

## Maintaining Egg Shell Quality in Hot Climates

The egg shell has a very important role. For a hatching egg, it serves as protection for the live embryo and as a medium for gas exchange. For table eggs, it serves as a barrier for harmful bacteria and other harmful microorganisms which may enter the egg, as well as a unique vessel for a valuable and very affordable source of protein.

Maintaining egg shell quality, although not very easy in hot weather conditions, should be carried out. The average shell contains about 97% Calcium Carbonate (Burley and Vadehra 1989). Due to this, calcium has to be provided in the hen's diet and it is usually provided as Calcium Carbonate. However, this has to be broken down in the intestine for the calcium to be absorbed into the blood stream for storage in the medullary bones and can be a source of calcium for egg shell formation in the future. Aside from the medullary bones, calcium from the diet will also be directly absorbed to the shell gland for shell formation. It is worth noting at this point that 95% of the calcium in the egg shell is taken from the dietary calcium and 5% from the medullary bones.

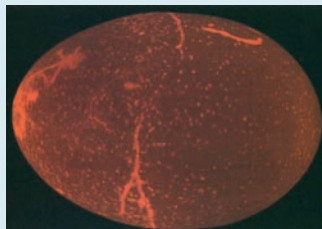
### Examples of egg shell abnormalities



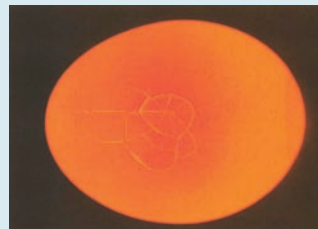
Soft and weak shelled eggs



Body Checks



Hairline Cracks



Star Cracks

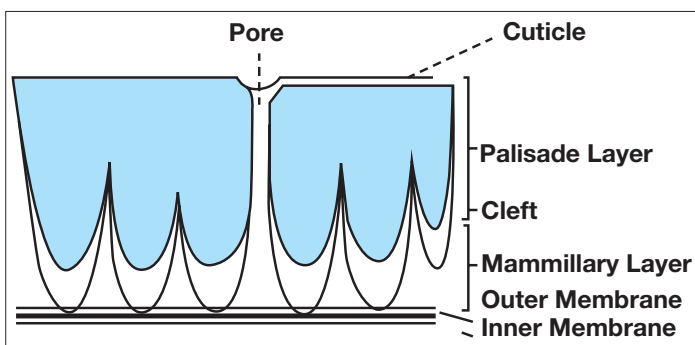
If hens are supplied in an optimal way with calcium in the feed or in addition to the feed, then 95% utilization of the dietary calcium can be guaranteed. The carbonate is

produced from the hen's own metabolism.

The optimal environmental temperature, sometimes called the "comfort zone" for layer hens, lies between 18 to 24 °C. Unlike humans,

chickens have no sweat glands so they have to lose body heat by other means. As the environmental temperature increases above the comfort zone, chickens tend to have a lower feed consumption. A higher water intake than usual will be observed in an effort to cool down. This may result in watery faeces and therefore, an increase in dirty eggs.

A reduction in feed intake would result in drops in egg production, egg weight and shell quality. In severe cases, this would mean increased



Egg shell structure (source: Gupta)

### H&N<sup>®</sup> Event

#### Latin American Poultry Congress

Robert Pottgüter, nutritionist of H&N International, will give a speech as an invited speaker at the Latin American Poultry Congress to be held in Buenos Aires in September this year. His topic will be: "Fibre in Layer Feed - a Practical Approach based on Varying Patterns in Raw Materials".

Fibre in poultry and especially layer feed, is a topic of increasing interest in a lot of countries around the world. This is either because of the high varying availability of raw materials in some regions of the world and/or due to the high "nutritional" benefits of crude fibre based on practical experience and new scientific work, which were not mentioned in the past.

Additionally, reliable information have confirmed that crude fibre in layer diets may influence the behavior of birds' in a positive way, a topic of high interest in all non-cage environments.


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numbers of cracked eggs and increased mortality.

As mentioned earlier, calcium from the feed is essential for egg shell formation. As a result of heat stress, the hen's appetite is reduced and the required daily amount of calcium in the feed may not be sufficient for shell formation. The hens will then take their entire requirement of calcium for the shell from the reserves in the medullary

bone. This will consequently result in what is called "Cage Layer Fatigue" (lameness in laying hens). Affected birds will be unable to eat and drink and will eventually die. This is aside from the fact that there will be an increased occurrence of thin-shelled eggs. Furthermore, the additional respiration will lead to an increased loss of CO<sub>2</sub>. This decreases the blood's concentration of bicarbonates which negatively

affects egg shell formation. Several measures have to be carried out in order to address the problems with the egg shell thinness brought about by heat stress.

