NZ GRASSLAND ASSOCIATION
Fuelled by Science, Tempered by Experience

GRASSLAND NEWS www.grassland.org.nz

Feb 2015
ISSN 1179-4216

## Thoughts from the President

Warwick Lissaman

It's dry alright. Across the country large areas are looking like Marlborough in a typical summer, rainfall records are only a reminder as to the reality. Most of our farm systems can cope with a 'dry patch', like they can a 'wet patch', but few can accommodate a dry spring and dry summer as is being experienced. This isn't good for NZ Inc, those of us associated with NZ Agriculture understand this, and we need to communicate this to the country as a whole.

As I sit here waiting the delivery of another water tank; stock water systems need storage, I ponder how much water storage people are thinking when they say "we have plenty of water, we just need to build storage." And of course they are spot on, but this isn't about local farmers buying a few tanks, it's about large (often community groups) scheme storage dams requiring significant financial investment. To do this we need enabling regional authorities and supporting national policies; too often this is lacking.

Sure storage dams require engineering; but really the exponential cost increases of this and associated compliance over last 10 years are killing private developments and putting these types of projects into regional or national government arena. Unfortunately then the regulatory authority and the development owner become one, and the resource management act wasn't designed for this scenario, as it was assumed the regional authority would be the regulatory entity; and in this case the regulatory entity and the asset owner become conflicted; to address this even more layers of cost are incurred. Again this isn't to the benefit of NZ Inc.

Interesting that when it all becomes too hard (eg. natural events, fires etc.) RMA rules are thrown aside, and really why this shouldn't be the same for projects of national significance like irrigation storage.

The scale of these financial investments mean often these are intergenerational loans within family farms and long term balance sheet items in corporate farm groups. Low interest loans, 30 year terms etc. are required to get these developments going faster.

We need to take the water when there is surplus and not increase the demand when rivers are low, we should not have a mentality of first in first served, we must protect the future demand of any catchment, and only when that is secure then the resource can be taken into another catchment.

For us in NZGA; forage systems that can use this stored resource more efficiently, and can adapt when it is cut off; livestock systems to utilise the forage resource, plant adaptation to variable resource availability; are all key elements for research and for farmers to hold onto for future productivity and resource use efficiency improvements, plus it gives us hope when we are dealing with the hardship of a particular adverse season, or market related squeeze.

Membership needs to hear about research; and develop alongside the researcher the innovation at farm level to adopt the research/technologies. Sometimes that comes from reading what happens offshore, and to that end we welcome contributions such as are included in this Grassland News; other times it comes from here at home, so please if you have a contribution you would like to make send it in.

Remember the good things you did last year, and the good you plan to do when the forage resource you grow is available again, the things you can control.

Canterbury Feb 2015

(Working with Jacqueline Rowarth and Frank Scrimgeour)

**NZ expends a considerable amount of money through the Ministry of Foreign Affairs and Trade to bring people with potential to learn from developing countries to New Zealand universities. Agribusiness is now a 'preferred' study area for these scholarships so an increasing number of postgraduate students are appearing on our shores to learn more. They add to the university experience of other students through debate and exchange of information, and the wider industry can benefit too. There are opportunities to take NZ expertise to other countries and the students can help us see the best way. In this issue Kg and Krishna have written about their observations on how we can work together.**

After working in Botswana Ministry of Agriculture: Dept of Crop Production in charge of agricultural intensification projects 3 years, followed by 2 years as an Assistant Training Co-ordinator, I was recruited by the Foundation for Human Rights, a Non-Governmental Organization under the European Union Fund, as an Intern Assistant Project Officer for Land Tenure and Farm Worker's Rights. It is against this background that I received a Ministry of Foreign Affairs and Trade (MFAT) scholarship to pursue a Graduate Diploma in Agribusiness as a pathway to Masters in Management Studies, at the University of Waikato. I am committed to socio-economic development and poverty eradication through agriculture. My gratitude is to Mr. Bosi Setlhomo, the Managing Director of Ankh Foods (Pty) and the people of New Zealand for this lifetime opportunity.

