



International
Specialised
Skills
Institute



Mobile Processing Systems for the Australian Livestock Industry



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The George Alexander Foundation/
ISS Institute Fellowship

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Executive Summary

Australian livestock producers and industry affiliates should recognise the potential benefits of multi-species mobile and/or modular abattoirs in the Australian livestock industry. Many regions, particularly those across northern Australia, are challenged by gaining access to local processing facilities. In many instances the closest facility can be over 2,000 kilometres from the farm gate. The lack of options and flexibility of marketing outlets is impeding the potential of rangeland meat products and is leading to direct depressed returns to rural and regional Australia.

These remote regions are challenged by isolation, climatic conditions and labour shortage, all of which have prevented the development or maintenance of a permanent processing infrastructure. As a result of the lack of consistent livestock supply for the operation of traditional permanent abattoir facilities, these permanent operations are not viable.

A Mobile and/or Modular Slaughter Unit (MSU/MOSU) has the potential of lower capital investment with flexibility in slaughter location and niche marketing avenues. They will expand market options in suitable regions and also assist local communities who currently cannot access locally produced fresh quality meat.

The fundamentals of the MSU include either a singular or series of trailers with both a slaughter and chilling section. Carcasses could either be transported to facilities that already exist or a central local processing system could be introduced. Hot boning techniques could also be considered to increase transport efficiencies and or reduce the extent of the processing facility requirements. Average throughput in similar systems examined in the USA was ten cattle in an eight-hour day with two labour units. The mobile system has the greatest flexibility in slaughter location and sourcing of livestock.

MOSUs would be based on container arrangement; that is semi-permanent with flexibility to move units on a more seasonal basis. Containers could connect with dedicated slaughter, processing and chilling sections. Although capital outlay would be expected to be greater, these units would have the distinct advantage of a higher throughput, with an estimated fifty cattle per eight-hour day.

There is also potential for both mobile and modular systems to work together, with a group of modular processing facilities to support them. The specific system and design of a unit is dependent on every individual circumstance.

The system could be used as a buffer for an introductory processing outlet in regions that are currently considering the introduction of suitable permanent processing plants. However, the greatest challenge with the concept is low throughput. This indicates the current challenges regarding the lack of processing capacity in the remote regions of Australia would remain.

Interested candidates must realise that the MSU/MOSU facility will simply be a marketing tool to provide alternative market avenues to those that are currently unavailable. They must therefore be willing to become vertically integrated and accept that the marketing and logistical management from the slaughtering process will be the major driver of MSU/MOSU system introduction.

Regulation in the USA has proven to be one of the greatest challenges for development, success and sustainability of MSU units. Government and industry need to work together to develop practical regulation to ensure industry best practice is carried out without impeding progress or development of MSU units in Australia.

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Abbreviations/Acronyms

CADA	Community Agricultural Development Association
CRC	Cooperative Research Centres
HACCAP	Hazard Analysis Critical Control Point
IGFC	Island Grown Farmers' Cooperative
ISS Institute	International Specialised Skills Institute Inc
MSU	Mobile Slaughter Units
MOSU	Modular Slaughter Units
NRMMC	Natural Resources Management Ministerial Council
PSMPC	Puget Sound Meat Producers Cooperative
SOP	Standard Operating Procedure
SSOP	Sanitation Standard Operating Procedure
USA	United States of America
USDA	United States Department of Agriculture
WA	Western Australia

Definitions

Design	<p>Design is problem setting and problem solving.</p> <p>Design is a fundamental economic and business tool. It is embedded in every aspect of commerce and industry and adds high value to any service or product—in business, government, education and training, and the community in general.</p> <p>Reference: 'Sustainable Policies for a Dynamic Future', Carolynne Bourne AM, ISS Institute 2007.</p>
Innovation	<p>Creating and meeting new needs with new technical and design styles. (New realities of lifestyle).</p> <p>Reference: 'Sustainable Policies for a Dynamic Future', Carolynne Bourne AM, ISS Institute 2007.</p>
Skill deficiency	<p>A skill deficiency is where a demand for labour has not been recognised and training is unavailable in Australian education institutions. This arises where skills are acquired on-the-job, gleaned from published material or from working and/or studying overseas.</p> <p>Reference: 'Directory of Opportunities. Specialised Courses with Italy. Part 1: Veneto Region', ISS Institute, 1991.</p> <p>There may be individuals or individual firms that have these capabilities. However, individuals in the main do not share their capabilities, but rather keep the intellectual property to themselves. Over time these individuals retire and pass away. Firms likewise come and go.</p>
Sustainability	<p>The ISS Institute follows the United Nations for Non-Governmental Organisations' definition on sustainability: "<i>Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs</i>".</p> <p>Reference: http://www.unngosustainability.org/CSD_Definitions%20SD.htm</p>

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Awarding Body – International Specialised Skills Institute (ISS Institute)

The International Specialised Skills Institute Inc is an independent, national organisation that for over two decades has worked with Australian governments, industry and education institutions to enable individuals to gain enhanced skills and experience in traditional trades, professions and leading-edge technologies.

At the heart of the ISS Institute are our Fellows. Under the **Overseas Applied Research Fellowship Program** the Fellows travel overseas. Upon their return, they are required to pass on what they have learnt by:

1. Preparing a detailed report for distribution to government departments, industry and educational institutions.
2. Recommending improvements to accredited educational courses.
3. Delivering training activities including workshops, conferences and forums.

Over 180 Australians have received Fellowships, across many industry sectors. In addition, recognised experts from overseas conduct training activities and events. To date, 22 leaders in their field have shared their expertise in Australia.

According to Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010':

Australia requires a highly skilled population to maintain and improve our economic position in the face of increasing global competition, and to have the skills to adapt to the introduction of new technology and rapid change.

International and Australian research indicates we need a deeper level of skills than currently exists in the Australian labour market to lift productivity. We need a workforce in which more people have skills, but also multiple and higher level skills and qualifications. Deepening skills across all occupations is crucial to achieving long-term productivity growth. It also reflects the recent trend for jobs to become more complex and the consequent increased demand for higher level skills. This trend is projected to continue regardless of whether we experience strong or weak economic growth in the future. Future environmental challenges will also create demand for more sustainability related skills across a range of industries and occupations.¹

In this context, the ISS Institute works with Fellows, industry and government to identify specific skills in Australia that require enhancing and are not available in accredited courses through Australian higher education institutions or other Registered Training Organisations. The Fellows' overseas experience sees them broadening and deepening their own professional practice, which they then share with their peers and representatives from industry and government upon their return. This is the focus of the ISS Institute's work..

For further information on our Fellows and our work see www.issinstitute.org.au.

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¹ Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010', pp. 1-2
http://www.skillsaustralia.gov.au/PDFs_RTFS/WWF_strategy.pdf

Acknowledgements

Fellowship Sponsor: The George Alexander Foundation

The George Alexander Foundation supports activities in the following two areas:

Education

- to help talented young people achieve their full potential in any endeavour
- to support programs designed to improve educational, employment and leadership opportunities for disadvantaged young people

Environment and Conservation

- to develop partnerships with communities, government and the private sector to prevent irreversible damage to the environment and to encourage the maintenance of biodiversity

Annabelle Coppin would like to thank the George Alexander Foundation for providing funding support for this Fellowship.

Supporters

Those involved in the development of the overseas program include:

- Carolynne Bourne, Paul Sumner, Ken Greenhill, ISS Institute
- Geoffrey Beere, Abattoir and Livestock Consultant, Meat & Livestock Australia
- Peter Dundon, Manager Livestock Services, Meat & Livestock Australia
- Blythe Calnan, Leading Hand, East Pilbara Cattle Company.

