation, with capacity building somewhat in the background, this is perfectly understandable and justifiable in the early stages. Despite this, the LSS recommends that the Extension Department should have as much responsibility, as possible, from the point of view of developing a sustainable system using local resources.

5 Pig finishing extension

Pig raising was mentioned as an area of interest for income generation by several groups during the PC/PS process. As a result the QNRDP is interested in conducting pig extension activities. Choice of extension topics for a demonstration approach may be broadly classified as:

- a) Pig Finishing Extension
- b) Sow Raising Extension

Sow raising extension activities in the lowland would tend to bias towards the better-off farmers due to the higher investment required, and perhaps for this and other reasons, the QNRDP has decided to concentrate on pig finishing extension in the short-term. The LSS agrees with this approach in the first instance but the two are obviously closely interlinked and so a combined approach may be required. The situation in the upland areas is likely to be different and, as noted above, will probably require separate consideration and a different strategy.

Pig finishing is already carried out extensively in the current target communes, but the LSS is unaware of any recent hard data relating pig ownership to wealth status. This information is critical when looking at how to design an extension program. However it is likely that farmers are already formed into several categories, as shown in Table 2.

Pig prices are good at the moment, and pig raising is quite a profitable enterprise if conducted well. However prices are notoriously cyclical. The effects of this on pig raising practices is not clear, as many farmers, particularly in Category 2 probably continue raising them whatever happens as they are a way of converting low value feeds into cash. i.e. a pig bank. Farmers in category 3 are possibly more effected by access to funds, and pig deaths than pig prices.

Table 2: Probable pig finishing categories

1	2	3	4
No pigs	2-3 finishing pigs only	6 or more finishing pigs with or without sow	Several sows, large number fatteners.
Very poor farmers. Either have never tried pig raising, or have maybe tried and not succeeded (e.g. pigs died)	Relatively poor farmers raising pigs on poor quality local rations (household waste, rice, rice bran, collected green feeds most of which is fed cooked), marketing high-fat pigs at 8-10 months of age. Probably poor health control (parasites, infectious diseases)	Relatively better off farmers, possibly using improved breeds, and some commercial feeds, but feeding is probably far less than optimal. Medium quality health control.	Piggery run on semi- or intensive lines. Feeding and health practices less than optimal.

Pig finishing extension models suiting farmers who wish to move from category 2 to 3, or those in category 3 already, are being implemented already in Quang Ngai through the ADP. However the QNRDP has a mandate to assist in a more targeted fashion those farmers at the lower and middle ends of category 2, and those in category 1 who wish to move up the production spectrum. At the same time of course, the QNRDP has a mandate to stop category 2 farmers from becoming poor.

In order to develop a pig finishing module, it is suggested that during the next input, the LSS:

- conducts field visits to project target farmers, and other farmers in upland and lowland for discussions on pig raising with farmers;
- meets with Extension Centre to discuss issues and visit Government Pig Station and sites of ADP demonstration implementation, and discuss other initiatives and experiences in the area; and
- meets with Veterinary sub-department to discuss specific pig issues.

In general, it is likely that pig health will play an important role in any pig extension activities, much more than in cattle.

In conclusion there are likely to be three pig modules:

- Suited to Category 2-3 farmers, similar to ADP;
- Suited to Category 1-2 farmers; and
- Suited to Upland Area.

Annex 1

Extension guidelines

Annex 1: Extension guidelines

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines Commune Meeting 1	
Objectives	Local authorities, technical staff, other relevant stakeholders are aware of the objective and activities that will take place in the commune.
Period/Location	Morning, Commune office
Materials	<ul style="list-style-type: none">• Project Overview flip-chart• Demonstration Overview flip-chart• Project leaflets/info docs
Schedule	Step 1: Introduce meeting, participants, objectives Step 2: Describe project, and demonstration objective and activities Step 3: Discussion, opinions, conclusions
Reporting	District Staff keep record of date/location/participants and comments/recommendations

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines Demonstration Overview	
Objective	Participant Farmers have the knowledge and skills to be able to fatten cattle for profit.
Activities Overview	<ul style="list-style-type: none"> a) Each demonstration has three sites b) Two cattle fattened at each site for period of two months. c) Demo farmer manages one site. Demo farmer who manages Site 1 is a lead demo farmer who should help support the other demo farmers. d) Site 1 begins first, Site 2 one week later, Site 3 one week later e) Four field days held at each site. f) Field Days 1-3 attended by group of 15 farmers. Field Day 1 introduction field day, discussing inputs (cattle, feed/resource analysis), roles and responsibilities. Field Day 1 at start of finishing, Field Day 2 one month later, Field Day 3 one month later at the end of the finishing. g) Farmer feedback meeting held with all farmers from the three demo groups to present and discuss the results from the three sites.
Demonstrations per Commune	The total number of demonstrations per commune or per year should be determined by the demand for the technology as expressed through the participatory process, demands on staff time and so on. It is not possible to give clear guidelines on this at this stage.
Period	Cattle: 2 months Pigs: 4 months
Time of Year	Provinces should aim to implement demonstrations at any time of the year, to demonstrate how finishing can be managed on an ongoing basis, and to demonstrate seasonal effects in inputs/outputs. Some specific opportunities exist e.g. finishing cattle for the Tet market; in such cases buying cattle just before Tet and selling after Tet may be less profitable than at other times. In any case discussion with farmer groups about their specific circumstances, as well as project-driven timetables will also play a part.
Approach of Staff	District Staff should act mostly as facilitators where possible. They should delegate responsibility for activities as much as possible to demo farmers and farmers. The district staff provide the framework for others to carry out the activities.

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines Farmer Selection	
Objective	Farmers who make up the target group of the project, and who have expressed an interest cattle raising through the Participatory Census/Solving Process, participate in the demos, and have the opportunity to be demo farmers.
Activities	a) Establish criteria and list of project target farmers in the target area b) Establish list of farmers known to have expressed interest in cattle raising during the PC/PS process; assess additional farmers who may be interested c) Assess numbers and decide on selection process if more farmers than can be accommodated. d) Demo farmers examine, understand and sign contract This is done in each of three demo sites, or together if demo sites are close enough together.
Location	Commune/village
Responsible Staff	District Staff
Period	The Demo farmers are selected as soon as possible after the provincial staff extension training has finished.
Selection Criteria	Farmers should discuss and approve the criteria, but here are project suggestions a) have experience with cattle raising b) have a suitable house for finishing cattle. The farmer needs to be able to feed each cattle separately in order to keep records of feed eaten by each cattle. c) Have good communication skills and be willing to communicate results to other farmers, during field days and at other times d) Willing to travel to demo farmer training course e) Be literate in Vietnamese, or in ethnic minority language
Responsibilities	The demo farmer must do the following by project guidelines and recommendations a) Attend Demo Farmer training course, and other meetings. b) Buy two cattle for finishing c) Decide which of the project concentrate rations to give to the cattle d) Supply one feed and one water bin for each cattle. Supply one feed and one water bin for the pigs. e) Ensure cattle always have access to feed and water f) Store, mix and give feed to cattle according to project recommendations g) Weigh all feeds given to cattle before giving to the cattle. h) Keep records as shown in the demo farmer record form i) Host three field days at the site. j) Sell the cattle at the end of the finishing period or ensure that cattle are valued accurately at the end of the finishing period if they are not sold. k) Visit other cattle/pig demonstrate sites to gain more experience in cattle/pig finishing. l) Assist district staff as requested m) Inform the district staff of any problems n) Communicate results freely to other farmers
Evaluation	District staff evaluate Demo Farmer performance and record in District Record Book.