**Botswana's Economic Diversification through Sustainable Agricultural Productivity: Lessons from New Zealand**

The government of Botswana has developed agricultural intensification policy initiatives to boost the declining role of the sector in economy and food security. Botswana has more than 19.3% of its population living below the poverty datum line of income less than US$1 a day, despite the country's ranking as a Middle Income Country with GDP per capita reported by the World Bank of approximately US$7,317 in 2013 (in comparison with New Zealand US$40,082). Approximately 70% of Botswana's population directly earn their livelihood from agriculture; this is as the sector's contribution to GDP has contracted from 42.7% at independence in 1966 to 2.0% as at 2014. The economy is driven by the mineral sector which contributes 34.9% share of the GDP in 2014 from 63.3% in 1983 mainly due to volatile international markets.

To diversify the economy from the mineral sector, the government of Botswana has invested more than US$91 million in agricultural intensification through policy initiatives: the Integrated Support Programme for Arable Agricultural Development (ISPAAD), and the National Master Plan for Arable Agriculture and Dairy Farming (NAAMPAD) targeting to increase productivity by small scale and commercial farmers. These programs have proved to be unsustainable in the long run as their Net Present Value (NPV) is negative while their Benefit-Cost Ratio has been calculated at 0.6 mainly due to lack of rainfall, poor farming systems and limited supply of seeds, fertilisers, farm implements and tractors (Marumo et al., 2014). Moreover, these projects mostly focus on increasing productivity and food security, resulting in land and water degradation plus increased greenhouse gas emission.

**Arable crop production intensification**

ISPAAD was introduced in 2008 to improve food security by providing free and heavily subsidised hybrid seeds, fertilisers, herbicides, farm mechanisation, fencing, and irrigation systems. Crops targeted include maize, sorghum, millet and cow peas which are traditional stable foods of Botswana. Land cultivation per year has increased from 104,000 hectares in 2007/08 to 298,000 when ISPAAD started, and increased to 377,000 hectares in 2010/11. However, crop production remains low during the ISPAAD years at an average of 58 000 tonnes annually (BCA Consult, 2012). Grain yields remain approximately 330 kg/ha, which is only a third of the targeted 1000kg/ha.

Poor technology adoption, unskilled and aging farmers, limited access to farm machinery, implements and inputs appear to be the problems. In particular, fertiliser application at 200kg/ha of NPK applied at late stages of crop development with no detailed soil fertility analyses (in the dominant traditional subsistence farming system) contribute to water pollution and soil degradation.

Since its inception, ISPAAD has experienced demand exceeding supply by 20-120% for seeds and 1600% for fertilisers which affects productivity of farmers (Marumo et al., 2014). There are an estimated 1560 tractors to assist 118 000 farmers every season which restricts area covered. Many of the tractors are under-utilised due to mechanical faults, shortages of farm implements and under staffing in service centres.

Irrigation schemes cover more than 1439 hectares but, again, have not increased agricultural productivity. Cabbage crop yields are 50 tons/ha compared to the expected 90 tons/ha. The challenges are high rates of evapotranspiration, limited surface water and salinity of underground water in most parts of the country that reduce irrigation efficiency.

The Government of Botswana has no regulations in place to measure the impacts of agrichemical and fertiliser to waterways and biodiversity which is critical to agriculture and environmental sustainability.

**Beef and Dairy Production**

Livestock is a significant sub-sector of Botswana's economy. The beef industry contributes approximately 80% of agricultural GDP. Cattle production for beef is primarily traditional free-range cattle-and-post system under tribal communal land tenure system; there are no limits on stocking rate and grazing is uncontrolled (Masike & Urich, 2008). The system is incompatible with the breeding programmes, supplementary feeding and disease control

which are integral to New Zealand's productivity in beef production.