- Without sacrificing the lighting program, feed the birds during the coolest part of the day which is early in the morning and late afternoon until early evening.
- As egg formation occurs during the night, it is recommended to give the birds a

"midnight snack". This is to help the birds to get the desired amount of calcium at the desired time for egg shell formation. This "midnight snack" is an additional period when the hens are exposed to artificial light during the night so that they can eat. It will depend on the individual lighting program whether lights come on at 12:00 midnight or sometime earlier or later.

## New Hot Climate Guides for H&N

Most of the world's egg production takes place in tropical and sub-tropical regions under hot weather conditions. Africa, Asia and South America have shown a magnificent increase in egg production (see table) and still have potential for greater growth.

*World production of eggs (in 1000 t)*

Continent	1990		2000		2008	
	Production	(%)	Production	(%)	Production	(%)
Africa	1.542	4.4	1.916	3.7	2.438	4.0
N.&S. America	5.766	16.4	7.583	14.8	8.598	14.2
S. America	2.227	6.3	2.826	5.5	3.721	6.1
Asia	13.803	39.2	29.190	57.0	35.680	58.8
Europe	11.663	33.1	9.480	18.5	9.995	16.5
Oceania	0.244	0.7	0.199	0.4	0.247	0.4
<b>World</b>	<b>35.246</b>		<b>51.194</b>		<b>60.678</b>	

Source: FAOSTAT 2010

It should be noted that not only very warm countries suffer the consequences of hot climate like heat stress, but also temperate countries, where high temperatures in summer occasionally occur. Heat stress is produced when birds experience difficulties in achieving a balance between body heat production and body heat loss. This means, birds are not capable of maintaining a constant body temperature without having to exercise additional efforts. Heat stress interferes with the bird's comfort and suppresses production. Under good conditions, modern commercial layers are able to produce more than 310 eggs per hen housed and year, simultaneously maintaining a feed conversion rate of around 2 kg feed for

1 kg of egg mass. However, production systems and environmental conditions are variable all over the world. Taking this into account, it is not surprising that countries affected by hot climatic conditions which are, in addition, normally not equipped with the latest technologies, cannot reach the standards stated by the breeding companies. At high temperatures of above 32 °C, the decline in performance and the loss of comfort of the birds is obvious. These detrimental effects already start before, but are often overlooked.

Without proper hot weather management, the negative impact of high temperatures on performance can be of great economic importance. Laying flocks first undergo

a reduction in feed intake, followed by a reduction in egg weight with a posterior reduction of production and reduced eggshell quality.

The management recommendations given in the new guide for managing pullets and laying hens under hot climates are intended to provide basic information and to help poultry farmers to fully exploit the genetic performance potential of H&N breeding products in locations dealing with hot climates. This management programme is intended as a guide for newcomers while at the same time, assist experienced poultry farmers with suggestions oriented to optimise their work with H&N breeding products in hot climates.

### H&N International Event

#### H&N Exhibits at VIV Asia

The VIV Asia show was held at the BITEC center in Bangkok March 9 to 11, 2011.

H&N exhibited at this important poultry industry event.

Attendees from Egypt, Syria, Nepal, Pakistan, India, Thailand, Malaysia, Korea, China, Philippines, Kenya and Iran visited the H&N stand.



Staff pictured at the H&N stand are (left to right): Mr. Choochai Sawanwatanakul of United Feeding Co.; Rich Wall and Mohammed Chairi of H&N.

# Chick quality control by H&N International

The aim of H&N International is to produce day-old chicks (DOC) which are able to cope with long transportation times and also perform well during brooding. This means a low first week mortality and uniform growth.

To achieve this, H&N International puts a lot of efforts into maintaining a high quality level in every production stage.