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Demo Farmer Selection	
Objective	Contracts are signed with demo farmers with good capacity and communication skills
Activities	<ul style="list-style-type: none"> a) Distribute posters and information leaflets in villages, announcing meeting 1 b) Meeting 1: Describe program, demo farmer responsibilities and demo farmer selection process. Farmers can choose selection criteria c) Meeting 2: Farmers who wish to be demo farmers nominate themselves/by others and explain why they want to demo farmers (5 minutes). Farmers vote and select farmers. d) Demo farmers examine, understand and sign contract <p>This is done in each of three demo sites, or together if demo sites are close enough together.</p>
Location	Commune/village
Responsible Staff	District Staff
Period	The Demo farmers are selected as soon as possible after the provincial staff extension training has finished.
Selection Criteria	<p>Farmers should discuss and approve the criteria, but here are project suggestions</p> <ul style="list-style-type: none"> e) have experience with cattle raising f) have a suitable house for finishing cattle. The farmer needs to be able to feed each cattle separately in order to keep records of feed eaten by each cattle. g) Have good communication skills and be willing to communicate results to other farmers, during field days and at other times h) Willing to travel to demo farmer training course i) Be literate in Vietnamese, or in ethnic minority language
Responsibilities	<p>The demo farmer must do the following by project guidelines and recommendations</p> <ul style="list-style-type: none"> j) Attend Demo Farmer training course, and other meetings. k) Buy two cattle for finishing l) Decide which of the project concentrate rations to give to the cattle m) Supply one feed and one water bin for each cattle. Supply one feed and one water bin for the pigs. n) Ensure cattle always have access to feed and water o) Store, mix and give feed to cattle according to project recommendations p) Weigh all feeds given to cattle before giving to the cattle. q) Keep records as shown in the demo farmer record form r) Host three field days at the site. s) Sell the cattle at the end of the finishing period or ensure that cattle are valued accurately at the end of the finishing period if they are not sold. t) Visit other cattle/pig demonstrate sites to gain more experience in cattle/pig finishing. u) Assist district staff as requested v) Inform the district staff of any problems w) Communicate results freely to other farmers
Evaluation	District staff evaluate Demo Farmer performance and record in District Record Book.

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Demo Farmer Training	
Objective	Demo farmers understand the technical and extension guidelines of cattle finishing demonstration, and their role in the demonstration. Demo farmers and staff know the feeding and health plans for the cattle.
Activities	1 day training
Location	Commune
Responsible Staff	District Staff
Period	After demo farmer selection
Schedule	<p>Activity 1 Project Description Step 1: Describe Project Overview Step 2: Describe demonstration objectives, activities</p> <p>Activity 2: Describe Extension Guidelines Step 1: Describe Guidelines Step 2: Discuss (target farmers/gender/timing of field days/contact with district staff)</p> <p>Activity 3: Technical Guidelines Step 1: Describe Guidelines Step 2: Describe technical and economic targets Step 3: Exercises related to application of guidelines Step 4: Discuss feeding options and decide feeding plan outline (which concentrate, introduction phase feeding, full feeding, which roughage). Describe, discuss and organise coupon system. Step 5: Discuss health options and decide on health plan (medicines, service providers). Describe, discuss and decide on coupon system.</p> <p>Activity 4: Discussion and Decide Time table</p>
Records	District Staff keep meeting records and conclusions
Evaluation	Demo farmers complete evaluation form.

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Cattle Field Day 1	
Objectives	<p>In relation to the current demonstration, at the end of the Field Day the farmers will know</p> <ul style="list-style-type: none"> • the objective and schedule of the field day program • the estimated weight, meat yield of cattle being fattened • the feeding options (concentrate and roughage) and the feeding plan for the cattle at this demonstration • the health recommendations and cost • the economic plan for the cattle finishing <p>In terms of general skills and knowledge, the farmers will know</p> <ul style="list-style-type: none"> • how to do a budget plan for cattle finishing, including • how to estimate cattle weight, meat content and value • how to mix concentrate feed • how to introduce cattle to feed, and other feeding management • list feeding options and medicine recommendations • how to keep records for cattle finishing
Period/Location	Morning, at demo site at demo site at start of finishing period
Materials	<p>Flip-chart</p> <ul style="list-style-type: none"> • Demonstration Overview • General principles of finishing (cattle intake, Farmer Record Book, Farmer Technical Notes)
Activities	
Method	Content
Tell	Introduce, Register Participants, give Farmer Record Book to participating farmers
Tell	Give Outline of Whole Program, and Field Day 1
Tell	Describe Concept of Cattle Finishing
Present and Discuss	Technical and Economic Targets; Describe Case Studies of Cattle Finishing
Present and Discuss	Feeding Options (Concentrate and Roughage) , Medicine Options
Present and Discuss	Feeding Plan, Health Plan for this site and other sites in demonstration
Tell	Introduce Economic Plan
Group Activity	Examine Facilities and Equipment
Group Activity	Examine and weigh/measure cattle, meat content and value
Group Activity	Treat Cattle with medicines
Group Activity	Examine and describe feed components and cost (roughage and concentrate)
Group Activity	Mix, Give Feed to Cattle
Tell and Discuss	Describe feed introduction to cattle
Group Activity	Complete Economic Analysis Plan.
Present and Discuss	Demo Farmers from other sites present their plans for cattle finishing
Tell	Summary of Field Day 1 and Arrangements for next Field Day

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Cattle Field Day 2	
Objectives	<p>At the end of the Field Day 2 farmers will know</p> <ul style="list-style-type: none"> • the weight and value of the demo cattle, and the weight and value gained since the first field day • the feeding results for the cattle during the first month • the profit that would be made if the cattle were sold after one month of finishing. • any problems or issues faced by the demo farmer in cattle management • the next step in the program <p>The farmers will have practised their skills in</p> <ul style="list-style-type: none"> • cattle weight, meat, value estimation • budgeting and economic analysis
Period/Location	3 hours, at demo site, one month after finishing period begins
Materials For Participants	Farmer Record Book Farmer Technical Notes
Activities	
Method	Content
	Register Participants (project staff, demo farmers and demo farmers introduce themselves), give Farmer Record Book to participating farmers
Tell	Introduce Participants
Tell	Give Outline of Field Day 2
Present and Discuss	Economic Analysis Plan from Field Day 1
Group Activity	Examine facilities and equipment
Group Activity	Estimate Cattle Value (Weigh/measure cattle, estimate cattle meat content and value)
Group Activity	Examine Feed, Discuss Feeding Program (including introduction period) and examine Demo Farmer Feeding Records, Mix feed again.
Group Activity	Discuss and Calculate labour costs, water supply, and manure value
Group Activity	Complete Progress Economic Analysis
Group Activity	Discuss any problems/issues related to finishing program
Present and Discuss	Demo Farmers from other sites discuss progress in the cattle finishing
Group Activity	Summary of Field Day 2 and Arrangements for next Field Day