Those involved in the Fellowship submission include:

- Jane Bennett, Managing Director, Ashgrove Cheese
- Chris Whyhoon, Executive Officer, WA Farmers
- Peter Cooke, Managing Director, Agknowledge
- Peter Clack, Arthur Blewitt, AgriFood Skills Australia

Those people/organisations visited as part of the Fellowship investigations:

- Bruce Dunlop – Farmer, Engineer of Mobile Slaughter Units (MSUs) – Member of the Island Grown Farmers' Cooperative, Lopez Island, Washington State, USA
- Carrie Coineandubh, Jay Howard, and Dr Greg Sherman – Puget Sound Meat Producers Cooperative (PSMPC), Tacoma, Washington State, USA
- Alan and Doreen Nelson – Smokey Ridge Meats, Chewelah, Washington State, USA
- Dan O'Brien – Wild Idea Buffalo Company, Rapid City, South Dakota, USA
- Joel Huesby – Owner/CEO, Thundering Hooves Meat Processing, Walla Walla, Washington State, USA
- Dr Temple Grandin, Mark Deesing, and Dr Tom Noffsinger – Colorado State University, Fort Collins, Colorado, USA, Nebraska and Kansas districts

Organisations That May Benefit From the Findings of This Report

Government – Federal and State

- Department of Agriculture, Fisheries, Forestry
- Department of Regional Development and Lands, Western Australian Government
- Department of Agriculture and Food, Western Australian Government
- Department of Health Meat Safety Branch
- Local Councils

Acknowledgements

Industry/Industry Bodies

- Desert Knowledge Cooperative Research Centres (CRC)
- Natural Resources Management Ministerial Council (NRMMC)
- Meat & Livestock Australia
- Red Meat Advisory Council
- Australian Meat Industry Council
- National Farmers' Federation
- Western Australian Farmers Federation
- Pastoralists and Graziers Association of Western Australia
- Cattle Council of Australia
- Sheepmeat Council of Australia
- Australian Meat Industry Council
- Western Australian Meat Industry Authority
- WA Beef Council
- North Australia Beef Research Council
- Animal Health Australia
- Aus-Meat Limited
- Australian Lot Feeders' Association
- Australian Meat Processor Corporation

Education and Training

- State Training Board of Western Australia
- Primary Industry Training Company

Community

- Aboriginal organisations across the four jurisdictions (land trusts, corporations and land councils)
- Natural Resource Management boards
- Conservation groups

About the Fellow



Name: Annabelle Coppin

Employment

- Family partner of East Pilbara Cattle Company
- Owner of West Australian Beef and Livestock services.

Qualifications

- Certificate IV Agriculture, 2005
- Certificate IV Meat Marketing, 2008
- Australian Nuffield Farming Scholar, 2008
- Commercial Rotary license, 2009

Annabelle Coppin's vision has been developed from her genuine passion for rural and regional Australia, particularly within the agribusiness and production sector in northern Australia.

She grew up on a family cattle station in the Pilbara, Western Australia. She is now currently a part of that business whilst also working in the Middle East for the Australian livestock industry. She was educated first by her mother through school of the air and then attended boarding school in Perth and Cunderdin, Western Australia. Coppin then studied a broad range of topics in Australian food production and marketing, including an Australian Nuffield Farming Scholarship studying global agricultural trends and the future direction of the livestock export trade beyond the Australian farm gate.

Aims of the Fellowship Program

The aim of The George Alexander Foundation/ISS Institute Fellowship was to develop the skills and knowledge to examine strengths, weakness, opportunities, threats, and the logistics and risks of the MSU operation in regional and remote Australia with particular interest for northern WA (Western Australia).

This included:

1. Collect and calculate information to develop critical knowledge of the economics in operating a successful MSU in remote Australia.
2. Explore and report on the limitations and barriers of operating the MSU.
3. Experience and develop a sound understanding of the MSU in operation.
4. Develop a practical knowledge and understanding of the logistics, the operation, and the optimum animal handling techniques of a successful MSU, as it would be applied in remote Australia.
5. Explore the possibility of engineering an MSU multi-species animal slaughterhouse system.
6. Develop a marketing plan for products processed in the MSU in remote regions of Australia.

The current lack of these mobile facilities in remote regions of Australia meant that the most beneficial method of developing skills for this practice would be to visit a number of existing and successful MSUs in North America.

The Australian Context

Despite some previous trials and minimal kangaroo plants there are currently no mobile abattoirs operating in Australia approved for commercial sales. They did historically operate in selected parts of northern Australia and some exist today solely for on-farm services.

The Australian livestock industry positioned in remote regions of the country is currently challenged by isolation, climatic conditions and labour shortage, all of which prevent development of a permanent processing infrastructure. Permanent abattoir facilities have proven not to be a viable option over the past century. There are currently no official portable processing facilities available for the commercial livestock industry in these regions. The idea is certainly recognised by many across the industry as having potential; however, there is currently very little formal and specific information available on MSUs operating within Australia.

Researching and understanding the information covering operation, engineering, logistics, marketing, economics and regulations of a MSU will provide the necessary skills and knowledge to implement a best-practice system in Australia.

Without best-practice knowledge, understanding and experience, industry innovation and ventures, such as the MSU operating within Australia, will either never be developed or will fail simply due to the existing lack of skills and knowledge.

SWOT Analysis of MSU/MOSU Systems

Strengths

- The ability to process livestock in isolated regions of Australia.
- The ability for producers to vertically integrate their businesses.
- The capacity to avoid pressure from radical animal rights groups on live transport.
- The unit is able to move with the seasonal flow and supply of animals that are raised on natural pastures.

Weaknesses

- The lack of skills and knowledge on all aspects of operation on units in Australia.
- Units have to be adapted to suit harsh environmental conditions, such as long distances, gravel roads, extreme heat, high and low rainfall.
- The limitation of the lack of throughput of livestock processed through the unit.
- The lack of storage capacity in the unit, meaning extra capital outlay for chilling and boning storage.
- The large initial outlay of capital required to operate the unit.

Opportunities

- Provide a viable and economical option for producers in isolated regions of Australia to process animals locally.
- To supply communities with their own local and processed meat.
- To value-add to rangeland livestock such as beef, goat, sheep, camel, and/or kangaroo.
- Market the livestock as a grass-fed free-range product processed on farm.
- To control feral animal populations in the Australian rangelands.
- Provide employment opportunities in regional and remote areas of Australia.
- Provide flexibility of market opportunity for livestock in isolated regions of Australia.

- Will enable marketing of a product with a reduction in the carbon footprint.
- Economical in capital infrastructure, once initial development understood.
- Increase the viability and profitability of Australian livestock enterprises.
- Increase the quality of the meat product through the reduction of stress on livestock being transported to a processing facility.

Threats

- The unit not being financially viable.
- Australian Government regulations not approving the unit.
- Disease in livestock limiting the area where the unit could operate.
- Large processing companies in Australia directly competing with the unit.
- Lack of suitable labour and skills to operate the unit.
- Carbon reduction policies threatening all livestock production in Australia.

Identifying the Skills Deficiencies

Definition of Skills Deficiencies

As already established, a skill deficiency is where a demand for labour has not been recognised and where accredited courses are not available through Australian higher education institutions. This demand is met where skills and knowledge are acquired on-the-job, gleaned from published material, or from working and/or study overseas.

Identifying and Defining Skill Deficiencies

Understand the engineering layout required for a successful and efficient MSU system.

