EXECUTIVE SUMMARY

The sheep industry in Barbados plays a vital role in the provision of meat for its diverse ethnic and cultural population of over 270,000. The industry supplies only about 15% of the lamb/mutton consumed locally. The government and other agencies have embarked on programmes to increase the production of lamb to reduce importation. In addition, IICA has embarked on a plan that proposes to improve production of the Barbados Blackbelly Sheep (BBB) sheep by increasing the number of breeding stock of superior performance through the establishment of nucleus flocks. In addition, breeding and multiplication units and technological packages on management for farmers and other stakeholders will also be established.

Substantial genetic gains were made over the years in Barbados on the BBB sheep through the use of objective measures of economically important traits such as birth weights, growth rates, carcass composition and prolificacy.

In the last quarter of 2004, the Ministry of Agriculture, Food, Fisheries and Water Resource Management (MAFFRWM) with funding from the Food and Agricultural Organisation (FAO), provided the opportunity for gathering of information (sheep survey) which gave a holistic view of the farmers’ situation as it related to sheep production in Barbados.

The Barbados Sheep Farmers Incorporation (BSFI) proposed Action Plan 2003, recommended two strategies for the development and expansion of the BBB sheep industry. The first strategy would focus on the development and refinement of government policies to facilitate achievement of industry’s competitiveness. The other strategy would be centred on the development and implementation of initiatives by the private sector to achieve efficiencies in the production of BBB breeding stock and BBB sheep meat. These strategies were recommended, due to several factors that included:

- The lack of a consistent supply of BBB sheep meat due to limited production base;
- Inadequate breeding and multiplication units to meet the demand for breeding stock; and
- Inappropriate husbandry methods.

To initiate the breeding and multiplication units, a nucleus flock comprising rams and ewes of BBB sheep will be established in addition to the existing one at MAFFRWM Greenland Research Station. The short term strategy is to increase the pool of ewes as a base flock for subsequent placement in breeding and multiplication centres. The proposed 1,500-ewe unit is expected to supply the sheep industry with approximately 30,000 lambs over the 5-year period. This equates to approximately 371,922.3 kg of lamb/mutton or 27.3% of the total domestic demand for lamb. This situation is expected to be replicated with the establishment of four additional 1,500-ewe units across the country.

In 2012, the local production was estimated at 89,850 kg and considering that sheep, after slaughtering, lose 50% of the carcass weight, the gross weight would be approximately 179,700 kg. This is equivalent to about 4,084 sheep. It can therefore be finally concluded that based on local production and imported lamb in 2012, to satisfy the local demand, 62,020 sheep were needed based on carcass weight of 22 kg.

In addition to the above BSFI recommended a production model for the further development of the sheep industry. This should involve the provision of:
• Specialist producers;
• Increase in animal numbers and reproductive females;
• Genetic improvement;
• Market driven production;
• Handicraft;
• Treating sheep production as a business; and
• Address marketing in an environment of Trade Liberalization.

The strategy and methodology options proposed in this document, for the advancement of the Barbados Sheep Industry include, but are not limited to:

• Three lamb crops in two years;
• The STAR© Lambing System (five lamb crops in three years);
• Cluster Sheep Production System; and
• Artificial Insemination (nucleus flock only).

The Barbados Sheep Industry is at an exciting stage of development. With the necessary financial assistance from Government and regional and international organisations, the industry can be the basis of a significant economic improvement for the disadvantaged rural poor, especially women and children, who have traditionally been the main raisers of sheep.

The development of economically viable technologies as an engine for future livestock production in Barbados cannot be over emphasised. Additionally, scientists in the Ministries of Agriculture and regional organisations such as CARDI will need to continue to develop economically viable systems for the producers. These should include sustainable forage based systems with drought tolerant forage species. Wherever possible the systems should maximise the use of available agro and industrial by-products. For example, there is the need to exploit the possibility of manufacturing molasses-urea feed blocks in Barbados for local farmers and possibly for export to the sub-region.