Another less common system is freehold farming under fenced ranchland mostly dominated by a small proportion of a politically privileged and rich farming community. Intensity of livestock farming in these systems exposes the limited range resources to degradation through overgrazing, soil erosion, animal faecal pollution of limited fresh waterways, and exposes cattle to predators and diseases. In Foot and Mouth infested zones cattle are monitored though tracer systems for controlled movement; this is a requirement for access to European beef market which Botswana has difficulties in meeting. Diseases such as measles from human waste render 10-13% of cows sent to local abattoirs not suitable for the European market which used to consume 70% of Botswana's beef exports **(**Tombale, 2015). In contrast, New Zealand has maintained access to 125 countries mainly due to compliance with market requirements and capability to negotiate bilateral trade agreements. For Botswana, benchmarking of the value chain of meat production in New Zealand's Beef and Lamb industry stands to improve the country's growth potential especially meat by-products. Botswana has the potential of establishing a rendering industry to process more than 10 000 tonnes of meat by-products to animal material, tallows and meals for domestic and export markets.

From 1999 to 2009 dairy industry in Botswana increased by 333 dairy cows and 0.42 million litres of milk per year; there were 6000 milking cows in 2013. This production amounts to 17% of the national milk liquids and milk products demand. The country imports 38.6 million litres of milk to supply the annual demand of 25.2 litres per person (Moreki et al., 2011)

Low beef and dairy productivity is due to poor pasture management, high prices of imported supplementary feeds and poor quality animal breeds. In contrast, New Zealand has good pasture management based on production of grasses that increase milk solids as well as weight gain in beef cattle. Genetic improvement of livestock in New Zealand has increased productivity; as in New Zealand, social acceptability of genetic technologies by farmers and the support from stakeholders is critical to attain agricultural productivity in Botswana.

**Agriculture and Public Policy**

Attaining economic diversity through sustainable agriculture is possible only through scientific research and development based on the needs of the farming community and consideration of the impacts on the environment. Compared to New Zealand, agricultural research in Botswana is top-down orientated with fewer linkages to the challenges experienced by farmers and extension officers in their daily operation. In the 5 months that I have been in New Zealand, and with engagement with NZIAHS, NZIPIM, Agresearch, DairyNZ, Beef and Lamb, LIC and the Meat Renderers' Association, it appears that New Zealand has an active farming community assisting researchers with eco-friendly farming practices**.** Compared to Botswana, agriculture has an important position in the New Zealand political system. This ensures that the sector remains significant in the economy especially in foreign trade agreements. In New Zealand agricultural politics are critical in formulation of policies that are economically and environmentally sustainable. In contrast, in Botswana agricultural policies are clientele oriented to appease the rural majority with short term benefits at the expense of the environment. The media in Botswana operates under strict government regulations with no significant role and vested interest in sustainable agricultural development. In contrast, the media in New Zealand has a strong agenda setting role influential to good farming practices.

**Conclusion**

Botswana's agriculture sector has considerable opportunities for increasing economic diversity, global competiveness and environmental sustainability by adapting many of the farming systems that New Zealand has in place. The size of the agricultural sector and the commitment the government has toward agricultural development is focused on production but with relatively small consideration of environmental friendly practices.

Based on my learnings in New Zealand, biggest gains towards the goals of the Government of Botswana will be from genetic improvement and pasture management improvement. Precision agriculture to ensure efficient use of inputs (e.g., fertilizer, pesticides and irrigation) will step change the approach. This requires investment in research and technology transfer, rather than in subsidies and New Zealand has an opportunity to assist Botswana through government consultancy and direct invest e.g., Fonterra in China and Chile. For this reason, the role of sound policy in attaining agricultural sustainability is inevitable, and this is why I am indebted to MFAT and the New Zealand agri-industry.

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# The role of cooperatives in achieving sustainable agricultural production in Jamaica

**Krishna Badaloo, Agribusiness at The University of Waikato**
(Working with Jacqueline Rowarth and Frank Scrimgeour)

I have been employed as a Statistician since March 2007 by the Ministry of Agriculture and Fisheries, in the Department of Agricultural Marketing and Information Division (AMID). During my time at AMID my main duties included the collection, preparation and dissemination of agro-socio-economic data to various stakeholders locally and internationally. Other tasks included farm visits, the estimation of production, development of survey instruments and the preparation of documents for the distribution at several annual agricultural shows, e.g., the Denbigh Agricultural show. To develop my professional capacity, I was awarded a New Zealand Aid Programme Scholarship through the Ministry of Foreign Affairs and Trade in 2014, to pursue a Graduate Diploma in Agribusiness as a pathway to the Master of Management Science offered at The University of Waikato. This article focusses on what Jamaica can learn from New Zealand – and therefore what opportunities there might be for New Zealand in Jamaica.