- Contact industry affiliates nationally and internationally who have had previous experience in the engineering design of MSUs. Record and investigate all their experiences and findings, and use these findings to formulate a practical action plan to operate a mobile slaughter plant in Australia.
- Appraise, compare and contrast MSUs that are currently operating throughout the world.
- Investigate and evaluate the elements of all the essential engineering characteristics of the MSU.
- Investigate and understand all engineering challenges still confronting these plants.
- Investigate and understand possible methods of counteracting these challenges.
- Investigate successful and innovative designs of these plants.

Action: develop a practical engineering plan for the MSU in remote Australia.

Explore the possibility of engineering the MSU multi-species animal slaughterhouse system, and experience and develop a sound understanding of the MSU in operation.

- Contact industry affiliates internationally who have had previous experience in operating MSUs. Investigate, record and analyse all their experiences and findings, and use this information to formulate a practical action plan to operate a mobile slaughter plant in Australia, capable of handling many different species of animals.
- Appraise, compare and contrast selected international MSUs that are currently operating as multi-species units.
- Investigate and evaluate the engineering designs and characteristics of the MSU designed for multi-species use.
- Identify the practical, logistical and economical challenges of a multi-species system.
- Contact industry affiliates nationally and internationally who have had previous experience in the physical operation of a MSU. Record and investigate all their experiences and findings, use these to formulate a practical action plan to operate a mobile slaughter plant in Australia.
- Work in and gain practical experience in the slaughterhouse whilst it is operating.
- Record all observations to enable a complete understanding of all strengths, weaknesses and opportunities of the selected slaughterhouses.

Action: formulate a practical action plan for the successful operation of a multi-species mobile slaughter plant in remote Australia.

Examine and fully understand all logistics of operating the MSU – prior, during and after the slaughter procedures.

- Contact industry affiliates internationally who have had previous experience in managing the logistics of operating the MSU. Record and investigate all their experiences and findings, and use these to formulate a practical action plan to successfully manage the logistics of a mobile slaughter plant in Australia.

Identifying the Skills Deficiencies

- Observe, experience, investigate and record all current logistical procedures of the successful working plants. Investigate all areas of the slaughter value chain:
 - pre-slaughter facilities
 - transportation to the slaughterhouse facility
 - stunning area
 - processing chain
 - storage of and handling of carcass
 - waste disposal
 - clean up and movement procedures.
- Meet with livestock handling specialists to observe and develop optimum skills in livestock handling of animals pre-slaughter. Discuss and understand the optimum handling facilities to complement existing techniques.

Action: develop a practical knowledge and understanding of the logistics, the operation, and the optimum animal handling techniques of a successful MSU in remote Australia.

Understand and evaluate the economics of a successful MSU.

- Contact industry affiliates nationally and internationally who have had previous experience with the economics of slaughterhouse operation. Record and investigate their experiences, findings and recommendations, and use this information to formulate a practical action plan to design and operate a mobile slaughter plant in Australia.
- Develop a workable MSU operation plan, including a costing and ongoing management that highlights:
 - capital investment required to develop and assemble a viable MSU.
 - capital investment necessary for a permanent processing infrastructure
 - ongoing operational expenses
 - management of maintenance, depreciation issues and costs
 - legislation and licensing requirements, such as health and safety, animal welfare, building regulations
 - marketing and promotion of the product.
- Investigate the critical challenges that must be addressed to enable the MSU to be economically viable.
- Investigate and identify various options for raising capital for this innovative project.

Outcome: develop measurable benchmarks for plant efficiency, production and viable economic returns.

To examine successful marketing pathways of products sold from the MSU.

- Investigate current marketing systems of successful operational slaughterhouses
- Apply the successful principles to a marketing plan for an Australian plant

Action: develop an implementable marketing plan for products processed in the MSU in remote Australia.

Examine the specific issues related to suitability of the MSU for use in the remote areas of Australia.

- Investigate the logistics and economics for a successful mobile plant that covers large distances and can succeed in challenging, and often hostile, environmental conditions.

Identifying the Skills Deficiencies

- Investigate and understand storage and processing logistics of the product after slaughter.
- Determine strategies for a constant supply of livestock for the operation within required specifications.

Action: explore and report on the limitations and barriers of operating a MSU in the remote regions of Australia.

Understand and examine the regulations and procedures required to operate the MSU:

- Contact industry affiliates nationally and internationally who have had previous experience regarding the regulations and procedures required for the operation of MSUs.
- Record, investigate and understand their experiences and findings, and use this knowledge to formulate a practical action plan to operate the MSU within these regulations and using these procedures in Australia.
- Compare Australian regulations and licensing procedures to selected countries where MSUs have been approved.
- Investigate their initial approval challenges and record all the relevant challenges in an Australian approval procedure.

Action: develop an action plan and ongoing procedures documentation for the MSU to be approved and effectively operate under all relevant Australian standards and regulations.

The International Experience

Destination: Island Grown Farmers' Cooperative MSU, Lopez Island

Location

Lopez Island Farm, Lopez Island, Washington State, USA

Contact

Bruce Dunlop – Farmer, Engineer of Mobile Slaughter Units (MSUs) – Member of the Island Grown Farmers' Cooperative (IGFC)

Objectives

The development and establishment of the MSU:

- Investigate the reasons why Bruce Dunlop designed and developed the MSU system.
- Investigate the particular circumstances of the Lopez Island region as a livestock region and why/how the co-operative was formed.
- Investigate other MSU units that have been constructed by Dunlop and where they are situated in the world.
- Investigate the future outlook for the MSU systems and why/how they will be a success into the future.

Economics:

- Investigate the capital investment and maintenance required to operate the MSU.
- Investigate the method of raising capital for the IGFC MSU.

Regulations:

- Investigate legislation and licensing requirements of the MSU.

Outcomes

The Development and Establishment of the MSU



Island Grown Farmers' Cooperative (IGFC) brand

The San Juan region in Washington State, near Seattle, is known for its beauty and close proximity to the city population. There has been a steadily increasing demand for smaller lifestyle blocks in this region for the semi-retired or weekenders from the city. The land is highly fertile, complemented with a climate to enable livestock production on reliable pastures for most of the year.

Despite this, the livelihood of the small- to mid-sized farms in this region is continually threatened by land values that are exacerbated by the real estate demand for smaller blocks, making the option of consolidation almost impossible.

It was, therefore, not an option for many farmers to produce a competitive commodity food product. Instead, there was an opportunity to add value and supply a niche, grass-fed market from paddock to plate for the increasing consumer population who are demanding a local, natural product where they feel connected to the farmer and history of their food product.

This product proved difficult to supply through the larger United States Department of Agriculture (USDA)-approved slaughterhouses processing animals in the region. The waiting lists were booked months in advance, there were high travel costs, plus there was a loss of control of product quality once the animal left the farm gate.

The International Experience

To counteract this supply challenge the community formed The IGFC, together with local donations and government grants, raised enough capital to build the first USDA-approved MSU in the region. The MSU was designed to lower processing costs, reduce stress on the livestock, lower the capital investment and to lower resistance from municipalities and neighbours towards slaughterhouses through a smaller environmental impact and the ability to move from farm to farm.

There are now at least seven MSU systems designed by Dunlop operating in North America.

Dunlop believes the MSU system is a success and will continue to grow stronger in his region. *"In fact it has only strengthened the industry as many livestock enterprises did not exist before this system was established. It has developed its own market and therefore given the opportunity for many small farmers in the district to run a small livestock enterprise"*.

