



## CONTENT

Feeding a Hungry World

ISA Hosted an Important Charoen Pokhand Group

Family Poultry in Developing Countries

Families Hendrix and Grelier Join Forces in Poultry Breeding and Distribution

## Feeding a Hungry World

Our theme for this edition of ISA Focus is based on a Conference with the same title, held in Ottawa, Canada, late in 2011\*. We are delighted to tell you that one of the prime movers who worked to make this Conference happen was Donald McQueen Shaver, the founder of Shaver Poultry Breeding Farms, now a proud part of ISA. There are many ways to approach the theme, from the very broad based ones, dealt with in some detail at the Conference, to quite narrow ones that deal specifically with poultry and eggs.

In the industrial world, and indeed among the emerging middle classes in developing economies, poultry and eggs are widely recognized as valuable contributors to the human diet. This is so for a number of reasons:

- Poultry and eggs are among the most efficiently produced, and reasonably priced, forms of animal protein available. Resources required to produce a unit of protein from poultry or eggs are much less than for other forms of animal agriculture, for example, beef, pork or dairy.
- As shown in Table 1, poultry and eggs have a modest carbon footprint when compared with other forms of animal protein. The data are from Canada, but are likely similar in other countries.

Table 1 Total CHG emissions in kg CO<sub>2</sub> eq./kg protein (data adapted from Dyer et al 2010. *Journal of Sustainable Agriculture*, 34, 618)

Beef	119
Milk	31.7
Pork	24.9
Broilers	10.6
Eggs	21.9

- Genetic progress has resulted in spectacular improvements in efficiency in both egg and poultry meat production over the past 60 years, as shown in Table 2.

Table 2 (data except 2013 are adapted from Jones et al 2001, *Poultry Science*, 80 1139)

	Age at 50% (days)	Average hen/day (%)	Egg mass/day (g)	Average egg weight (g)
1950 control	183	57	34	56
1959 control	173	60	37	62
1972 control	166	64	41	61
1993 commercial	155	73	49	64
2013 commercial <sup>+</sup>	143	79	55	62

<sup>+</sup> ISA estimate

- There are few religious taboos limiting the consumption of eggs, and relatively few for chicken meat. Some vegetarians consume eggs as a protein source. Several major religions prohibit consumption of pork, and others, beef, but there are few restrictions on chicken. ▶

\* For the Proceedings of this Conference, go to [www.farmcarefoundation.ca](http://www.farmcarefoundation.ca) and click on the box showing the Conference title.



- Both eggs and poultry meat are easy to cook, and extremely versatile in terms of the variety of presentation methods. There are whole books on egg cookery and also for chicken.
- For those consumers concerned about saturated fat consumption, neither chicken nor eggs presents a serious problem.

Whenever the question of feeding the 9 billion people expected to inhabit planet Earth in 2050 comes up, there are those who question the use of animal products in any form. For sure, we could feed 9 billion people a lot easier if we were all vegetarians. But as world economies evolve, consumers are tending to demand more meat, not less. Furthermore, they want to be offered choices on how they spend their discretionary food dollars. Imposing vegetarianism is not an option. Indeed, even in countries such as India, with a large vegetarian population, changes are occurring as some of the emerging middle class consumers move away from being rigidly vegetarian.

Many will eat eggs, and some, chicken meat.

There's also a temptation to dwell on the tragic famines, predominantly, but not exclusively, in Africa. While these certainly merit emergency action, and the world's sympathy, prevention of future recurrences surely depends more on countries' domestic politics and education than on external sources of food.

In developing countries, sometimes more than half the poultry population are grown in very small flocks, often just enough to offer a family a supply of eggs and the occasional chicken. While these low input: low output conditions may appear primitive to industrial producers, they often make a huge contribution to both the nutrition and financial stability of poor rural and some urban communities.

Dr. Guèye's article explains some of the details. ■

## ISA hosted an important group of Senior Managers of Charoen Pokphand Group

From September 8 till 14 ISA hosted an important Group of senior managers of Charoen Pokphand Group of Companies (CP) in The Netherlands and France. The people visiting ISA have leading roles in Thailand, Cambodia, Vietnam, Myanmar, Laos, India, Bangladesh, Turkey and Russia, and in most countries work exclusively with ISA's products and brands. The CP mission is to become "the kitchen of the world".

The group is involved in broilers, pigs, layers, ducks, shrimp and many more. With 300.000 employees in farming, feed and processing, CP is the leading protein food producer in Asia and one of the largest Thai based companies. In the countries mentioned above CP produces about 75 million day old layer chicks per year, of which the fast majority consists of ISA Brown.