**Introduction**

Jamaica is a Small Island Developing State (SID) of about 11,424 square kilometres with an estimated population of 2.7 million people. Approximately 200,000 people are directly involved in agricultural production. The exchange rate moved from JD$57.93 to USD$1 in 2003 to JD$114.66 at the end of 2014, making it increasingly expensive to import both indirect and direct agricultural inputs, but attractive to export (Bank of Jamaica, 2015). Although the agriculture sector's contribution to GDP fell from 7.4% in 1997 to 5.0 % in 2008 (in Jamaican dollars at constant prices) the sector remains the largest employer of labour (PIOJ, 2011). The country has been an annual net food importer with approximately US$968 million of food imports and just US$266 million of food export for 2011 (STATIN, 2013).

In the tropical country of Jamaica, the Agricultural Sector is comprised of farmers with an average age of 55 years, a model farm size of 0.4 ha, distant from market and mostly domestic crops (including legumes, vegetables, condiments, plantains, cereals, potatoes, yams and other tubers). Agriculture output comes mainly from open fields with some produce from protected farming systems (greenhouses and shade houses). Most of the open fields are concentrated in traditional farming communities with the majority of farmers operating independently. Other aspects of the sector include livestock, forestry and commodity boards. Jamaica is an open economy with support from Government only in the form of concessionary waivers on equipment and agro-processing units imported. However, as most small farmers do not reach the taxable threshold, the agricultural sector makes only a small contribution to Government revenue.

**Cooperatives in Jamaica**

Cooperatives are common in Jamaica; development had origins in peasantry and dates back to emancipation in 1838. A cooperative is an organisation in which those who transact with (i.e., patronise) the organisation also own and formally control the organisation, and derive significant benefits from those transactions over and above any financial returns they derive from their investment in the organisation (Evans & Meade, 2005). By this definition, farmers have an incentive to support the formation of cooperatives that will enable them to meet their aims which are more difficult if they practice on an individual level. Benefits could be derived from the input side through supply cooperatives in accessing cheaper inputs such as fertilizer, chemicals, seeds and petroleum; funding research; reducing cost of production and improving their competitiveness. At the other end, output cooperatives provide the post-farm gate services such as bargaining, handling, processing and or marketing and distribution to protect farmers from market power working against the purchase of their produce, if they depend solely on independent marketing contracts.

Cooperatives in Jamaica were initiated as a vehicle facilitating self-help and socio-economic transformation to raise standard of living and reduce government spending, for example, access to private health care, provide better education for their children, save a portion and cushion urban drift. In addition Cooperative societies have been exempted from stamp duty and income tax. Presently, about 100,000 persons are members of 39 Agricultural Cooperatives, many of which are in rural areas across the country.

Traditional agricultural cooperatives in Jamaica have been failing to protect farmers' interest in the globalisation of markets. For instance, the Christiana Potato Growers Association almost failed due to high cost of input and exposure to competition. However, it regained strength after the market price became attractive and imported potatoes were deemed sub-standard due to taste, texture and shorter shelf life when compared to the locally produced potatoes.

Agricultural cooperatives are still considered by the Government and other stakeholders to be essential in promoting and enhancing sustainable agricultural production in Jamaica, however, the reality is inefficient production systems and ineffective cooperatives resulting in annual reduction in agricultural profits. Jamaica is a net importer of agricultural produce that could be produced locally. To alleviate these problems, with minimal environmental impacts, Jamaican farmers could adopt the sustainable approach enabled by New Zealand farmers' cooperatives such as Ravensdown and Ballance Agri-nutrients, the two big fertiliser companies that provide funding for research into the environment. Another model is the dairy companies that dominate the country's

economic contribution to international dairy trade which have moved into compliance through the water accord (i.e., protecting waterways by using fencing and culverts to prevent entry of animals and riparian plants to trap sediments). The main tenets of agricultural cooperatives in New Zealand are economic significance, yield improvements, protection of the natural environment and social conscience.