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Cattle Field Day 3	
Objectives	At the end of the Field Day farmers will know <ul style="list-style-type: none"> • the technical and economic results of the cattle feeding The farmers will have practised their skills in <ul style="list-style-type: none"> • cattle weight, meat, value estimation • budgeting and economic analysis
Period/Location	Morning, at end of cattle finishing, two months after start
Materials For Participants	Farmer Record Book Farmer Technical Notes
ACTIVITIES	
Method	Content
Tell	Introduce and Register Participants
Tell	Outline of Field Day 3
Present and Discuss	Economic Analysis Plan from Field Day 1 and Progress Economic Analysis from Field Day 2
Group Activity	Examine facilities and equipment
Group Activity	Estimate Cattle Value (Weigh/measure cattle using tape, estimate cattle meat content and value).
Group Activity	Examine Feed, Discuss Feeding Program (including introduction period) and examine Demo Farmer Feeding Records
Group Activity	Discuss and Calculate labour costs, water supply, and manure value
Group Activity	Discuss how to get the best price when selling cattle
Group Activity	Complete Economic Analysis Results
Group Activity	Discuss any problems/issues related to finishing program <ul style="list-style-type: none"> • cattle selection • feed selection (what other feeds can be used? What if the feed prices go up?) • Feeding level (what happens if you feed less to the cattle) • relationship between feed level and profit • cattle marketing • seasonal effects on cattle finishing any other issues
Present and Discuss	Demo Farmers from other sites discuss progress or results of the cattle finishing
Group Activity	Complete Farmer Uptake Survey Farmers Complete Evaluation Sheet
Tell	Summary and Schedule for Feedback Meeting

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Cattle Field Day 4 (optional if cattle are sold for meat)	
Objectives	At the end of the Field Day farmers will know <ul style="list-style-type: none"> • the technical and economic results of the cattle feeding • be able to relate retail price to farm-gate price and cattle condition
Period/Location	Early Morning, day after Field Day 3
Materials for Participants	Farmer Record Book Farmer Technical Notes
Activities	
Method	Content
Observe	Cattle are slaughtered
Group Activity	<ul style="list-style-type: none"> • Weigh and record all organs of the cattle according to protocol in the record book • calculate retail price • compare with farm-gate price • calculate formula for calculating farm-gate price
Group Activity	Complete Farmer Uptake Survey Farmers Complete Evaluation Sheet

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Farmer Feedback Meeting	
Objectives	Farmers who know the technical and economic results of all the cattle finishing sites, and understand the experiences, ideas and opinions of the various participants.
Period/Location	1 day. Commune
Participants	Farmers, demo farmers, local authorities, other stakeholders
Materials For Participants	Demo Results Summary Notebook, pen
Activities	
Method	Content
Tell	Introduce and Register Participants
Tell	Outline of Meeting (Objective, Schedule)
Present	Demo Site Description (location, time etc) Technical and Economic Analysis Plan from Demo Sites
Group Activity	Comments from Demo Farmers and General discussion, for example: Technical aspects <ul style="list-style-type: none"> • Cattle Selection • Feeding • Health • Marketing Economic Aspects <ul style="list-style-type: none"> • Comparison with other activities e.g. cattle breeding • Seasonal effects on input supplies and marketing • Can you fatten cattle in all seasons? Labour effect <ul style="list-style-type: none"> • Who is responsible for the various activities in the cattle finishing (husband, wife, children?) • How does cattle finishing affect other farm activities and other issues as they arise from the group.
Tell	Staff give outline of next step, Group Formation Phase
Group Activity	Present Certificates to Demo Farmers. Conclusions, recommendations
Reporting	District staff report meeting details and recommendations

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Commune Meeting 2	
Objectives	Project Staff, demo farmers, local authorities agree on next step into Group Formation Phase.
Period/Location	Morning/Commune office
Schedule	Step 1: Introduce meeting, participants, objectives Step 2: Step 3: Discussion, opinions, conclusions
Reporting	District Staff keep record of date/location/participants and comments/recommendations

Quang Ngai Rural Development Project Cattle Finishing Demonstration Extension Guidelines	
Stakeholder List for Demonstration Phase	
Core Participants	
District Staff	Oversees/ facilitates all activities Liases with local authorities/private sector Takes photos; Makes reports and records Organises database management
Activity Assistant	Attends all activities Assists demo farmers at three sites (record, cattle management), under contract; Makes records and reports
Demo Farmer	Attends 2 x selection meetings, 3 x field day meetings, and farmer feedback meeting Signs Demo Farmer Contract Provides Demo Farmer Contributions to the Demo. Includes cattle, house, feed bins, labour for cattle management, feeding, roughage, Attends Demo Farmer Training Course (1 day) Organises, assists at 3 x Field Days Attends Demo Farmer wrap-up meeting
Farmer	Attends 2 x selection meetings, 3 x field days at demo site, and farmer feedback meeting Receives <ul style="list-style-type: none"> • record book • technical book • project information leaflet/document
Other Participants	
Local authorities	Attend Commune opening and conclusion workshops Receives project info Gives opinion ideas on participation etc
Veterinary Workers	Deliver medicines (coupon system?, if so, record treatment on the coupon) Attend field days Receive reports
Feed agents	Sell feed (coupon system) May be able to attend meetings if possible Receive reports
Cattle Traders	Cattle traders can be invited to meetings
Slaughterhouse operators	Slaughterhouse Operators should be invited to meetings.
Credit Agencies	Attend meetings e.g. VBARD, Womens Union Receive Reports.