Besides exchanging ideas about the future of world animal protein production, and changing consumer demand, time was also spent on updating the CP group on the advantages of the use of Genomics (reading DNA profiles) in the ISA breeding program. Such objectives as increased layer persistency (500 eggs in 100 weeks) will improve their business performance in the years to come.

The visit was also used to show the CP group some of the new facilities of ISA in Europe and some farms with cage free production systems.

Last but not least the top people of CP and ISA/Hendrix Genetics had enjoyable moments together, visited some nice touristic sites in Amsterdam and Paris, and celebrated the excellent relations between both companies. At the end of the visit one of the CP people commented: "The visit to ISA / Hendrix Genetics was really superb, and confirms that both CP and ISA have chosen the right partners. Not just for today, but also for tomorrow". ■



# Feeding a Hungry World: A summit for Animal Agriculture

By Dr. Peter Hunton

In his introduction to the Conference, Dr. John Kennelly, University of Alberta, pointed out that animal agriculture in Canada (but probably in most developed countries) is in danger of losing its social license – it no longer has its contract with consumers. We in animal agriculture have to demonstrate our responsibility and commitment to doing our part in feeding the world.

## What is the Challenge?

The first speaker, Prof. Alastair Sumerlee, University of Guelph outlined the major issues involved with feeding the world.

Sufficient food is produced globally today, but it is poorly distributed. There are about 1 billion people starving, yet 20-30% of population in some industrial economies are obese.

The population of the world is expected to peak at 9 billion in about 2050. So in 30-50 years, production must be doubled to deal with existing mal-nourishment and population growth. Land base is being diminished by urban sprawl.

Existing agriculture has provided good examples with huge increases in efficiency and output. Innovation in terms of breeds and varieties with improved yields. Public policy and investment have supported agriculture.

Summerlee quoted the example of the Province of Ontario, Canada, where in the past 50 years, the human population has doubled and:

- crop yield has doubled
- egg production has doubled
- pork production has tripled
- productivity/ha has increased 6-fold
- milk yield/cow has increased 5-fold
- there is 42% less agricultural land
- ¼ the use of pesticides
- ½ fertilizer use
- major reductions in water use.

Another speaker (Rob Aukerman of Elanco Animal Health) cited data from US agriculture, showing about 150% increase in output and productivity, from the same inputs, from 1948 to 2008. There is good evidence that similar improvements may be possible in some other countries where technology is not so far developed.

The reference to water use was picked up by Stephen Graham, Chief Marketing Officer for Maple Leaf Foods, a major food processor and marketer based in Toronto. Canada has the highest per capita water availability in the world. Giving Canada a value of 100, other countries stack up as follows:

Brazil	50	UK	3
Russia	35	Japan	2
Australia	27	China	2
US	11	India	2
Mexico	5	S. Africa	1

Another speaker (Lorne Hepworth of CropLife Canada) also emphasized the potential constraint of water supply: he showed that the existing, accessible, sustainable supply (4,200 m<sup>3</sup>/year) and demand are in balance, but demand by 2030 is expected to increase to 6,900 m<sup>3</sup>.

Hepworth also pointed out that in developed economies, consumers will drive the growing demand for increased food quality and value, pushing for higher yields, but also competition for resources. This is already seen in countries where “green” policies are taking corn out of the food chain (both direct human consumption and use in animal feed) and diverting it to fuel production.

At the same time as they demand ever cheaper and more versatile food products, consumers will also demand more “natural” products, improved health and nutrition, improved animal welfare and general sustainability. Combining this with the previously noted increase in food production required just to keep pace with rising population size, will be our greatest challenges.

Hepworth showed that implicit in the need for increased food production from animals is the need for more feed grains and protein sources for use as animal feed.

So how does the animal feed industry ensure an adequate supply of ingredients, bearing in mind the competition (from food, energy and bio-mass) for a finite amount of crops? In addition, consumers are requiring assurance of increasingly stringent safety standards and environmental sustainability.

Data were presented demonstrating the increased consumption of meat as per-capita income rises. Global meat consumption is projected to increase to 465 million tonnes by 2050 from 225 million tonnes in the year 2000. ▶





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### How Do We Increase Output?