It is debatable whether or not the units are fully self-sustainable. This is because the initial capital required to build them was raised through government and community grants. This is clearly not the priority in the establishment of the units in this particular district. The priority is community dynamic and sustainable farming systems that deliver on the philosophy of 'Feed the family, the neighbour, the community and then the world'.

Economics

Initial capital to establish the MSU was raised through government grants and private donations. The San Juan Island Food Co-op now leases this unit from the Local Land Trust, which raised this capital with the option to buy within ten years of establishment. Unit outlay was \$200,000 (grants and private donations), plus the purchase of processing equipment and infrastructure to comply with regulations \$600,000 (funded by the Co-op).

Regulations

- There is currently a full-time person in the Co-op dedicated to dealing with regulation, Hazard Analysis Critical Control Points (HACCP) and licensing.
- Regulations are not uniform between counties and states, resulting in requirements changing every time the unit is moved.
- There is currently no official federal process directly related to MSUs. These are currently under development and should be published in 2010. This development is aimed to make the process official and less complicated.

Destination: Island Grown Farmers' Cooperative MSU, Arlington

Location

Arlington, Washinton State, USA

Contact

Bruce Dunlop

Objectives

Operation and engineering logistics:

- Investigate and understand the basic and essential elements of the MSU layout.
- Investigate and understand all engineering challenges that the MSUs are still confronted with and the possibilities of counteracting these challenges.

The International Experience

- Record all observations to enable a complete understanding of all strengths, weaknesses and opportunities of the MSU.
- Gain practical experience of this slaughterhouse whilst it is operating.
- Examine and understand all logistics of operating the MSU prior, during and after the slaughter procedures.
- Observe, experience, investigate and record all current logistical procedures of the successful MSU. Investigate all areas of the slaughter chain:
 - pre-slaughter facilities and logistics to the slaughterhouse facility
 - stunning area
 - processing chain
 - storage of and handling of carcass
 - waste disposal
 - clean up and movement procedures.

Outcomes

Throughput

- Annually 2,000 animals (combination of cattle, sheep, goats, pigs)
- Daily six to eight beef (maximum 11 head, approximately one beast per hour, based on eight hours due to USDA inspector allocation with two butchers), or 25 Lamb (maximum 36), or 15 Pigs (maximum 20), or a combination of the above.

Owned by: The Local Land Trust of the San Juan Region

Operated by: The IGFC (the MSU was manufactured in 2001)



MSU processing truck

Throughput Breakdown

<i>Animal</i>	<i>Slaughter Fee – \$ (US) Per head</i>
Sheep	37
Pigs	48
Beef	100

Construction

The construction consists of a 40-foot trailer, split into three sections:

- Section 1. Front – mechanical storage
- Section 2. Middle – hanging, storage and chilling
- Section 3. Back – processing

Strengths and Weaknesses of Operation and Engineering Logistics

- The height of this unit allows greater maneuverability; however, the unit height means large carcasses need to be quartered.
- There is a lack of water storage on the unit (one x 250 litre tank) and current regulations do not allow the unit to use on-farm water.

Pre-slaughter Facilities and Logistics to the Slaughterhouse Facility

- The unit travels to approximately 40 farms in a 150-kilometer radius in the San Juan district on a consistent monthly schedule.
- The IGFC must have \$450.00 worth of slaughter fees confirmed before they travel to a property. Some farmers transport small amounts of livestock to an agreed, centralised farm in their district to meet this benchmark.
- The USDA must examine the animals for a pre-mortem inspection before stunning.



USDA inspection pre-mortem



Typical approved stunning area

Stunning Area

- Outside, at the back of the trailer. The animal is stunned and bled before being moved into the first section of the trailer for processing.
- The Livestock must be retained in an area that allows for humane slaughter practice and then to fall onto a clear hygienic area.
- Areas vary from a concrete pad with a specialised restraining box, to a portable yard or a trailer for retaining the animals and a temporary mat on the ground.

Carcass Processing

- Carcass is moved or winched into the first section of the trailer.
- They are thoroughly washed, then placed on their back on a cradle.
- Head, feet and hide are removed.
- Carcass is winched from cradle and hung for gutting.
- Organs and head are then inspected by the USDA.
- By-products (offal, hide, legs) are removed from the unit through a door in the corner to a waste area outside.
- Carcass is halved and trimmed for inspection.
- Carcass is washed with water and sprayed with a vinegar solution.



Carcass is thoroughly washed

Then the carcass is placed on its back, on a cradle

By products (offal, hide, legs) are removed from unit

Storage of Carcass

- Halves (or quarters, if required) are pushed into the cooler.
- The carcasses must cool to below four degrees Celsius within 24 hours.
- Carcasses are delivered to the USDA inspection processing facility. They could instead be transferred into another transport facility.



Carcasses ready for transport to the processing facilities



Many districts (but not all) allow farms to compost the materials on site; there was no odour issue

Waste Disposal

- By-product procedures depend on individual state and or county regulations.
- Many districts (but not all) allow farms to compost the materials on site.
- Other regulations require waste to put in watertight containers, and often to be separated and returned to an official facility for disposal and rendering.

The International Experience

Clean Up and Movement Procedures

- The stunning area and Section 1 of the unit are cleaned down after each animal and or species.
- All areas are cleaned down at the end of the day.
- The unit is usually moved within a 30–60 minute period after the last animal is processed.

Destination: IGFC Processing Center

Location

Bow, Washington State, USA

Contact

Bruce Dunlop

Objectives

Marketing:

- Investigate processes, marketing and promotion of the product from the MSU.
- Investigate the storage and processing logistics of the product after slaughter at the MSU.
- Determine the specific strategies for a constant supply of livestock for this operation.

Outcomes

The IGFC operates its own cut and wrap activity, in a leased facility. Other groups with MSUs partner with existing cut and wrap businesses.

At the plant, the MSU hooks up to a rail system to offload the carcasses into the plant's cooler. They will then be hung for aging, and later custom processed into packages of meat, ready for retail sale.

Currently there are five full-time staff working within the IGFC, either at the MSU or in this facility. The facility is leased, and the equipment is owned by the IGFC.

Members of the IGFC are able to sell their meat through the small store on site; however, it is still their responsibility to arrange these sales. A vast majority of the meat is only processed ready to be picked up by farmers, who then market their meat individually.

The meat is frozen instantly. This allows clients to store meat at certain times of the season, to cover the times when their livestock are not suitable for sale. The most common outlets used by members for selling their meat is through farmers markets, word of mouth and Internet sales.



The IGFC Processing Center



Sample of a branded product from an IGFC member
Bruce Lopez

The International Experience

Throughput Breakdown

<u>Animal</u>	<u>Processing Fee (Cut & Wrap) – \$ (US) Per Kg</u>
Sheep	2.21
Pigs	1.43
Beef	1.66

Destination: Puget Sound Meat Producers Cooperative (PSMPC)

Location

Tacoma, Washington State, USA

Contacts

- Carrie Coineandubh, PSMPC Operations Manager
- Jay Howard, Treasurer of the PSMPC
- Dr Greg Sherman, USDA inspector

Objectives

The development and establishment of the MSU:

- Investigate the reasons this organisation developed an MSU system.
- Investigate the future outlook for the MSU systems and whether they will be a success into the future.