In addition to conventional hatching control measures, there are also routine checks implemented to control the product itself, i.e. the quality of the DOCs, not only on the day of hatch, but also in the initial stages of life. These include the measurement of

The result is a comparable value for chick quality. This method was initially developed by the University of Leuven and then adapted by Pas Reform to make it more suitable for daily use in a hatchery. Based on this system, a DOC of first quality will

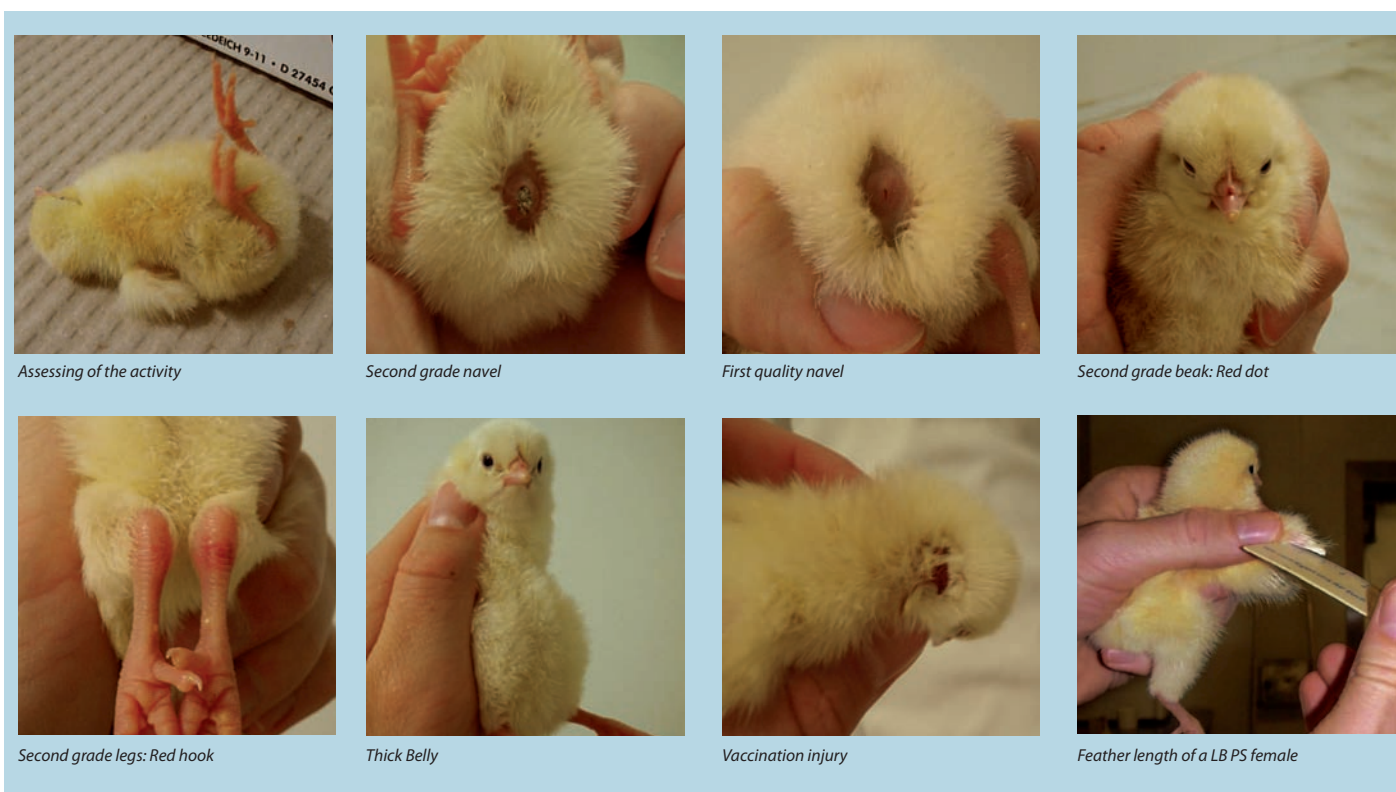
chick on its back and evaluating the time it needs to get back on its feet. The chick loses one point if it takes longer than 3 seconds to get back on its feet.

The second parameter is the quality of the navel. A navel of first quality needs to be fully closed with no or only a little amount of remaining membrane.

As a third and fourth parameter, the quality of the beak and the legs are evaluated. Red dots on the beak or red hooks are mainly indicators

chicks during brooding and leads to an increased mortality. Thick bellies are usually caused either by insufficient water loss of the eggs or very high temperatures during incubation. If the belly feels hard, there is probably an infection of the yolk sac.

The CQS measurement is done with processed chicks which are ready for transport. Conducting this check at this stage, makes it possible to also check the quality of the chick handling, vaccination and grading. Any injuries caused by vaccination or car-



the individual chick weight per breeder flock once a week and a quantitative scoring system known as “Chick quality score” (CQS). The sample size for both of these is 80 DOCs.