Dr. Hepworth showed that most of the increased crop production must come from increases in yield, as there is little prospect of increases in available arable land. Some modest increases in crop intensity may occur. Increased yields can result from a combination of technological developments in plant breeding, pesticide development and bio-stimulants or growth promoters. The wild card here is that at the consumer level in developed countries, there is well orchestrated resistance to many of these technological advances. However, they may well become widespread in countries where such prejudices are absent. And in relation to this, the speaker showed that while corn production is almost optimized in North America, it is much less so in Brazil, India and China where much of the increased production is expected to originate. Interestingly, the objections to the use of biotechnology are much less strident in those countries. The same is probably true for other crops including soybeans.

This speaker also emphasized the reduction in waste resulting from judicious use of pesticides: an extra US\$7.9 billion worth of value to farmers of field, vegetable and fruit crops. Without

fungicides, he estimated that yields of most fruits and vegetables would fall 50-90%. Current post-harvest losses in Asia are estimated at US\$145.2 million: in the developed world, a similar level of waste is left on consumers' plates.

### How Do We Deal With Consumers?

Many speakers at this Conference emphasized the need for improved communication with consumers. Charles Arnot, from the Centre for Food Integrity in Gladstone, MO, dealt with this problem in some detail.

He said that farmers don't have an image problem, they have a problem with trust. People like farmers but they don't believe that factory farming is what they should be doing. Farmers use science as their argument, but this doesn't help in an ethical discussion. Arnot used the example of putting hens in cages: it is scientifically proven as the best method for egg production, but is it the ethical thing to do? He says this kind of discussion results in "two armed camps deeply suspicious about each other, shouting past each other".

Another example was the BLT sandwich: we should introduce consumers to the farmers who produced these products to

establish greater understanding.\* Farmers and the whole food chain have a vested interest in showing the public how food is produced, and how technology has helped to improve efficiency. Not only is more food more affordable than ever, it is also safer.

In the round-table discussions, these issues were again brought to the fore. There appears to be a lack of vision and leadership in the animal agriculture industry. Industry leaders are well versed in science but not very effective in communicating our messages to the public. Unfortunately, many of the sources of information used by the public in the field of meat production are exceptionally well funded, often by relatively small but vociferous animal welfare advocates. The food chain seems to currently lack the resources to mount successful initiatives.

There is also the point that government support and understanding is lacking in many cases. Agriculture is not a priority, and a lot of people making decisions related to agricultural matters don't fully understand the issues. ►

## Families Hendrix and Grelier Join Forces in Poultry Breeding and Distribution

Hendrix Genetics B.V. and Financière Grelier Holding s.a.s. have completed their agreement to join forces in poultry breeding and distribution.

Hendrix Genetics acquired 100% of the Grelier Groupe. As a part of the agreement, Jean-Marc and Dominique Grelier become shareholders of Hendrix Genetics next to Hendrix family (who have majority control), followed by Sofiprotéol (a financial institution of the French oil and protein industry) and some leading managers.

An exclusive negotiation period was already announced in December 2010. The projected cooperation allows to strengthen the groups and to secure their growth because of complementarities in activities and countries.



This project is a result from the joint reflection by the shareholders of the two groups, which show synergies and significant growth for the resulting group in the coming years. The new combination will have around €300mio sales and more than 2,000 employees. ■

In his remarks at the conclusion of the Conference, Dr. John Kennelly made the point that most, if not all, of the people attending were agreed on the major issues. If this is so, he said, how have we not already solved the problem? He said that animal agriculture needs a more effective mechanism for building trust among consumers. "Here, everyone is speaking with one voice, but when you leave, there's many voices." He pointed out that the Centre for Food Integrity may be a good model for animal agriculture.

Conference organizers will continue to work to ensure the momentum of the Conference is not lost.

\* At the time of writing, the Egg Farmers of Ontario have just re-introduced a very successful billboard advertising campaign that does exactly what is suggested. In each area of the Province, the local farmer-Director is shown promoting his product in a very personal way. A previous campaign was well received by consumers. To see this feature, go to [getcracking.ca](http://getcracking.ca) and click on the 'Who made your eggs today' button. ■

#### Acknowledgements

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## Family Poultry in Developing Countries

By E. Fallou Guèye, PhD, Safe Animal Production and Biodiversity Specialist, Regional Animal Health Centre for Western and Central Africa, B.P. 1820, Bamako, Mali  
E-mail: [efgueye@gmail.com](mailto:efgueye@gmail.com) or [efgueye@refer.sn](mailto:efgueye@refer.sn)

#### What are family poultry?

In developing countries, small numbers of poultry, which consist of chickens, guinea fowls, turkeys, ducks, pigeons etc.,

are kept in many households for many reasons such as home consumption, additional income from occasional sales, socio-cultural uses (e.g. special banquets for distinguished guests, gifts, cocks as alarm clocks for the villagers, ornamental poultry, hobby, exchange, breeding stock) and/or religious ceremonies (e.g.