**Constraints**

The major land management issues in SIDS are the degradation of the limited land area and water quality caused by improper planning and monitoring. Smallness limits the practice of large-scale agriculture and creates intense competition for arable lands. The fresh water resources in these countries are contaminated by human, livestock waste, agricultural chemicals and effluent discharge by industries. The main constraints faced by farmers are the rising cost of agricultural inputs coupled with the unpredictable weather pattern, unsecured markets, disaggregated farming practice among stakeholders and the treatment of the environment as a priority. A further problem is that they do not keep proper records of expenditure and are vulnerable to the offers of middle men.

Most of the fertile arable lands on the plains across the country have been dominated by monoculture, with sugar cane the largest crop. Domestic crops such as vegetables, tubers, condiments and fruits are mostly cultivated on smaller plains and hillsides with undesirable road conditions and limited irrigation. Also, the encroachment of housing developments on arable lands close to the cities increases the price and reduces the available lands for farming; leaving farmers to use more marginal lands to cultivate.

Processing plants discharge effluent which ends up into rivers at certain times of the year has major environmental impacts to in-land fishing. The eradication of fish (including spawning disruption) affects the livelihood of many local fresh water fishermen for some months since their families and customers switch to other sources of protein (such as chicken-back i.e. one part of the chicken), putting further pressure on foreign exchange demand.

The local consumers prefer local produce, such as carrots, which have a longer shelf life than the cheaper imported ones. However, as in other countries, purchase is made on price and not quality, despite local campaigns such as 'eat what you grow, grow what you eat' and 'Buy Jamaica'

As in New Zealand, Jamaican farmers do not benefit from subsidies. They are, however, provided with extension services through the Rural Agricultural Development Agency (RADA), but fall short in targeting markets on a timely basis, resulting in periods of excess production and periods of limited supply. In addition, Jamaican farmers use inputs (seeds, fertilizers, tools and machineries) mainly from the US and then have to compete with subsidised US produce in the local market.

**Conclusions**

Agricultural cooperatives have been essential to the Jamaican economy, but the time has come for a new approach that coordinates all major players towards improving the practice of sustainable agriculture as in NZ. The main areas to target are: increase productivity and production to protect food security while reducing the annual food import bill; reduce environmental degradation through efficient application of fertilizers and sprays; improve waste disposal; and increase agricultural contribution to GDP. Also, preference could be given to cooperatives to import, if and when their outputs become insufficient, so as to maintain national consumption and their livelihoods while meeting other financial obligations. Cooperatives could provide farmers with economies of scale, make better use of concessionary waivers to improve competitiveness, provide more profits for farmers and increase revenue for the Government from taxable operations.

The open economy of Jamaica with a relatively high food import bill and a deteriorating currency make it vulnerable to international trade, food insecurity and poor farm practices that could lead to environmental degradation. Hence, the formation of cooperatives that are effective, will enable the country to safeguard against the many vulnerabilities and export excess. By adopting the sustainable approach taken by NZ cooperatives, Jamaica has the potential to be self-sufficient with minimal environmental footprint, excess production could be exported, and enhance socio-economic stability.

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## Thoughts from America

By Dr David Stevens, Vice-president NZGA

The current newsletter has a decidedly international flavour and in that spirit I thought I should reflect on our recent trip through the USA. Marie and I have not been back to the USA for 17 years, since my PhD. The trip was an opportunity to visit with old friends and to re-examine what had been our home for three years. The trip reminded me again of our place in the world and some of the things we need to remember.

On arrival into San Francisco the path through customs reminded me of the stark difference between New Zealand and the rest of the world. While security against threats from people was a key part of screening, biosecurity was not. Two factors resonated. On the one hand we live in a safe haven at the bottom of the South Pacific, but on the other hand what we need to protect ourselves from is much more insidious and has a much greater potential to destroy our lives and livelihoods than the threat of people.

A walk through the historic Tenderloin district of San Francisco, named from a meat processing past, at 9am on a Sunday morning is a very sad experience. Every other doorway is filled with somebody staying alive however they can. Low price accommodation provides shelter for those a little better off, and charity shelters provide food. A hand to mouth existence that few of us ever experience. If we stay in the commodity meat market, is this our potential fate?