Greenland Livestock Research Station should be used basically as the nucleus flock as well as a ram evaluation centre and for genetic improvement of the BBB breed. Multiplication units should be established throughout the country from where breeding stock will be distributed. Superior rams from the feedlot or other private farms should be evaluated for maternal traits, thus evaluating the usefulness of these rams to be used as replacements rams. Feedlot rearing of the progeny would greatly assist in the evaluation of rams for growth and carcass characteristics.

A holistic developmental approach that combines market requirements, production systems and post-production and value adding is now required. Such an approach would enhance the sheep industry’s competitiveness and profitability, equitable distribution of income for the producers, food security of the people and a sustained environment. The sheep industry’s main economic product is meat but importance has to be placed also on the use of the skins for leather or other craft products to harness the underutilised resources.

IICA, in tandem with other agencies such as CARDI, needs to develop key aspects of livestock development, in terms of training modules to enhance awareness of livestock development strategies (genetic improvement and breeding strategies) to assist decision makers in formulating livestock development policies and strategies. Competitiveness cannot be maintained if the research and development required to optimise production systems is not available. Research and development is also necessary to support the modernization of the rest of the sheep chain, from the feedlot operations, through to marketing and handicraft development.

The preparation of information and communication tools to transfer the results of the Research and Development is also critical, so that all of the stakeholders are able to readily implement the recommended practices.
The direct beneficiaries of the project will be the MAFFWRM, CARDI and other R&D organisations and BBB Sheep producers who depend on the MAFFWRM for technical support and also for replacement breeding stock. The outputs of this project would provide the MAFFWM and other funding agencies with technical information to support and possibly sustain production of the Barbados Blackbelly Sheep industry.

The objective therefore, is to provide sheep farmers with improved / increases in breeding stock that will drastically improve the quality of the flock, and subsequently increase financial returns.

The major factors limiting a meaningful and sustainable improvement in sheep production in Barbados are as follows:

- Seasonally related low levels of nutrition;
- Inadequate feeding programmes;
- Low level of animal management;
- A lack of focus on genetic improvement;
- Inadequate technical support from the extension and livestock division of the Ministry of Agriculture;
- Low productivity because of the low–input low–output animal husbandry practices of the majority of livestock owners; and
- Lack of market led quality products from this sector.

Project Justification

In terms of livestock development, Barbados has earmarked sheep production as one to be developed so that the country’s food and nutrition security related to animal protein is strengthened. This area has often been neglected in other food and nutrition security initiatives. The production of meat from sheep has not kept pace with Barbados’ demand for the product as domestic production only satisfies approximately 15% of the 1,364 MT of local mutton demand. Imports of mutton/lamb from extra-regional sources (Australia and New Zealand) dominate the local market accounting for the remainder of local demand (Singh et al 2006). Justification for the proposed project includes:

- The need to address the lack of adequate sheep breeding strategies within the Barbados;
- The need to make genetically improved animals readily available to small farmers;
- The lack of trained personnel to adequately service the sector;
- The need to demonstrate to livestock farmers that sheep production could be viable and sustainable if appropriate breeding and feeding strategies are put in place; and
- Improving management and husbandry practices to increase productivity, income and food security among the predominantly poor small ruminant farmers in the region.

The gap between the quantity of sheep meat imported and domestic production continues to widen, thus representing potential investment opportunities for sheep production notwithstanding the biological, genetic resource and technological limitations.

This proposal presents an opportunity to increase local production by providing support to strengthen the local sheep industry. The primary focus will be on two areas:

a) Breeding strategies (i.e. artificial insemination); and
b) Nutrition

Recommendations (Proposed Solutions)

Strategies to Achieve the Recommended Level of Production

The BBB sheep is well known for its genetic traits of high prolificacy, low fat on the rib eye muscle and high tolerance to internal parasites. These traits make the breed a valuable economic resource for small subsistence farmers through the Caribbean. However, the determination of what is a purebred...
BBB sheep has long been a contentious issue because of the subjectivity. It is therefore necessary to have a more reliable means of identifying what is a purebred BBB sheep for purposes of conservation and breed improvement.¹

Substantial genetic gains were made over the years in Barbados on the BBB sheep through the use of objective measures of economically important traits such as birth weights, growth rates, carcass composition and prolificacy. It is widely recognised that there are many other traits of equal economic and biological importance that are not so easily quantified, for example lamb vigour, lambing ease, maternal ability, cleanliness and disease resistance. It is also widely assumed that in animal breeding the underlying trait that is being assessed is normally distributed and influenced by a large number of genes (polygenic). This assumption is fundamental to many of the genetic evaluation methods used, and holds true for most economically important traits.