Quang Ngai Rural Development Project Cattle Finishing Demonstration			
Demonstration Contributions			
	Item List	Demo Farmer	QNRDP
Fixed Costs	Cattle Housing Cattle Feeding bins Small scales for weighing feed Weigh tape Feed storage bags/bins	Cattle Housing Cattle Feeding bins Feed storage bags/bins	Small scales for weighing feed Weigh tape
Variable Costs	Cattle Medicine/vaccines (routine/response)P-D Concentrate Feed Roughage Feed (C-D)	Cattle Med/Vacc D (coupon) Roughage Feed (C-D) Concentrate Feed (C-D)	Medicine/vaccines (P-coupon/observed at field day 1) Concentrate Feed (P-coupon)
Other Supplies	Contract Working Record Book Pen Technical Book Visitors Book Blackboard Signboard Demo Record Book (with photos of cattle etc) Certificate		Contract Working Record Book Pen Technical Book Visitors Book Blackboard Signboard Demo Record Book Certificate?
Cost			
Ownership post-demo	Blackboard remains property of project Signboard	Working Record Book Pen Technical Book Visitors Book Blackboard Signboard Demo Record Book Certificate	Blackboard Signboard

Annex 2

Recording and reporting documents

Annex 2: Recording and Reporting Documents

Quang Ngai Rural Development Project Cattle Finishing Demonstration

Farmer Record Sheet

1. Cattle Record Sheet					
Name					
Dia chi					
Demo Site	Name				
	Dia chi				
Cattle 1	Breed				
	Age				
	Sex				
	Condition				
	Field Day 1	Field Day 2	Field Day 3		
Date					days
VN					increase
DTC					increase
kg TLH					increase
% meat					increase
kg meat					increase
Value					increase
d/kg meat					increase
d/kg TLH					increase
TAT kg					total
TAX kg					total
Cattle 2	Breed				
	Age				
	Sex				
	Condition				
	Field Day 1	Field Day 2	Field Day 3		
Date					days
VN					increase
DTC					increase
kg TLH					increase
% meat					increase
kg meat					increase
Value					increase
d/kg meat					increase
d/kg TLH					increase
TAT kg					total
TAX kg					total

VN (m) x VN (m) x DTC (m) x 90 = kg TLH

2. Feed Rations						
	d/kg	1	2	3	4	5
Cassava						
Corn						
Molasses						
Peanut						
Soy						
Fishmeal						
Urea						
Bone Meal						
Salt						
TAT d/kg						
TAX				TAX d/kg		

3. Thuoc (name, dose , date, cost)		
1		
2		
3		
4		

4. Economic Analysis					
		Field Day 2		Field day 3	
		Cattle 1	Cattle 2	Cattle 1	Cattle 2
Cost = A	Buy cattle (d)				
	Medicine (d)				
	TAT (d)				
	TAX (d)				
	Total (d)				
Income = B	Sell Cattle (d)				
	Sell faeces (d)				
Profit 1 = B - A (d)					
Interest (d) = C					
Profit 2 = B-A-C (d)					
Labour (days)= D					
Profit 3 = (B-A-C)/D					

Quang Ngai Rural Development Project
Cattle Finishing Demonstration

**District Staff
Report**

District Staff Report

Province:

District:

Date:

Staff Name:

1. Introduction
2. Commune Meetings
3. Demo Farmer Selection
4. Demo Farmer Training
5. Demonstrations
6. Results
 - Technical
 - Economic
 - Participation
 - Uptake
7. Farmer Feedback Meeting
8. Good points of implementation
9. Weak points of Implementation
10. Conclusions and Recommendations

Table 1: Demo Farmer and Technical Results

Table 2: Economic Results

Table 3: Participation

Table 4: Concentrate and Roughage Feeds

Annex: Copies of 3 x (demo record sheets) from each district

Table 1: Demo Farmer and Technical Results						
	Site 1		Site 2		Site 3	
Farmer Name						
Commune						
Village						
Age						
Sex						
Ethnic						
Date start						
Date finish						
Cattle	1	2	3	4	5	6
Cattle breed						
Age						
Sex						
Cattle start (kg)						
TAT (kg)						
TAT No.						
TAX (kg)						
TAX No.						
Cattle finish (kg)						
W. Gain (kg)						
W.Gain (kg/day)						
FCE						

Table 2: Economic Results						
Cattle	1	2	3	4	5	6
Buy cattle (d)						
Medicine (d)						
TAT (d)						
TAX (d)						
Costs (d)						
Sell cattle (d)						
Sell faeces (d)						
Profit 1 (d)						
Interest (d)						
Profit 2 (d)						
Labour (days)						
Profit/day (d)						
Costs/kg w.gain (d)						

Table 3: Participation										
	Site 1			Site 2			Site 3			
	1	2	3	1	2	3	1	2	3	FFM
Kinh M										
Kinh F										
Ethnic M										
Ethnic F										

Table 4: Concentrate and Roughage									
Concentrate Types									
	1	2	3	4	5	6	7	8	
Cassava									
Corn									
Molasses									
Peanut									
Soy									
Fishmeal									
Urea									
Bone Meal									
Salt									
TAT d/kg									
Roughage Types									
	1	2	3	4	5				
Description									
Medicine Types Given at each Site									
Site 1									
Site 2									
Site 3									

Table 5: Demo Farmer Evaluation			
	Demo Farmer 1	Demo Farmer 2	Demo Farmer 3
Follows Recommendations			
Cattle House			
Buy Cattle			
Planning			
Introduce Feed			
Health			
Feeding			
Water			
Cleaning Pen			
Keeping Records			
Economic Analysis			
Knowledge and Skills			
Planning			
Buying cattle			
Estimating Weight			
Estimating Meat			
Estimating Value			
Selecting Concentrate			
Selecting Roughage			
Feeding			
Health			
Selling cattle			
Recording			
Economic Analysis			
Conclusion			
For all Questions: 3= good, 2 = average, 3 = poor			

7. District Staff Time Sheet								
Ngày		Activity	Ngày		Activity	Ngày		Activity
Thang			Thang			Thang		
	1			31			61	
	2			32			62	
	3			33			63	
	4			34			64	
	5			35			65	
	6			36			66	
	7			37			67	
	8			38			68	
	9			39			69	
	10			40			70	
	11			41			71	
	12			42			72	
	13			43			73	
	14			44			74	
	15			45			75	
	16			46			76	
	17			47			77	
	18			48			78	
	19			49			79	
	20			50			80	
	21			51			81	
	22			52			82	
	23			53			83	
	24			54			84	
	25			55			85	
	26			56			86	
	27			57			87	
	28			58			88	
	29			59			89	
	30			60			90	

Demonstration Site Records

District:

Commune:

Site:

1. Cattle Record Sheet					
Name					
Dia chi					
Demo Site	Name				
	Dia chi				
Cattle 1	Breed				
	Age				
	Sex				
	Condition				
	Field Day 1	Field Day 2	Field Day 3		
Date					days
VN					increase
DTC					increase
kg TLH					increase
% meat					increase
kg meat					increase
Value					increase
d/kg meat					increase
d/kg TLH					increase
TAT kg					total
TAX kg					total
Cattle 2	Breed				
	Age				
	Sex				
	Condition				
	Field Day 1	Field Day 2	Field Day 3		
Date					days
VN					increase
DTC					increase
kg TLH					increase
% meat					increase
kg meat					increase
Value					increase
d/kg meat					increase
d/kg TLH					increase
TAT kg					total
TAX kg					total

$$\text{VN (m)} \times \text{VN (m)} \times \text{DTC (m)} \times 90 = \text{kg TLH}$$