The principal of a scoring system is the conversion of visual, qualitative parameters into a quantitative score.

have a score of 10 points. 1 point will be subtracted for every parameter which is not of first quality. The parameters assessed include the activity of the chick, the navel area, the legs, the beak, the belly and the quality of chick processing.

The activity of the chick is measured by placing the

of non-optimal conditions in the hatcher that stressed the chick during hatching.

Red dots are mostly related to elevated temperatures, whereas red hooks are also seen in combination with a thick belly.

The belly of a chick should be soft in texture. A thick and/or hard belly handicaps the

less chick handling, reduces the chick score by one point.

The length of feathers in the wing is also measured. This is a method to judge the freshness of the chicks and helps to adjust the setting time in order to let the chicks hatch exactly at the right time.

# “Super Nick” Performs Profitably in Turkey

Following is a flock performance table for “Super Nick” commercial layers.

The comparison goes to 80 weeks of age as this is the upper age limit of the current standards.

Flock 1 was actually depleted at 85 weeks of age, flock 2 at 86 weeks and flock 3 at 83 weeks.

In most performance parameters, these flocks on average exceeded the “Super Nick” Management Guide standards. It is especially interesting to note that these flocks produced 60 g or more daily egg mass for an average of 28 weeks. This parameter includes both hen day production and egg weight so it provides a clear indication of the superior performance of these flocks. The fact that all three flocks were kept beyond 80 weeks not only indicates the excellent persistency of egg production, but also the trait shell quality.

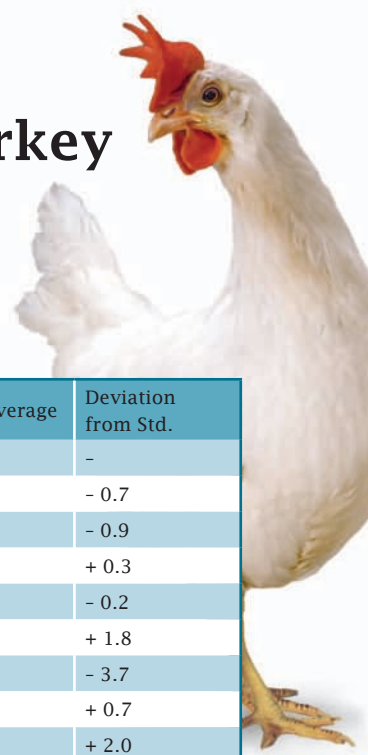
## H&N “Super Nick” Performance in Turkey

Locations: Adapazari & Inegol, Turkey

3 Houses with Controlled Environment, Conventional Cages

Trait	Flock No. 1	Flock No. 2	Flock No. 3	Total/Average	Deviation from Std.
Number of Layers	26.057	25.482	59.925	111.464	-
Eggs/HH to 72 wks.	317.8	314.3	317.1	316.4	- 0.7
Eggs/HH to 80 wks.	356.1	355.2	359.5	356.9	- 0.9
Peak Hen-Day Prod. (%)	96.6	94.6	96.5	95.9	+ 0.3
HDP to 80 wks. (%)	83.4	83.2	84.2	83.6	- 0.2
HDP 77-80 wks. (%)	75.2	77.2	80.8	77.7	+ 1.8
Weeks Over 95% HDP	14	0	14	9.3	- 3.7
Weeks Over 90% HDP	33	29	33	31.7	+ 0.7
Egg Wt. at 30 wks. (g)	63.0	62.0	61.0	62.0	+ 2.0
Egg Wt. at 80 wks. (g)	68.0	68.0	68.0	68.0	+ 1.6
Avg. Egg Wt. (g)	64.1	64.1	65.0	64.4	+ 2.0
Total Egg Mass (kg)	22.83	22.77	23.37	22.99	+ 0.66
Avg. Daily Egg Mass (g)	53.5	53.5	54.7	53.8	+ 1.5
Weeks Over 60 g DEM	31	21	31	28	28
Feed Cons. (g/bird/day)	110.7	112.7	109.1	110.8	+ 0.8
FCR (kg feed/kg egg mass)	2.07	2.11	1.99	2.06	- 0.01
Body Wt. at 19 wks. (g)	1,449	1,449	1,400	1,433	+ 75
Body Wt. at 80 wks. (g)	1,866	1,865	1,849	1,860	+ 20
Weekly Mort. (%)	0.20	0.15	0.13	0.16	- 0.06

\*Note: +/- indicates better or worse than standard



## Verbeek Invests in a State of the Art Hatchery

Verbeek Hatchery of Lunteren, Netherlands, is the distributor of H&N “Brown Nick” and H&N Coral day old layer chicks and starter pullets in the Netherlands.