To chart the way forward for further breeding, selection and multiplication of the BBB sheep, there is a need to introduce “new blood” following the research finding of McClean et al (2011). This can be achieved by the re-importation of BBB rams and or semen from some neighbouring Caribbean countries and maybe further afield.

**Strategy and Methodology**

For the sheep industry to develop and expand in a similar manner to the pig industry in 2002 and 2003, a subsidy should be introduced to allow sheep farmers to retain ewes and rams that would normally end up in the marketing and value-added chain. The pig industry was re-developed under Gilt Replacement Programme (GRP) and Pig Improvement Programmes (PIP) in 2002. Under the GRP farmers were paid Bds$500.00 to retain gilts for breeding but this programme was monitored and evaluated by the MAFFWRM livestock division before any disbursements were granted. Therefore the expansion of the sheep industry will take off only if similar incentives are applied.

Another breeding strategy, especially in the smallholder sector and where no progeny testing and artificial insemination (A.I.) scheme exists, is for breeders with small flocks to adopt cooperative breeding schemes. This involves a number of interested farmers who select the best females based on phenotype and send them to one unit forming a nucleus flock.

**The Major Activities Involved in this Strategy:**

The major activities involved in this strategy include:

- Equip four local facilities to breed and multiply selected, BBB breeding stock;
- Procure superior stock, including semen and operationalise the breeding and multiplication facilities;
- Develop breeding strategies / protocol;
- Identify/establish satellite farmers (multiplication units) to work with the project;
- Train local sheep farmers in breeding and production management;
- Design the required policy framework to facilitate the movement of animal genetic resources throughout Barbados in consultation with the stakeholders (MOA, BSFI and other responsible government agencies);
- Commence sale and distribution of livestock to farmers; and
- Establish an inter-agency working group to monitor, evaluate and maintain the system.

**CONCLUSION**

- The demand for BBB sheep is high both locally and internationally. In addition, there is tremendous export potential for the breed (live animals, semen or embryos) and its products as

¹ Genetic Analysis of Three Populations of Barbados Blackbelly Sheep at Microsatellite Loci (McClean et al 2011).
Barbados stands to benefit from increased foreign exchange through development of this export potential of the industry.

These proposals aim to validate the basically untested theory, that for the sheep industry to be viable, both production and productivity must be enhanced given the significance of this industry to the country. The proposed interventions have been tailored to respond to the needs of the BSFI, MAFFWRM and other stakeholders and should provide a sound basis for the business continuity of the sheep sub-sector. These interventions are in line with the Government’s policies and strategies and should be integrated into the development plans to ensure the sustainability of the process. In addition, the MAFFWRM personnel and other stakeholders, through training sessions, should build human resource capacity in new breeding technologies through training, technical assistance and information sharing. This training will lend support to sustainable sheep production in order to ensure food security and increase lamb/mutton self-sufficiency, while improving the productive capacity of the animals through improved feeding standards as well as improved breeding strategies. Profitability is most likely to ensure sustainability of the sheep sub-sector.

In summary, these proposals will consist basically of four components:

- **Component A**: Breed Improvement & Dissemination of Stock (BBB sheep as foundation stock, followed by breeding, multiplication and dissemination to farmers).
- **Component B**: Technology Transfer & Capacity Building (training of livestock producers, processors and groups).
- **Component C**: Small Ruminant Production (dissemination of improved stock with improved production practices)
- **Component D**: Marketing and Processing (refurbishment of abattoir facilities, demonstration/training in meat processing and by-product refinement).