2. Feed Rations						
	d/kg	1	2	3	4	5
Cassava						
Corn						
Molasses						
Peanut						
Soy						
Fishmeal						
Urea						
Bone Meal						
Salt						
TAT d/kg						
TAX				TAX	d/kg	

3. Thuoc		
1		dong
2		dong
3		dong
4		dong

4. Economic Analysis					
		Field Day 2		Field day 3	
		Cattle 1	Cattle 2	Cattle 1	Cattle 2
Cost = A	Buy cattle (d)				
	Medicine (d)				
	TAT (d)				
	TAX (d)				
	Total (d)				
Income = B	Sell Cattle (d)				
	Sell faeces (d)				
Profit 1 = B - A (d)					
Interest (d) = C					
Profit 2 = B-A-C (d)					
Labour (days)= D					
Profit 3 = (B-A-C)/D					

6. Cattle Feed Records							
			Bo 1			Bo 2	
Ngày Thang	Ngày	TAT	TAX	Khac	TAT	TAX	Khac
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

			Bo 1			Bo 2	
Ngày Thang	Ngày	TAT	TAX	Khac	TAT	TAX	Khac
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						
	42						
	43						
	44						
	45						
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	59						
	60						

Annex 3

Technical guidelines

Annex 3: Technical guidelines

Buying Cattle	
Overview	<p>The ability to select and buy the right cattle in order to fatten cattle for profit is a function of understanding the range of factors which are described here. Practical experience is the best way to learn this, but it is important to have a good theory background when you start, and to give you a framework to use as you gain more experience.</p> <p>It is important to understand that the objective of cattle finishing is to make as much profit as possible from the available resources of the farmer. Farmers should remember that the purchase price of a cattle is about 80% of the costs of finishing cattle. This means that small change in purchase price can have a big effect on profitability.</p>
Breed	<p>Any breed can be fattened successfully - bo vang, lai sindh, lai zebu - taking into account all the other factors.</p> <p>On a technical basis:</p> <ul style="list-style-type: none"> • Breeds with large mature size (e.g. lai zebu) will grow more quickly than cattle with small mature size (bo vang), because they use feed more efficiently for growth. • An area which is not well researched but is worth bearing in mind is whether the local breeds are intrinsically better at digesting poor quality roughages than improved breeds, and therefore may be better able to utilise the even in finishing rations. • If imported genetic material has been selected on the basis of performance under high feeding conditions, then they will also tend to utilize the feed more efficiently for growth.
Sex	<p>Cattle of any sex can be fattened profitably if other factors are also adequate.</p> <ul style="list-style-type: none"> • Do not buy pregnant cattle for finishing. It is not always easy to know if an aged female is pregnant or not, as they have distended abdomens; of course it is more difficult the less pregnant they are. The buyer can look at the cow and ask the farmer. If the buyer is buying from a trader he will not know. • On a technical basis, bulls use feed more efficiently for growth than females.
Age	<p>Cattle of any age can be fattened successfully.</p> <p>On a technical basis</p> <ul style="list-style-type: none"> • Young growing cattle in good condition will use feed more efficiently for growth than older cattle in good condition
Condition	<ul style="list-style-type: none"> • Cattle that are skinny will grow better and use feed better than cattle that are in medium condition. Cattle in medium condition will grow better and use feed more efficiently than fat cattle. Do not buy fat cattle for finishing, unless they are young and still growing taller. • Cattle that are skinny exhibit compensatory growth which means that they convert feed to bodyweight gain very efficiently. Also they have a high potential for meat production which uses far less energy than fat production (although it needs more protein). • Cattle in medium or fat condition, produce more fat as a percentage of the weight gain. A lot of energy is needed to produce fat and it is a low price product, so this should be avoided • The farmer can shorten (e.g. 4-6 weeks) or lengthen the finishing period to suit the cattle that are being fattened.

Temperament	Cattle that are quiet, happy and have a good temperament will eat more feed, and grow better than cattle that are wild, stressed and unhappy. In general, do not buy cattle that look wild.
Health	<p>Cattle that are healthy will fatten much better than unhealthy cattle, which may not fatten at all.</p> <p>Cattle that look unhealthy may have a health problem that you cannot treat, or they may have a health problem that you can treat easily. It is not easy to know this, and there is always some risk in buying skinny cattle that look a bit unhealthy.</p> <ul style="list-style-type: none"> • Signs of health or ill-health are: <ul style="list-style-type: none"> - eating/not eating normally - bright and attentive/dull - breathing normally/not normally (e.g. coughing, breathing quickly) - normal faeces/diarrhoea - dry coat/shiny coat - walking normally/not normally - passing urine normally/not normally • An assessment of health will have to take into account all these factors. When you look at a cattle, you should take a few minutes to observe all these factors. • The most important is that the cattle looks bright and attentive and is eating, and walking around normally, and is breathing normally. • A dry coat is often a sign of intestinal worms, or poor nutrition. Most worms can be easily killed. • Diarrhoea may be caused by fresh green feed. If the faeces are black or dark-coloured, do not buy. • If the urine looks red or bad-coloured do not buy. • Always check the muscles in the rump. If you see signs of recent injection of medicine, for example blood spots, do not buy the cattle • Many technical staff in the provinces are convinced that Fasciola infection is a major problem, despite the fact that they have little or no evidence. In other words its importance is probably over-estimated although there may be areas of high infestation where it can be a problem.
Price	<p>It is very important that you do not pay more than the meat price for cattle, if you intend to fatten the cattle for sale for slaughter, and that you know the value of them when you sell them.</p> <p>To know what the meat price is of the cattle you have to be able to</p> <ul style="list-style-type: none"> • Estimate cattle liveweight. Do this by scales, weighing tape or experience. Most farmers do not have a lot of experience and most farmers do not have access to scales, so using a weighing tape is often the best. <ul style="list-style-type: none"> ➢ To use the tape: use a normal cm tape and measure the girth (VN) and the distance from shoulder point to pin-bone (DTC). Use the formula $VN (m) \times VN (m) \times DTC \times 90 = \text{kg liveweight (kg)}$ • Estimate meat content. For local breeds, these are some estimates. <ul style="list-style-type: none"> ➢ Very skinny cattle have 22-27% meat ➢ Skinny cattle 27-33% ➢ Medium cattle 33-38% ➢ Fat cattle 38-42% ➢ Improved breeds a little higher across each category. • Bulls will tend to have higher meat content than cows. • Estimate meat value: multiply meat content by price of first grade meat