Operation and engineering logistics:

- Investigate basic operating procedures.
- Investigate and evaluate the elements of all the essential engineering characteristics of this particular MSU.
- Investigate and understand all engineering challenges that the MSUs are still are confronted with and the possibilities of counteracting these challenges.
- Gain practical experience of this slaughterhouse whilst it is operating.
- Record all observations to enable a complete understanding of all strengths, weaknesses and opportunities of the MSU.
- Examine and understand all logistics of operating the MSU prior, during and after the slaughter procedures.
- Observe, experience, investigate and record all current logistical procedures of a successful MSU. Investigate all areas of the slaughter chain:
 - pre-slaughter facilities and logistics to the slaughterhouse facility
 - stunning area
 - processing chain
 - storage and handling of carcass
 - waste disposal
 - clean up and movement procedures.

Marketing:

- Investigate marketing and promotion of the product from the MSU.
- Investigate the storage and processing logistics of the product after slaughter this MSU has in place.
- Determine the particular strategies for a constant supply of livestock for the operation.

The International Experience

Regulations:

- Investigate legislation and licensing requirements of the MSU.

Economics:

- Investigate the capital investment required to assemble the MSU.
- Investigate the method of raising capital for this MSU.
- Investigate maintenance and depreciation expenses.

Outcomes

The Development and Establishment of the MSU

The Puget Sound meat producers were faced with a similar situation to the San Juan region. They had a critical need for a local USDA meat processing facility to enable the survival of the small- and mid-sized farms by adding value to their livestock and meeting the increasing demand for local, grass-fed produced meat products that could be traced from paddock to plate.

In 2008 the non-profit PSMPC was formed (mainly by local farmers, butchers, and restaurant owners) to service approximately nine counties in the Tacoma region, near Seattle, Washington State.

The Pierce Conservation District funded the venture through a development grant. By August 2009 the cooperative had its 45-foot MSU approved under USDA specification and began processing. The cooperative leases the unit from the Pierce Conservation District with the opportunity to purchase in a ten year time period.

At the time of the Fellow's visit and subsequent inspection this unit was only on its 24th day of operation.

Owned by: Pierce Conservation District

Operated by: PSMPC

Throughput Breakdown



Tacoma MSU

The unit is able to process many different species, and at the time of inspection had processed cattle, sheep, goats and pigs. Daily throughput, based on an eight-hour day, (this is the maximum time allocated by the USDA inspection service) is either:

- 30 sheep
- 20 Pigs
- 10 cattle

or a combination of the three.

Layout

Consists of a 45-foot trailer, divided into three sections:

- Section 1. Front – mechanical storage
- Section 2. Middle – hanging, storage and chilling
- Section 3. Back – processing

The International Experience

This unit was designed and built by the same organisation in the San Juan district. It operates in a very similar fashion to the description of that above.

The Engineering Design and Characteristics

A range of species can be processed in this unit. The limitations and factors to consider included:

- Appropriate facilities to handle particular species before transport
- Height of the trailer (for hanging logistics)
- Meeting requirements of slaughtering with many different species in the same unit.

Pre-slaughter Facilities

Animals are required to be retained in a small holding area for stunning. This was a small pen for sheep, goats and pigs with a washable cement pad; and a crush on a washable cement pad for cattle.

Animals are processed on an individual basis:

1. Inspected by the USDA.
2. Stunned and bled on a clean, washable cement pad.
3. Hoisted by a winch through the back door of the unit.



Lamb being hoisted through the back door of the unit.



Lamb being processed

Section 1. Processing Section

Animals are skinned, gutted, USDA inspected, halved and quartered (if required) and washed. Small animals are hung during this process, but cattle are placed on a cradle on the floor for the skinning process. The carcass is then transferred on a rail to the middle section for cooling

Section 2. Middle Section

The cooler component is set at zero degrees Celsius. Carcasses are stored in this trailer until they are delivered to the processing unit or transferred to a refrigerated truck.

Waste Disposal

Most counties in this region demand that all carcass by-products are to stay on the property. The offal, blood, skins and skulls are composted and then spread back on the pastures.

Other counties, however, require this waste to be taken to an official incinerator and therefore it has to be stored within the unit for later disposal.



MSU being cleaned after use

Clean Up and Movement Procedures

The unit and surrounding area is able to be cleaned and ready for movement within 30 minutes.

The Engineering Challenges and Ways of Counter-acting these Challenges

The unit is still in the initial stages of development and facing some engineering challenges that will have to be corrected. These include:

- Winches needed to be replaced.
- Chiller walls need to be thicker to address condensation issues.
- Extension for hoisting animals in trailer needed to be longer.
- Acid wash parts needed replacing.
- Unit has frozen over on cold mornings.
- More cooler fans need to be added to the freezer unit.

Marketing

Members of PSMPC are responsible for marketing their own product. This occurs via their own butcher shops, home delivery and/or Internet sales. PSMPC is strictly to serve as a processing service.

Regulations

- There is currently a full-time person at PSMPC dedicated to dealing with regulation, HACCP and licensing.
- Regulations are not uniform between counties and states; requirements change every time the unit is moved.
- There is currently no official federal process directly related to MSUs. This is currently under development and should be published in 2010 with the aim of making the process more clear.

Economics

The initial capital outlay for the unit of approximately US\$230,000 was provided through a government grant. A further US\$100,000 was required from PSMPC to equip the unit. PSMPC provides the processing service to members at a non-profit rate.

Approximate slaughter fees per head:

- \$100.00 for cattle
- \$50 for pigs and sheep

This price includes transporting them to the processing facility. There is an additional processing fee per kilogram charged for carcass weight. This ranges from 25 to 50 cents per kilogram depending on the species and particular animal requirements.

Destination: Smokey Ridge Meats

Location

Chewelah, Washington State

Contact

Alan and Doreen Nelson, Owners

Objectives

The development and establishment of the MSU:

- Investigate the reasons why and how Smokey Ridge became a part of the MSU system.
- Investigate the particular circumstances of the Chewelah region for livestock and why and how the Smokey Ridge Meats company was formed.
- Investigate the future outlook for the MSU systems and whether or not they will be a success into the future.

Operation and engineering logistics:

- Investigate and understand the basic and essential elements of the MSU layout.
- Investigate and understand all the engineering challenges that MSUs are still confronted with and the possibilities of counteracting these challenges.
- Record all observations to enable a complete understanding of all strengths, weaknesses and opportunities of the MSU.

Marketing:

- Investigate processes, marketing and promotion of the product from the MSU.
- Investigate the storage and processing logistics of the product after slaughter implemented by this MSU.

Outcomes

The Development and Establishment of the MSU

Members of the Chewelah district and local farmers were concerned with the lack of access to slaughterhouses in their community and the resultant threat of their livestock industry depleting due to low returns.

The Community Agricultural Development Association (CADA) was successful in applying for and receiving a government grant to support the capital outlay of the unit.

The unit now permanently operates at the Smokey Ridge Meats processing facility in Chewelah. It still has the capacity to move to other locations in the district; however, logistics and regulations currently inhibit this process.

Smokey Ridge Meats is a privately owned meat processing and marketing outlet. It is HACCP approved and cuts, wraps, chills, freezes, cures and smokes meat. It has steadily grown over the years and is now a successful small business enterprise.

Operation and Engineering Logistics

- This unit consists of two modules: transport and processing.
- The transport module is a refrigerated body truck that joins and pulls the processing trailer.

The International Experience

- The unit is not operated in peak winter months as it freezes over due to extreme conditions.
- The freezer unit is driven a small distance to the processing room where the carcasses are unloaded in the Smokey Ridge Meats processing facility.



The transport module is a refrigerated body truck that joins and pulls the processing trailer.

Smokey Ridge Meat Shop

Marketing

All livestock slaughtered through the unit are processed and value added at Smokey Ridge Meats. Customers specify their processing requirements and needs.