As a clear signal of its commitment to the European egg industry, Verbeek has invested in a state of the art hatchery facility. With an annual production capacity of 30 million layer chicks, it is billed as Europe’s largest layer hatchery. This facility is located in Zeewolde, one of Netherlands’ new polders (land reclaimed from the sea). Bio-security is the main reason for selecting this site as there are very few poultry farms in this locale. Anyone entering the hatchery must first shower and change to



company supplied uniforms and footwear.



A major feature of the new hatchery is the state of the art single stage incubation equipment. This concept of incubation will produce the most uniform maximum hatches of premium quality day old chicks.

The hatchery is equipped with separate egg storage rooms that can be maintained at different storage temperatures according to the length of time the eggs will be stored. Eggs can also be turned during storage which is another means of assuring maximum hatchability. All material handling equipment (eggs, chicks, hatchery waste and movable equipment such

as racks and trays) are fully automated.

Other innovative features include a centralized sanitation system that distributes cleaning and sanitizing solutions to strategic points throughout the hatchery. There is also a heat exchanger that salvages heat from the hatcher cooling coils for use in heating floors in the building. With the inauguration of this new hatchery, Verbeek is assured to be among the most important chick suppliers in Europe for many years to come.

# CP Standart Invests in New Breeder Farm and Hatchery

**CP Standart with its headquarters in Istanbul and operations throughout Turkey, is a member of the Charoen Pokphand Group based in Thailand.**

To further strengthen its already solid position in the Turkish egg industry, CP Standart has invested in a new breeder farm and hatchery

ventilation systems. The layer houses have automatic egg collection systems. Water for the growing and laying farms is sourced from a 120 meter

stage incubation equipment have been installed and all material-handling equipment within the hatchery (hatching eggs, chicks, hatchery waste and movable equipment such as racks and trays) are fully automated. Strict bio-security measures are in place at



An outside view of the six layer houses at the breeder farm.



An exterior view of the hatchery

ry facilities near the town of Inegol. The breeder growing and laying facilities consist of two brood/grow houses with a capacity for 35,000 pullets plus males. There are also six breeder layer houses with a total capacity of 105,000 females plus males. The breeder farm can produce 23 million hatching eggs per year. All houses are equipped with automatic pan feeding, nipple drinker and

(394 feet) deep well which supplies a storage tank with 300 cubic meters of storage capacity. CP Standart is also a major feed producer so diets can be readily adjusted according to each flock's nutritional needs. The hatchery has the capacity to produce 9.5 million Brown Nick and Super Nick pullets per year. Only layer chicks are hatched at this facility. The latest designs in single

both the breeder farm and the hatchery. Showers and a change to company supplied uniforms and footwear are required for all who enter these facilities.

The hatchery will supply CP Standart's own layer farms as well as the growing demand for Brown Nick and Super Nick layers in the Turkish market.

## New Hatchery Management Guide

**H&N's Technical Service Team has produced a new Hatchery Management Guide.**

Following on from the recommendations for parent stock management, the new guide explains how to handle hatching eggs, to provide optimum incubation conditions and to organize the chick processing. It focuses on presenting the relevant causal relationships affecting hatchability and chick quality. The guide includes a section on important hygiene measures and controls. Finally, correct preparations to deal

with hatchery problems and the solution-oriented handling of these problems are discussed. The new Hatchery Management Guide also presents procedures not routinely used at every hatchery. These include prestorage incubation, pre-warming before setting, the measurement of chick weight in relation to egg weight and various break-out methods. H&N is convinced that this guide



contains suggestions on how to improve hatchery management that will be of interest to every reader.