	<p>(commonly 40-45,000 dong/kg). By this formula, farmgate price is approximately 75% of the retail value of the cattle.</p> <ul style="list-style-type: none"> • This is only a guide to liveweight, meat content and meat price. However it is an improvement on what appears to be the existing understanding of the farmers, which seems to be: <ul style="list-style-type: none"> - male cattle 40% meat - female cattle 33% meat • Selling and buying is always influenced by demand and supply on the day of purchase or sale. This is heavily influenced by the common farmer habit of selling cattle "when they need the money", so that buyers will look around for cheap cattle. The best the farmer can do when selling is to try to get some competition in the market, and be prepared to hold on to the cattle if the right price is not met. • In general, it is more likely that older cattle are traded at meat price while young cattle are traded at a "production price", which would be higher than meat price. However there are no doubt shifts between these markets.
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Health Recommendations	
General	<p>Key points of the health recommendations are:</p> <ul style="list-style-type: none"> • The general approach is to give a blanket recommendation for cattle treatment at the start of the finishing • Try to make farmers aware of health indicators, and general problems they can solve themselves, and when they need to call a vet technician. • Make sure that farmers know who and where the local vet is • Ensuring a good environment (clean pen, ventilation, not dusty, protection from hot and cold winds, low stress, plenty of good clean water) is an important part of health management
At start of finishing	<ul style="list-style-type: none"> • As a general recommendation, all cattle should be treated with medicine to remove intestinal parasites. The cheapest medicine, and seems the most easily available and commonly used, is levamisole. It is very cheap. This can be injected or given orally (the consultant has not yet checked if oral preparations are available in Quang Ngai or districts). Levamisole kills mature roundworms, but not immature. There is no hard evidence to indicate how many cattle that would be fattened have internal parasites, nor how many respond to treatment. However in the absence of hard data, it is recommended to proceed on the basis of observational experience, which suggests it is worthwhile. • Treatment with levamisole should cover most situations. Heavy infestations with Haemonchus for example would not be cured by levamisole but this is probably quite rare. Ivermectin-based medicines kill a larger range of parasites more efficiently (they kill immatures as well as ticks and blood-sucking lice), but it is more expensive and not generally available. • Fasciola medicine e.g. dovenex, fasciolid should not be used unless there is evidence of fasciola infection in the area from which the cattle were previously living. Fasciola disease is found in cattle living in lowland areas with access to swamps and ponds where the snail intermediate host lives. If the cattle came from upland areas, then there is little or no probability of fasciola infection. The danger of giving a blanket recommendation to use Fasciola medicine, "just to be safe" is not justified as this is the sort of thing that can lead to misinformation

	<p>throughout the farming and technical community. In addition, the most common fasciola medicines are large dosage and can be irritant and this can upset the cattle, which makes them stressed and less easy to handle (particularly bulls). The consultant would recommend some small-scale applied research to see what fasciola infestations are present (see below). Financially speaking, the decision to use or not use fasciola medicine is not a big issue. It is a case of confidence in cattle health, and their ability to convert feed to meat. Another overlaying issue is that available medicines e.g. Dovenex only kill adult, not immature flukes, and in areas with heavy infestation, a stronger medicine e.g. fasinex may be required but is not very much available.</p> <ul style="list-style-type: none"> • External parasites (ticks, lice, flies) should be killed if present outset with a simple treatment such as an organophosphate e.g. Neguvon. This is mixed with water and rubbed over the cattle. The consultant has not checked the availability of external parasiticides in Quang Ngai or districts. Ticks and lice are only occasionally present and the farmer should inspect the cattle closely when he buys them. • Vaccinations (e.g. Haemorrhagic Septicaemia (HS), Foot and Mouth Disease), are generally not recommended as being necessary for cattle at the start of finishing. This is because it would add extra cost and effort for the farmer and add to a risk of a reaction to the vaccine if administered poorly (e.g. bad temper and irritation of the cattle, temperature rise, muscle damage). The risk of getting these diseases is quite low given the short finishing period, and the restriction of the cattle from contact with other cattle. Older cattle have some immunity to HS and given the relatively high rates of vaccination in many areas, it is likely they would have been vaccinated one or more times in their life.
During finishing	<ul style="list-style-type: none"> • In general there should be few health problems during the finishing period, with good management.
Stress	<ul style="list-style-type: none"> • Avoid stress by quiet handling of the cattle; making sure cattle have enough room to turn around easily in the house; cattle are protected from sun, rain, cold or hot winds, and dust and noise; cattle always have access to feed and good clean water; floor is kept clean by cleaning faeces and urine away.
Infectious disease	<ul style="list-style-type: none"> • Infectious diseases (caused by bacteria, viruses), as outlined above are relatively unlikely to be a problem
Parasitic disease	<ul style="list-style-type: none"> • Parasitic problems should largely be removed with levamisole and external parasiticides, as outlined above. There is little information on coccidiosis, but this is generally a problem of yearling calves in heavy grazing situations. The consultant is unaware of any evidence of coccidiosis being a potential problem in finishing cattle.
Toxicity or feed problems	<ul style="list-style-type: none"> • Urea poisoning is a potential problem, but can generally be avoid with good management that most farmers seem capable of. Good management includes ensuring urea is part of a balanced concentrate with a highly rumen-fermentable carbohydrate source (cassava, corn, molasses); steady introduction to urea (few days); steady daily intake of a concentrate with maximum 3% urea; avoiding cattle eating wet feeds where urea may concentrate in the water. (see attached reference). • Aflatoxin poisoning in cattle being fattened with a concentrate containing peanut meal should generally not be a problem. The finishing is over a short period, and ruminants, especially older ruminants are not very susceptible to it. Peanut meal feeding would only ever be at 10% of the concentrate (5-7% of the diet) as a maximum so this also reduces the probability of such a problem occurring.

	<ul style="list-style-type: none"> • Carbohydrate overload should also not generally be a problem as long as the feed is introduced steadily and then fed steadily throughout with no major fluctuations. The risk of problems increases as the percentage of diet as concentrate increases. A safe percentage of concentrate is 70% of diet as dry matter (equivalent to about 1.9% of liveweight daily intake of concentrate). Increasing % concentrate to 80% is possible, but generally not recommended. • Do not change feed rapidly
Trauma	<ul style="list-style-type: none"> • Wounds to feet (e.g. cattle getting the foot stuck in something, and damaging or tearing the skin), to noses (e.g. skin damage from ropes while handling) should not generally lead to major problems if the wounds are cleaned with soapy water at an early stage. If significant swelling occurs, and the cattle stops eating or looks uncomfortable, then this may be an indication of infection entering the soft tissues and the bloodstream, in which case a local vet technician should be called.
Health indicators	<p>There are several health indicators that farmers can use, related to changes in normal bodily functions, such as:</p> <ul style="list-style-type: none"> • Skin condition (cattle should have a nice shiny coat within a week or so of the start of the finishing period - if not there may be a problem) • Eating (sudden decrease); • Breathing (increased breathing or coughing); • Passing faeces (e.g. becoming hard and dry, or diarrhoea). It is important to remember that faeces colour and consistency will change with a different, relatively low fibre diet. It will usually be more yellow, with high water content, and richer smell. • Nasal discharges. • With experience, farmers will get more experience in recognising normal and abnormal functions in the finishing cattle. • If any of these changes are extreme, and the cattle stops eating, the farmer should call the vet technician.