Some of this product is sold through their marketing outlet, and others marketed by the individual customers. Smokey Ridge Meats have their own brand name and labeling system.

A large component of the Smokey Ridge Meats value-adding activities is smoking meat. It is sold through the shop and through local shows and farmers markets.

SWOT Analysis

Puget Sound Meat Producers Cooperative (PSMPC), Tacoma; Smokey Ridge Meats, Chewelah; and San Juan.

Strengths

- The unit allows local farmers to add value to their livestock through complete control of the supply chain.
- The community can be supplied a quality product that is produced and processed by local farmers.
- Raising livestock in a small- to mid-sized operation is now an option.
- Livestock production in the region now exists due to opportunities that the unit has created. These opportunities simply would not have existed before the implementation of this unit.
- An increase in livestock in the region has reduced the risk of fires and increased environmental improvement.
- There is little to no sign of E. coli pathogens in the units. This is related to small throughput and healthy, unstressed animals.
- Many regions are able to compost and fertilise land with by-products/waste.
- There is a growing demand for low impact, natural grass-fed products that have been delivered from paddock to plate.

The International Experience

Weaknesses

- It is difficult to source full-time, dedicated and skilled staff in the meat processing sector.
- Low throughput capacity may limit economic production viability.
- The initial capital required to produce the units was raised through government and community grants.
- The systems may not be able to survive without subsidy support.

Opportunities

- The units are a benefit to community dynamics.
- These benefits increase the opportunity of grants to assist in funding the units.
- The official federal regulation process for MSUs is currently in the planning and development stage. This is aimed at making the process clearer and to suit the particular requirements of mobile units.
- The unique supply chain enables a point of difference for products in the market.
- The locally produced and processed product could prove to have a lower carbon footprint for future marketing.

Threats

- The large amounts of capital outlay needed by operators for the equipment, making the units no longer economically viable.
- Strengthened and perhaps more stringent regulations making the units no longer economically viable.
- Low throughput and efficiencies making the units no longer economically viable.

Destination: Wild Idea Buffalo Company

Location

Rapid City, South Dakota

Contact

Dan O'Brien, Owner

Objectives

The development and establishment of the MSU:

- Investigate the reasons why O'Brien developed an MSU system for the Wild Idea Buffalo Company.
- Investigate the future outlook for the MSU systems and whether or not they will be a success into the future.
- Investigate how the MSU system interacts with the local indigenous community.

Operation and engineering logistics:

- Investigate and understand all engineering challenges associated with the MSU and the environmental conditions of South Dakota.
- Record all observations to enable a complete understanding of all strengths, weaknesses and opportunities of the MSU.

Outcomes

The Development and Establishment of the MSU

The Wild Idea Buffalo Company is based in South Dakota. Indigenous Americans are involved in the introduction of large-scale buffalo herds, with the commitment of restoration to grasslands on the northern Great Plains. The core of the Wild Idea Buffalo Company is sustainable ranching and it now uses the MSU to assist in its meat marketing process.

"The natural instincts of buffalo make them challenging to handle and process in traditional systems such as corrals and slaughter plants. Many indigenous Americans do not have the capital to build handling equipment and so field harvest is a good alternative. It is also more in keeping with their traditional relationship with buffalo." —Dan O'Brien 2010, as stated during the Fellow's visit to the Wild Idea Buffalo Company and interview with O'Brien.

O'Brien believes that the MSUs are a success for the company and is planning to expand his operation in the future. He advocates:

"...that it is a concept that could not work within the modern, industrial model of agriculture. This is for people who care about the animals, where their food comes from, and doing the right thing. It will never catch on with those interested only in the bottom line. The key is the tie-in with traditional beliefs in treatment of the animals and with a desire to have truly healthy food and once markets with those values develop it certainly would work in Outback Australia." —Dan O'Brien 2010

Operation and Engineering Logistics

South Dakota has similar environmental extremes to that of isolated regions in Australia. They both deal with isolation, rough roads and long distances, with South Dakota's extreme cold being more of an issue than the extreme heat in Australia. O'Brien stated that he would thicken walls, install larger tyres and design a stronger chassis to combat these issues if they were to redesign the unit.

Destination: Thundering Hooves Meat Processing



Location

Walla Walla, Washington State, USA

Contact

Joel Huesby (left), Owner, Designer, Builder, Operator and CEO

Objectives

The development and establishment of the MSU:

- Investigate the reasons why Thundering Hooves designed and developed the MSU system.
- Investigate the particular circumstances of the Thundering Hooves farm and how the MSU system works within it.
- Investigate the future outlook for the MSU systems and whether or not they will be a success into the future.

Operations and engineering logistics:

- Investigate and understand the basic and essential elements of the MSU layout.
- Record all observations to enable a complete understanding of all strengths, weaknesses and opportunities of the MSU/MOSU.

Economics:

- Investigate the method of raising capital for the Thundering Hooves unit.
- Investigate the methods used to make the enterprise profitable.

Regulations:

- Investigate legislation and licensing requirements of the MSU/MOSU supply chain.

Marketing:

- Investigate processes, marketing and promotion of the product from the MSU.
- Investigate the storage and processing logistics of the product after slaughter from this MSU.
- Determine their particular strategies for a constant supply of livestock for the operation.

Outcomes

The Development and Establishment of the MSU

Thundering Hooves is a family owned and operated farming business in the Walla Walla district of Washington State. The business began to market their farm meat products in the early 1990s. In order to gain full control of the supply chain they constructed and funded their own USDA-approved mobile abattoir, which was completed in 2007.

Animals including cattle, sheep, pigs, turkeys and chickens are slaughtered on the farm. They are then transported to their own processing facility and sale outlet in Walla Walla.

Carcasses are unloaded, trimmed, aged and value added for sale. The meat is sold through the shop in town and through Internet orders (predominately from the Seattle district).

The on farm slaughter unit secures control of their product integrity and reduces the need to rely on a third party to process and deliver their product. They are able to have complete control of product quality and processing. This also gives them a point of difference in the market place.

The Huesby family is planning to rapidly expand the business operations of Thundering Hooves. They believe that the system complements the increasing demands of their target market. They have the economic status and lifestyle to be able to demand and develop an interest in knowing where and how their food is grown and processed. The emphasis on local, organic, natural grass-fed, humanely raised products is usually linked to this demand.

Their product has a point of difference in the market and is able to be sold at a premium in the market place. This does not abolish the need for efficiency and the uptake of new marketing and value-adding techniques. Their current MSU is a success but will need to be altered in the near future to increase efficiency and throughput.

One of the recognised weaknesses of the existing unit is that of seasonality. Their latest thinking is that greater profitability can be realised by shutting down the unit in the 'off-season', in the same way that expensive capital items such as crop harvesters, are put away after the months of productive operation (between January and May). This would require consideration of revised worker payment and employment for the off-season, but would be balanced by the savings achieved from replacing expensive feed/handling of livestock during winter months with container freezing of up to 100 head of cattle.

To date the MSU has processed almost 7,000 head of livestock, used at about 30 per cent capacity. They contend that the current unit remains a somewhat less efficient prototype than the latest design innovations. It will be replaced by a new processing system that is semi-permanent with the ability to increase throughput without the need of a permanent building.

The International Experience

A carcass cooler trailer has been added recently because the previous mobile abattoir cooler did not have sufficient capacity. The trailer has almost three times the rail capacity. This enables the abattoir to remain in place while the cooler trailer makes the trip to the retail outlet.