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With the dwindling scavengable feed resource base in villages and the scarcity of natural feed resources in urban environments, supplementary feeding has become more common. The term "family poultry" has now come to embrace all these small-scale production types. Birds have a wide variety of genetic make-up, including indigenous or local types, exotic breeds, and crosses between breeds. Despite the substantial progress made by commercial poultry production over the last sixty years in developing countries, its sustainable development is highly constrained in countries that are not self-sufficient in cereal production, and are lacking hard currencies to import costly inputs. Where day-old chicks from high-performance hybrid stocks, balanced feeds, drugs, vaccines, etc. are not readily available, commercial production is difficult. In addition, most consumers cannot afford to buy the commercial products. ►



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A woman poultry keeper is providing supplementary feeds to some of her large flock of around 60 local chickens in her yard in the Msinga area of KwaZulu-Natal, South Africa (Picture by Ed Wethli).

However, family poultry are still very important in developing countries. More than 80% of the world's poultry stocks is kept in small numbers, from as few as 3 up to about 20. Family poultry keeping has been a traditional and integrated component of most rural, many peri-urban and some urban households or small farms. This activity, which requires low levels of inputs (i.e. land, labour and capital), has been practiced by local communities for many generations and is likely to continue as such in the foreseeable future. Thus, 80 to 95 % of rural households in sub-Saharan Africa and South Asia keep one or more species of poultry (largely dominated by chickens) that contribute up to 90% of poultry products in many countries, (e.g. Afghanistan, Bangladesh, Bolivia, Botswana, Burkina Faso, Cambodia, Ethiopia, Haiti, Mali, Niger, Pakistan). Family poultry are mostly owned and managed by women, children and vulnerable people (e.g. old and disabled persons). All ethnic groups tend to be involved in this form of production.

### What are the prospects for Family Poultry development?

The importance of Family Poultry as a tool for food security, poverty alleviation and the promotion of gender equality, especially in disadvantaged groups and less-favoured areas, has long been identified and is being promoted. Many projects have attempted to replace the local poultry breeds, also termed 'ecotypes', with exotic or crossbreeds specialized in egg or meat production, whilst introducing the standardized conditions of more intensive systems.

Success, however, has been very limited because of numerous constraints such as required artificial incubation, high mortality due to infectious diseases (especially Newcastle disease) and seasonal lack of feeds and feed resources, high losses from predators, thefts and bad weather, and low knowledge, skills and resources of poultry-keeping farmers.

The great genetic variability observed in Family Poultry birds in developing countries is resulting from random breeding within such diverse poultry populations. Local poultry are usually selected for their hardiness and sometimes for meat production, but almost never for egg production. Indigenous poultry are thus poor layers (e.g. around 50 eggs/local hen/year versus 200 eggs/exotic hen/year), however they are good hatchers and brooders, except for guinea hens. These birds are also well-adapted to extensive husbandry systems and are utterly suitable for farmers endowed with very limited means, as is so often the case in developing countries. Furthermore, indigenous poultry represent an important reservoir of genetic variation that should be studied and conserved, each bird being a 'running gene bank'. The modern poultry breeding companies should contribute significantly and steadily to this challenging endeavour, as indigenous poultry genetic resources can offer them sought-after genes to use in the development of new hybrid lines.

For further information, please visit the International Network for Family Poultry Development (INFPD) website at: [www.fao.org/ag/againfo/themes/en/infpd/home.html](http://www.fao.org/ag/againfo/themes/en/infpd/home.html) ■



### Institut de Sélection Animale B.V.

Villa 'de Körver'  
Sporstraat 69  
P.O. Box 114  
5830 AC Boxmeer  
The Netherlands  
T +31 485 319 111  
F +31 485 319 112  
E [info.isa@hendrix-genetics.com](mailto:info.isa@hendrix-genetics.com)

## INFORMATION

### Editorial Team

**Peter Hunton**  
Poultry Consultant and past President, World's Poultry Science Association

Nels Koppes  
Marketing & Communications Assistant

**Ruud de Keijzer**  
Marketing & Communications Manager

The editorial team can be reached at:  
[isa.focus@hendrix-genetics.com](mailto:isa.focus@hendrix-genetics.com)

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