Feeding Recommendations	
Overview	<p>The feeding recommendations should be framed around the following concepts:</p> <ul style="list-style-type: none"> • The principle recommendation is that cattle must be fed as much as they can eat of a ration that is balanced for chemical constituents (protein/energy/minerals), as well as physical characteristics (fibre/concentrate) for healthy rumen function. • The ration for the cattle consists of a concentrate and a roughage • The concentrate is made up of a mixture of ingredients • There are many different ingredients and roughages available, (either on-farm or off-farm), at different prices/availability at different times of the year. • Farmers should be shown a wide range of different ingredients, roughages and concentrates that can be used to fatten cattle in different farming systems/seasons. However at the same time, we do not want to make the recommendations too complicated as this may reduce farmer understanding and uptake. • Quality of feed ingredient will vary and quality estimation will be largely visual by the farmer • Farmers will adapt feeding recommendations to suit their local management and we need to follow them up, collect as much data and information as possible and modify recommendations accordingly.

	<ul style="list-style-type: none"> • Feed costs represent only 20% of the costs of finishing so extension efforts expended on this issue, while obviously important, should be kept in perspective with extension efforts on cattle purchasing (80% of costs) and cattle marketing. • Recommendations should include: <ul style="list-style-type: none"> – ingredients, concentrate and roughage options to give the highest chance of finishing success – relative amounts of concentrate and roughage to feed – amount of concentrate to feed during an introductory phase and a full-feeding phase – daily practical feed management
<p>Concentrate Options</p>	<p>Table 1 shows a range of options based primarily on cassava or corn as energy sources, and soybean, peanut meal or fishmeal. Farmers should choose the cheapest/easiest/most available. Emphasis is on cassava due to its high availability in many areas. These are the current recommendation being used in the Agricultural Diversification Project, and seem to be getting widespread support from farmers. While molasses is included as a potential energy source, it is not yet easily available in many areas</p> <p>However there are specific issues in relation to this concentrate recommendation which may be addressed within the QNRDP. For example:</p> <ul style="list-style-type: none"> • Improved access to molasses through contract arrangement with sugar factory • Alternative source of calcium and phosphorus (limestone, dicalcium phosphate) • Addition of ammonium sulphate (in ration urea: ammonium sulphate of 6:1, i.e. 0.5% of the concentrate ration) to improve the utilisation of the urea, by supplying sulphur. This is not necessary in concentrates with a lot of molasses because molasses contains some sulphur.
<p>Roughage Options</p>	<p>The best available roughage should be used to feed the cattle. Roughage options include</p> <ul style="list-style-type: none"> • Best green feed available (e.g. elephant grass, sugar cane leaves) • Rice straw. Treatment of rice straw with urea at stacking time can increase the nitrogen content and digestibility of the straw, thereby improving the quality of the rice straw as a roughage. <p>Additional roughages can be considered e.g.</p> <ul style="list-style-type: none"> • Cassava peels which contain some cassava root and the fibrous outside layer (this is also a potential useful feed for breeding cattle) <p>Alternative protein sources e.g.</p> <ul style="list-style-type: none"> – Use of cassava leaf meal as a source of protein in the concentrate (collection of cassava leaf, drying and crushing into a meal) – Use of sweet potato leaf. These are commonly fed fresh, or cooked, to pigs, and thus have a commercial value. In general, if the fresh leaf cost is less than 1/25 th the price of the soybean/peanut meal/fishmeal price, then use of the fresh leaf may be considered. For example, fresh leaf is commonly sold for 200d/kg, and the protein sources 5-7000 d/kg. – These are interesting technical issues that may play some role in some areas, but it is not likely that they would make a big difference in profitability, given the labour involved and the low energy content of the leaves. Nevertheless worth looking at.

<p>Absolute and Relative amounts of concentrate and roughage</p>	<p>During the introductory phase (a few days to a week) of feeding, concentrate should be fed at about 1% of bodyweight per day, with free access to roughage for the balance of the feed (daily intake is about 2.5-3% of dry matter as bodyweight), depending largely on digestibility of the feed. After the introductory phase, the farmers can choose to feed at one of three different levels according to the degree of investment in skills, time, management, quality and availability of roughage, and capital that suits them.</p> <ul style="list-style-type: none"> - Low input feeding: keep feeding concentrate at around 1.7% of bodyweight, with balance as roughage. This is about a 60% concentrate/40% roughage ration. - Medium input feeding: keep feeding concentrate at around 2% of bodyweight, with balance as roughage. This is about a 70% concentrate/30% roughage ration. - High input feeding: keep feeding concentrate at around 2.2% of bodyweight, with balance as roughage. This is about a 80% concentrate/20% roughage ration. - For all input levels, the amount of concentrate steadily increases each day as the bodyweight of the cattle increases. As an example, a 200 kg cattle eating 2% concentrate (4kg/day), may gain 50kg of weight by the end of the feeding, so will be eating about 5kg/day by the end of the finishing period. Conversely, the amount of roughage will decrease each day, but this is not very noticeable. - In general, farmers should start at medium input level, gain experience and later aim to progress to high input level. As quality of roughage decreases, then a higher concentrate input level should be used.
<p>Daily practical feed management</p>	<p>Concentrate and roughage is usually given in separate bins - large permanent bin for free access to roughage and smaller or even non-permanent (e.g. metal dish) for concentrate. Water is in a separate bin. The daily concentrate ration is split into at least four meals to ensure most effective utilisation.</p>
<p>Concentrate prices</p>	<p>The cost of the concentrates as recommended will vary from about 1.700 to 2.200 d/kg under the prices of ingredients found in the different seasons in Central Vietnam, at prices ex-feed agent.</p>

Table 1: Concentrate Options: % of Ingredients			
Feed	1	2	3
Cassava	85	65	44
Corn	0	25	50
Protein Source	10	5	0
Urea	3	3	3
Salt	1	1	1
Bone meal	1	1	2
Total	100	100	100

Notes:

- a) Protein Source can be Fishmeal, peanut meal, or soybean meal
- b) Molasses can replace cassava on a 1:1 kg Dry Matter basis in cases where molasses is cheaper/more easily available than cassava
- c) Bone Meal should be increased to 2% of rations 1 and 2 if no fishmeal is included in the ration
- d) Choice between rations at demo sites should be based on price and availability. However all ration options should be described to farmers at field days and in technical and extension material. A range of rations should be used to demonstrate that different rations can be used
- e) Roughages should depend on price, quality and availability. Aim to use the best available, e.g. elephant grass. If only rice straw available, then also consider adding rice bran as 10-20 kg per 100 kg of concentrate and/or urea treating straw