The 'Modular Food System' was invented by Joel Edward Huesby and he continues to be directly involved in the continued improvement of the efficiency and capacity of the unit. Joel Huesby stated "Modular Food Systems is now our major business establishment. Its sole purpose is to develop the next generation products created by myself and my business partner David Getzier. Additional talent and experience has also come into the Modular Food Systems team from the world of corporate finance, commercial building, and electrical/mechanical engineering disciplines. We have been working with clients from across the USA, not only remote regions such as Hawaii, but also from the large meat packers right here close to home".

Owned and Operated by: Thundering Hooves

Throughput Breakdown

Daily throughput, based on an eight-hour day:

- 18 cattle
- 52 sheep
- 35 pigs

Or as a single species kill over an eight-hour day:

- 20 head of Cattle (or one about every 20 minutes)
- 60 head of Sheep and goats (or one about every eight minutes)
- 40 head of Pigs (or one about every 10 minutes)
- 500 Chickens—process, chill, bag and label (or approximately 100 per hour)
- 200 Turkeys (or approximately 40 per hour)

The Layout

One 53-foot trailer, split into three sections:

- Front: mechanical storage and office
- Middle: hanging, storage and chilling
- Back: processing.

This unit was designed and built by Huesby. Some of the differences in its operation/construction compared to the other MSU units include:

- Entry of the animal into the MSU
 - The animal is winched to a sloped table that allows a quick delivery into the trailer unit.
 - Cattle are stunned in a crush inline with the back of the unit, where they drop onto a cement pad.
 - They are then winched by the rear legs, bled and then placed on the table ready to fall into the back of the trailer.
- The doors on the side of the unit that are used for depositing by-products are larger.
- There are windows in the unit enabling internal illumination by way of natural light.
- There is a section between the back and middle section for the USDA inspector to routinely check carcasses.
- The unit is approximately 53-feet long (the chassis was originally from a car transport trailer).
- The unit generally only slaughters at the one facility on farm.
- The unit is able to slaughter cattle, sheep, goats, pigs, turkeys and chickens.
- The water for the unit is collected on farm and there is no need for water to be stored in tanks.
- All by-products have to be stored in containers and taken into town for official waste processing.

The International Experience



The Huesbys use their cattle yards facility to support the MSU



Permanent farm labourers are also trained and work in the MSU

A USDA inspector must be on sight at all MSUs in the USA



Joel Huesby receiving carcasses in their processing facility

Economics

This unit was fully funded through the Thundering Hooves business. It did not receive grants or any other outside funding. The approximate initial outlay for the unit was US\$ 200,000.

Regulations

Adhering to and interpreting regulations, including a HACCAP plan, was the biggest challenge prior to initial operation of the unit. This was complicated by the fact that there are no official regulations for MSUs units in the country, meaning many guidelines are elastic and unknown even by the authorities.

Marketing

- All Thundering Hooves livestock are processed and sold through their system.
- They are sold through their local butcher shop in Walla Walla and through the Internet, mainly in the area of Seattle.
- Consumers can join Neighborhood Buying Clubs where they are able to order their meat and it is delivered to allocated drop off points. It can also be home delivered.

- It is marketed to the premium market as 100 per cent pasture finished meat, with no hormones or antibiotics.
- Meat products are sold frozen, fresh, in value packs or separate cuts, whilst some are processed as jerky and smoked.
- For consistent supply of the product all year round, their herd of cows has a split calving process and cattle from other farms are sometimes sourced and finished on the property. The poultry and pigs are contracted to an approved grower for production and brought to the Thundering Hooves farm for processing.



Left: Thundering Hooves have their own butcher's outlet. Right: Thundering Hooves meat. It is all marketed to the premium market as 100 per cent pasture finished meat, with no hormones or antibiotics.

Thundering Hooves SWOT Analysis

Strengths

- The unit assists in the Thundering Hooves' mission and goals to value add their livestock with complete control of their supply chain.
- There is little or no sign of E. coli pathogens in the units, related to small throughput and healthy, unstressed animals.
- Individual staff working in the unit are able to be interchangeable from the farm, the MSU and the processing facilities.
- The value-added product processed through the unit attracts a premium price in the market place.
- Thundering Hooves are able to produce livestock that only suit their individual needs and requirements.
- It has not been supported by community or government grants.
- It has no reliance or complications of being involved in a cooperative.

Weaknesses

- Initial outlay needed to produce and operate the unit.
- Lack of daily throughput.
- Extra skills needed by farm labour to carry out the job.
- The full-time meat inspector must be at the site at all times during the slaughtering process.
- Processing, marketing and value-adding are time consuming and costly to the farm enterprise.
- Poor processing and marketing can increase the risk of the business not being viable or sustainable.
- Calving times are spilt, which can affect on farm performance of that particular herd.

Opportunities

- The unique supply chain enables a point of difference for these products in the market.
- The locally produced and processed products could prove to have a low carbon footprint for future marketing.
- Appropriate processing, marketing and value-adding activities can the business viability and sustainability.
- Revised processing and operation timing to enable planned close down in 'off-season' winter months to combat seasonal inefficiencies.

Threats

- Unit becoming less viable due to low throughput.
- New regulations affecting the operation.
- The time and capital spent on this value-adding process may affect on farm production performance.

Modular Food Systems

Modular Food Systems is a concept being developed by Joel and Gordon Huesby to adapt to their current MSU. The idea is based on mobile, adaptable, scalable and affordable food processing infrastructure. It would replace their current system to improve throughput and efficiencies.

The International Experience

"The Modular Food System is a blend of mobile and fixed meat processing establishments, having unique cost, price, and volume advantages over existing smaller Mobile Slaughter Units coupled with fixed plants". —Joel Huesby, 2010

The basic idea is to utilise modified cargo containers to serve as food processing modules. A meat processing unit will include modules for all the operations involved in slaughter, processing, and value-adding activities. Modules are designed for specific purposes such as slaughter, hot carcass cooler, smokehouse, training, USDA accommodation, and administration.

Designs would be flexible to individual situations and could include containers being stacked on top of each other to give more vertical space for slaughter activities. The units could also be modified and scaled up as the operation expanded over time.

One change already implemented is that offal and hides are no longer transported for cold storage prior to pick up. A rendering company now picks up twice a week at the farm, thus eliminating transport and storage costs. Joel Huesby further stated *"I would also like to see a better use of offal by-products and on-farm composting, but this is not a big priority for us at the moment. However, it may be important for individual clients of Modular Food Systems in the future"*.

The system would also provide a service such as Standard Operating Procedures (SOPs), Sanitation Standard Operating Procedures (SSOPs), pre-requisite programs, HACCP Plans and the USDA Grant of Inspection. This would speed up the process of adhering to regulations and may also assist in the application of available funding and grants.

It is aimed that the initial capital expenditure for this system remains under US\$ 1,000,000 or as low as US\$ 300,000, with most interest coming from a smaller facility at less than US\$ 500,000 (tax, destination charges, and options not included).

Destination: Colorado State University

Location

Fort Collins, Colorado, USA, Nebraska and Kansas districts.

Contacts

- Dr Temple Grandin, a designer of livestock handling facilities and a Professor of Animal Science at Colorado State University.
- Mark Deesing, Livestock Specialist and Co-author with Dr Temple Grandin.
- Dr Tom Noffsinger, Leading USA Cattle Veterinarian and Handling Specialist.

Objectives

Develop a practical knowledge and understanding of the logistics, the operation, and the optimum animal handling techniques of successful MSUs for application in remote Australia.