**Gilbert R. Cervantes, DVM, Dip. PCPP**

- Born in Manila, Philippines in 1966
- Graduated from the University of the Philippines with a degree of Doctor of Veterinary Medicine in 1990

After graduating, Dr. Cervantes has been involved with technical service for several integrated poultry companies in the Philippines. His responsibilities included veterinary and technical service for breeder, layer and broiler flocks. Dr. Cervantes also has extensive experience in the poultry health products industry. He was both Chief Epidemiologist and National Manager of the Animal Health Group of Bounty Farms Inc., a leading poultry integrator in the Philippines, prior to his promotion as Chief of Corporate Technical Services. In this capacity, Dr. Cervantes served as veterinary advisor to Bounty's company-owned broiler and layer operations. Before joining H&N, Dr. Cervantes was the Marketing and Technical Director at Vet. Specialists Inc., a company involved in marketing imported veterinary drugs and animal nutrition products in the Philippines. Effective June 15<sup>th</sup> 2011, Dr. Gilbert R. Cervantes has been appointed Asian Area Technical Advisor for H&N International. In addition, he will assume sales management responsibilities for Nepal and Vietnam.

# Moroccan Excursion to the Netherlands

The production of table eggs in Morocco has seen remarkable growth in the last decade with a significant increase in egg consumption, i.e. from 80 eggs per capita in 2006 to 120 eggs per capita in 2010. Production facilities are becoming bigger, equipped mainly with modern installations in terms of materials, cages of 550 cm<sup>2</sup> / hen, and power ventilated houses adapted to the hot climate conditions of the country.

The current rate of production (nationally) is at around 3 billion eggs a year, with about 13 millions layers in the country. However, the marketing of table eggs in Morocco is still disrupted due to the lack of specialized marketing centres (pack stations) and egg-processing factories.

2011, to observe facilities there and gain practical insight.

Five Moroccan companies participated in this excursion. These companies have a total of more than 1.8 million laying hens in Morocco and are represented by:

Mr Machhour Said, Manager



Left to right: Moh'cine Stilli, Karim El Yousfi, Adil Senhaji, Othmane Afaf, Najib Saber, Hassan Erreimi, Said Machhour

In order to improve the marketing of eggs, Moroccan producers are aware of the necessity to invest in the egg industry, especially in the area of egg-packaging. Europe, and in particular Holland, is a good example to follow in this aspect. For this purpose, the company S.E.S Warren Maroc organized a trip for potential H&N customers in Morocco to Holland in April

of the layer company Solap-rav

Mr El Yousfi Karim, Manager of the layer company Emimdi  
Mr Saber Najib, Manager of the layer company Avisca  
Mr Erreimi Hassan, Manager of the layer company Coprogal

Mr Senhaji Adil, Manager of the layer company Senhaji  
S.E.S Warren, being a member of the holding company Dia-

na Group (chaired by Mr Zni-ber Brahim) actually covers 40 % of the national market needs of day-old layer chicks in Morocco. They intend to develop and to modernize its production facilities so as to increase the market shares. This visit organized by H&N International, allowed the Moroccan group to get acquainted with new breeding techniques in Europe (e.g. aviaries and enriched cages) and to see the genetic potential of Brown Nick under the European conditions.

The Moroccan producers were particularly impressed by the company KWETTERS, a family owned company with 60 years of experience in egg production, packaging and marketing of table eggs under different quality labels. This company supplies a wide range of products under its own label. There are also a lot of different private labels for several supermarket chains throughout Europe. This kind of organization exemplifies possibilities to improve the marketing of table eggs in Morocco.

The companies, Prinzen and Moba, specializing in egg collection automation and egg processing, were also part of the visit programme. They gave our customers all the necessary explanations concerning egg collection automation and egg grading on the farms, as well as information about the investment required. The visit was concluded with a visit to the company WULRO, an independently-owned family

business dealing with the export and processing of eggs which accounts for 20 % of Dutch egg exports.

Basically, this visit allowed our Moroccan customers to have an overview on the investments they need to make in order to organize the production processes in their own companies and how to manage the required marketing tools to ensure an increase in value after production.

## H&N Market International

### Netherlands market data 2009

■ **Basic country information**  
Population 16.2 million  
Land area 4.2 million ha  
Agricultural 2.3 million ha land

■ **Laying hens**  
Layers 31.600.000  
Brown to white ratio: 55:45  
Chick placements 34.700.000

■ **Production**  
Shell eggs 603.000 t  
Average egg weight 62.5 g  
Total egg products 254.000 t

■ **Production System**  
Cages 44 %  
Barn system 41 %  
Free range 15 %

■ **Consumption per Capita**  
Shell eggs 141 eggs / year

■ **Trade**  
Shell eggs (exports) 391.000 t  
Shell eggs (imports) 138.000 t  
Self sufficiency rate 309 %

Source: International Egg Commission (IEC), 2010



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