Touching down on the East Coast, into North Carolina, changed the scene. In wealthy Chapel Hill, a University town, the first thing our daughter showed us in the supermarket was 'grass-fed' beef, the most expensive item in the cabinet. My question is, where is our beef and lamb? Are we really making the investment and effort to get this product on the shelf, are we locked out of these markets, or are we so busy juggling the sale of all of the parts of the carcass that we are missing the opportunity?

Land use and our Resource Management Act became part of the conversation as we travelled into the Appalachian Mountains near Asheville, NC. How come all of these houses are allowed to be built, anywhere? The answer was part of the freedom the USA prides itself on. This is my land and I will do what I want! Regulation of land use was very low. So how does the guy who farms the cattle get by? Well he leases some and owns some and moves animals as little as possible between the small scale housing developments. The result is a very inefficient grazing system, low productivity and a highly threatened beef breeding system. No wonder they need a significant premium from 'grass-fed' beef.

Another lack of this regional governance of the land resource is a significant lack of environmental controls. No set-backs or riparian river bank protections are mandatory and so soil erosion, the reason that farming failed in this region in the 1800's, continues in significant rainfall events even though vast tracts of what we would consider farmland are covered in secondary forest growth.

Up through Virginia and into Pennsylvania and we found a rich and intensive dairy farming region. This provided a glimpse into the highly intense, near industrial farming nature of the region. As we came over a ridge and viewed the valley near the town of Intercourse, PA we thought that we were looking at an industrial estate. The towers and buildings were silos and barns for dairy cows as far as the eye could see. This was a stark contrast to the forests of North Carolina. It was a reminder of what the Americans could do if they set their mind to it and of the vast undeveloped potential if they decide to tap into it.

New York City on New Year's Eve. What a hell of a town! Big cities are the same all over the world, they smell, are full of noise and people and have a life of their own. They have the wealth to buy our products and make us rich.

A stopover in Washington DC and a visit to the National Memorials reminded me of two things. The first is the value of inspirational people. As George Bernard Shaw wrote, '…all progress depends on the unreasonable man'. - that person who sees a better world or a better way to do things and doesn't take no for an answer – that creates progress. The second was directly linked to the first and that is the power of celebration, particularly the celebration of people who drive change and succeed. We strive for success because it is such a rare thing, and it follows that we must celebrate it. It brings to mind why we have the Ray Brougham Trophy, The Levy Oration and the Regional Awards. In these we both celebrate pioneers of the past and the success of the present.

Onward, "go west young man" as Greely said, to Colorado, to visit with friends. The first step of that part of the journey was to leave Washington DC in a snowstorm. Valuable lessons were observed here that apply directly to farming. The first one was patience. The second was being prepared for crisis. The sight of 24 snowploughs working in series on the runway is an impressive example of being prepared. Another lesson was about timing. A plane takes about 5 minutes to de-ice and coat in antifreeze. There is a 30 minute window to get that plane into the air. Everyone must be focussed on the task at hand to make solutions work in a crisis.

Colorado in mid-winter reminded me of how lucky we are to have a mild temperate climate. A visit to the National Centre for Atmospheric Research in Boulder, where climate change is studied using supercomputers provided a reality check of our influence on the planet and the responsibility we need to take for fixing the problem. On the way through we are also going to have to change, adapt, and develop new systems to ensure the resilience of our primary industries.

Back to San Francisco to travel the Pacific Coastal Highway down to LA. Leaving San Francisco we began to encounter the powerhouse of US vegetable cropping. This isn't horticulture as we know it, it is again, industrial farming. Brussel sprouts, the current food fashion, (Roast Brussel Sprout salad is the thing) were everywhere and harvest was in full swing, 100's of hectares at a time. Strawberries were being planted, a staggered planting both within farms and across the state at the scale of 1000's of hectares. One strawberry packing facility had 8 truck loading bays, to service one farming enterprise. Artichokes fields went on for miles. The scale and efficiency of production is something we cannot compete with.

Lessons from America – 'Grass-fed' is worth lots of money, resource management is important to us and to our future, don't try to compete on scale or efficiency but compete on quality, celebrate who we are and what we have got, be unreasonable!!