Outcomes

- Stress is cumulative and pre-slaughter handling and facilities are essential for quality meat outcomes.
- Appropriate handling facilities prior to the MSU and stock handling techniques must be incorporated into the slaughter system to ensure product quality.
- All people in contact with the livestock pre-, during and post-slaughter must be trained in the appropriate livestock handling techniques to ensure product quality.

The International Experience

- The facilities must complement livestock behaviour to reduce stress and increase efficiencies.
- The MSU could be designed to be a multi-species system.
- Facility design will differ depending on the livestock handler's experience.
- If handler experience is transient and, therefore, will always be challenged with inadequate livestock skills, facilities should be designed to block vision and contact from livestock to the handler. This would include a tub facility with a curved, filled in race for livestock and a handler walkway. If the handler is experienced and training is provided on a regular basis the design of the facility would encourage livestock, handler interaction, with straight, open race facilities.

Knowledge Transfer: Applying the Outcomes

There is potential in certain circumstances for either mobile and/or modular slaughtering units to be incorporated successfully within the Australian livestock industry. Their major advantage is the potential of lower capital investment compared to a conventional facility with flexibility in slaughter location and niche marketing avenues.

Due to the low throughput of MSU/MOSU, these systems could not solve all of the current challenges of the lack of processing capacity in the northern region of Australia. However, they could assist many individual cases to expand market options and assist certain communities who are currently lacking access to locally produced fresh quality meat.

The specific system and design of a unit is dependent on individual circumstances. MOSU systems appear to have distinct advantages of a higher throughput, whilst the MSU systems have greater flexibility in slaughter location and sourcing of livestock. There would also be potential for both these systems to work together with a mobile slaughter unit and clan of modular processing facilities.

Throughput and processing efficiencies must be considered for the overall outcome of a unit. Specific targets would vary in each unit depending on species types, inputs and product return.

The marketing and logistical management beyond the slaughtering process would be the major driver of the complete system. The MSUs/MOSUs themselves would simply be a marketing tool to provide alternative market avenues.

Processing facilities have to be incorporated into the system. Carcasses could either be transported to facilities that already exist in southern regions of Australia or, indeed, a specific infrastructure needs to be constructed to cater for the mobile facility. In this case the area would be dependent on centralisation for ease of product delivery and dispatch, access to labour, power and water. Hot boning techniques could also be incorporated into the MSU system to increase transport efficiencies and/or reduce the extent of the processing facility requirements.

Design and Layout

Specific sizes would vary depending on individual outcomes. Maximum length trailers (40–50 feet) would increase throughput potential, whilst smaller ones would allow for more flexible access in remote conditions. It would be imperative that the design caters for a dust-free, cool environment, with a high, solid chassis.

A series of multiple trailers would allow for an increase in throughput, with one trailer dedicated to processing and the two others used for chilling and transporting to processing facilities. These trailers could also be utilised as storage units for the processing facility.

The system should be able to service many different species including camels. The height of the unit and pre-slaughter facilities would be the major limiting factors.

Economics

The overall economic success of the MSU/MOSU system would depend on individual management styles, marketing avenues, and adhering to the potential direct and indirect costs of regulation.

The amount of capital investment required to develop, construct and begin operation would be the outright limiting factor to establish the MSU/MOSU system. It would have to be supported by counterparts who are prepared to be flexible and take the risk of innovation. Marketing outlets and supply chain logistics would have to be carefully considered before this operation commenced to ensure cash flow as soon as possible.

Markets

The product processed through the MSU/MOSU system would have a distinct marketing advantage for niche marketing outlets. The majority of the product should be targeted towards these markets, as they would not be economically competitive with meat processed through a conventional abattoir system.

Niche markets would include local districts and communities, premium meat outlets, family meat packs through Internet sales and home delivery, carbon measured markets and all outlets that sell product with a story or target a specific suitable target market.

Hallal accreditation should be considered to expand marketing outlets even within the Australian domestic market.

Outlets for by-products, such as bone, offal and hide, would also need to be developed. Suitable compost piles should be approved in regulated standards and incorporated within this system.

Export markets could expand horizons and exacerbate potential marketing avenues. However, current regulations surrounding export accreditation would limit these possibilities.

Regulations

Regulation in the USA has proven to be one of the greatest challenges for development, success and sustainability of MSUs. Regulations should be developed to ensure quality control measures are carried out without slowing progress or development.

The MSU/MOSU system could provide flexibility in marketing outlets for livestock producers who currently have no reasonable access to conventional abattoirs.

Recommendations

Government

It is recommended that government assist industry counterparts to develop robust, profitable and sustainable MSU/MOSU systems in the Australian livestock industry. Assistance should be strategically directed to ensure that the units are not directly subsidised. These units must be self-viable into the future, this would be ensured by the following controls and regulations:

- Policy development to ensure infrastructure, environmental regulations and health regulations all complement, and not inhibit, MSU/MOSU development.
- Provide a direct support role to assist in all administrative duties surrounding development and operation, particularly in relation to the regulation of the MSU/MOSU.
- Divert current pest management funding to cover certain harvesting expenses of feral animals (e.g. camels, goats) for the MSU/MOSU system.
- Include schemes such as Buy West Eat Best to support meat processed through the MSU/MOSU system.
- Provide facilities and specific service personal to cover the time and skill required to adjust to and report on regulations imposed by government for both the development and ongoing function of the MSU/MOSU system.
- Provide infrastructure to service the logistical supply chain for product from the MSU/MOSU system. This would include power, water and solid road access.
- Develop support mechanisms to encourage the employment of local staff for the MSU/MOSU system. This would include tax relief, housing assistance and training.
- Assist in the development of programs for official training and traineeships for all staff and affiliates working in the MSU/MOSU system.
- Assist in the supporting a role for a local meat inspector for exporting MSU/MOSU products.
- Policy reform is needed to reduce direct inspection and administration costs for the MSU/MOSU system, enabling them to supply the export market.

Industry

Industry should consider the benefits of mobile and/or modular abattoirs in the Australian livestock industry.

MSU/MOSU units could be owned and operated by individual producers and incorporated within a vertically integrated marketing system. They could also be developed through an industry alliance or cooperative arrangement. The unit could also be owned and operated individually and source livestock from various locations. The radius of operation would depend on product return, throughput, sourcing of labour and fuel price. It could also be used as a buffer and introductory processing outlet in regions that currently are considering the benefits of introducing a permanent processing plant.

With all new projects there will be teething problems and engineering challenges. Additional funds in the budget for the extra time and money should be allow for these problems. Interested candidates must realise that a successful MSU/MOSU in itself will simply be a marketing tool to provide alternative market avenues that are currently unavailable to the industry. They must, therefore, be willing to become vertically integrated and accept that the marketing and logistical management beyond the slaughtering process will be the major driver of the MSU/MOSU system.

Candidates involved with the development of the MSU/MOSU should influence early regulation standards for MSU/MOSU systems to develop the most robust, user friendly, practical regulation standard for Australian systems. This should include communicating with specific contacts in the USA who have already experienced specific regulation development.

Recommendations

Developing export markets will increase the potential marketing avenues for product from the MSU/MOSU. Affiliates should lobby for current regulations and expenses surrounding export accreditation rather than impede, and instead they must encourage export development.

As part of the total environmental and sustainability aspect of successful MSU/MOSU development, all parties must consider compost systems for waste products that could benefit safe land fertility.

Education and Training

TAFE providers should provide training and skill development through existing programs, such as the meat units in the nationally recognised training programs.

Community

Communities who have potential for mobile abattoirs should encourage and lobby for all initial development.

They should also support ventures by prioritising their purchases from the locally produced product from the mobile abattoir processing unit.

References

General Information

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<http://stockmanship.com/>

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