Selling Cattle	
Overview	Just like buying cattle, the farmer must be able to accurately estimate the meat value of the cattle by estimating weight, meat content and meat prices. Of course, the farmer may be able to sell the cattle for more than the meat price which would be very good! In addition the farmer should try and get some competition into the market to get the best price for his cattle.
Weight and Meat gain	The farmer should understand that the majority of the liveweight gained by cattle during the finishing period is meat. Therefore the meat content (% of meat) of the cattle has increased during the finishing period, for example: <ul style="list-style-type: none"> - If a skinny 200 kg cattle with 25% meat (50kg) gains 50 kg of liveweight during finishing, it may have an extra 40kg or more of meat. Therefore when it is sold it has a liveweight of 250kg and 90kg of meat. It has a meat content of $90/250 = 36\%$. The meat content of weight gain will vary from cattle to cattle according to sex/breed/age/condition. Meat will be a higher percentage of weight gain in bulls/improved breeds/younger cattle/skinny cattle.
Liveweight prices	Farmers should understand that as meat content rises, so will liveweight price (dong/kg liveweight). In the above example, if the 200kg cattle was worth 2.000.000 dong at the start (40.000 d/kg meat), and 3.600.000 dong at the end of the finishing period, then the liveweight price (d/kg liveweight) is as follows: Start price (d/kg) = $2.000.000 \text{ d} / 200 \text{ kg} = 10.000 \text{ d/kg}$ Finish price (d/kg) = $3.600.000 \text{ d} / 250 \text{ kg} = 14.400 \text{ d/kg}$

Technical and Economic Targets	
Overview	There will inevitably be a large variation in the technical and economic performance of cattle being fattened under the range of conditions likely to occur when farmers uptake the technology. Already in the finishing demonstrations being supported by QNRD there is significant variation in conditions which are at least under some control and supervision by QNRDP staff. Nevertheless it is worthwhile to state some general targets for cattle finishing.
Weight Gain	Weight gains should be of the order of 0.5-1.0 kg per day. If a large range of cattle types are fattened under various feed conditions, but generally following the technical recommendations, then experience suggests that growth rates will average around 0.75 kg/day. Healthy bulls of good frame, skinny condition, large mature size breed will be at the top of this range (possibly higher). Old local breed females will tend to be at the bottom of the range, but some can also grow in the upper end of the scale.
Daily Feed Intake	This will be in the order of 2.5-3.0% of liveweight per day (Dry Matter), of the recommended concentrate/roughage mixture. A range of factors can affect daily intake, and the variation is well recorded in the QNRDP data collected at the demo sites.
Total Concentrate Intake	This will depend on the period of finishing and the input level (low, medium, or high). For example, given a two month finishing period, total concentrate intake will be of the order of <ul style="list-style-type: none"> • start liveweight x 1.1 for low input feeding • start liveweight x 1.3 for medium input feeding • start liveweight x 1.5 for high input feeding
Feed Conversion Efficiency	Given a concentrate/roughage mix of 70/30 on a dry matter basis, $FCE = (\text{total ration DM/kg of gain})$, would expect to be of an average around 8.
Costs	The breakdown of costs will be about: Cattle 80%, feed, 15-17%, interest 3%, medicine 1-3%. Average investment is for a two-cattle finishing system is likely to be of the order of 5 million dong, including feed and cattle and medicine. Cattle house costs, if need to be built, would be over and above this. Such a loan could be paid back at the end of the finishing, so only a short-term loan is required (VBARD defines a short-term loan as 1 year).
Profit/head	Over a broad range of situations during a farmer uptake phase with minimal support, profit will probably average about 600.000 dong/head. This is defined as "Profit 1" in the proposed economic analysis protocol shown in the farmer record sheet. There will be a very large range, all the way from a small loss to profits of over 1.000.000 dong per head. Profits should be higher with increasing external technical support, such as found during the demonstrations, and the range should be lower.
Return on Investment	Average return on investment will be of the order of 10% per month, with a large range reflecting the large range in profitability.

Evaluation Mechanism	
Overview	The most important evaluation of the demonstration is whether the farmers are interested in uptaking the technology. Nevertheless there should a system in place to help them evaluate it, that take into account technical, economic and social factors. The collection of accurate records is the basis of the technical and economic evaluation.
Records	The farmer record sheet shows the daily and monthly data that should be collected and recorded.
Technical	The technical parameters (changes in weight, meat content), feed intake and feed conversion should be compared with the targets.
Economic	The recommended system for economic evaluation is shown in the farmer record sheets. It shows a calculation of "three profits": Profit 1 = Income (cattle, faeces) - Costs (cattle, medicine, concentrate feed) Profit 2 = Profit 1 - interest costs on capital if borrowed Profit 3 (dong/labour day) = Profit 2 divided by estimated labour days
Cost per kg of weight gain	This is another useful economic indicator.
Social and other Effects	This is an umbrella term that refers to changes in family labour etc, and any side-effects within the social or farming system of the family unit.

Suggested applied research activities to strengthen/fine tune the technical recommendations	
Overview	There are many gaps in our current knowledge of many of the technical issues with which the cattle finishing deals. QNRDP cannot fill all these gaps but it is useful to highlight some of them. When referring to farmers it should always be remembered that we are dealing with at least three sub-populations: lowland poor/non-poor, and upland.
Buying/selling Cattle	Relationship between condition score and meat yield Develop conditioning scoring system for extension (i.e. pictures of cattle with condition score and meat yield) Effect of Meat quality and price Relationship between tape weight estimation and weight by scales Routine data collection on meat price Current farmer information channels on meat and cattle prices, and knowledge of cattle prices. Farmer cattle buying practices/marketing channels. Relationship between farm-gate and retail price
Health	Epidemiology of Fasciola (prevalence, intensity of infection).
Feeding	Use of Cassava leaf meal/sweet potato leaf as protein source Use of sulphur additive to improve utilisation of urea in cassava based diets

Suggested data collection in the Short Term	
Overview	There is a need to collect a range of baseline and ongoing data related to the farming system and livestock production in the communes. This will help to give a background to the cattle finishing, and help to identify the range of stakeholders.
Veterinary Medicine	Feed and veterinary medicine outlet database Available medicines and price (levamisole oral/injectable; ivermectin-based; fasciola medicines; external parasiticides)
Feed Agents	Feed outlet database Available feeds (cassava, corn, soybean, peanut meal, fishmeal, bone meal, limestone, dicalcium phosphate, salt, urea, molasses, commercial concentrates), and seasonal price indication.

Potential second generation technologies	
Overview	These are issues and technologies that may be of interest to farmers who have already uptaken cattle finishing, and relate to further changes within their farming system to take account of the new activity. These may be of interest during the Activity Phase (Step 4), or the Ongoing Activity Phase (Step 5), but may be introduced during earlier Steps if farmers are interested.

Technologies for Farmers	Changing of crop production (crop choice, management) in light of extra value that can be added by putting crop products through an efficient livestock system e.g. cattle finishing. Comparison of crops and forage plots (e.g. elephant grass) Improved management of existing elephant grass plots (fertiliser, harvesting practices). Biogas Semi-Intensive Pig Production
System Development	Development of Store Markets from breeding areas to finishing areas