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Report 695

Livestock, the World, and the Dutch

A quick scan of opportunities in livestock production in nine countries

May 2013

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Publisher
Wageningen UR Livestock Research
P.O. Box 65, 8200 AB Lelystad
Telephone +31 320 - 238238
Fax +31 320 - 238050
E-mail info.livestockresearch@wur.nl
Internet http://www.livestockresearch.wur.nl

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Abstract
This report explores opportunities and associated challenges for companies and organizations engaged in livestock production and marketing by looking at nine countries, representing BRIC countries, the so-called Next 11, and developing countries.

Keywords
Animal production, livestock development, livestock products, growth opportunities, dairy, poultry, pigs, quick scan, Russia, China, South Korea, Vietnam, Indonesia, Turkey, Ethiopia, Kenya, Mexico, The Netherlands

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Authors
Jan van der Lee
Katrien van 't Hooft
Jessica Cornelissen
Bram Wouters

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Acknowledgements

A Quick Scan of livestock production in nine countries sounds easy. In actual fact it turned out to be a enormous task that could not have been done without the help of a large group of people. I would like to thank the agricultural counsellors in these nine countries, staff of DG Agro, Ministry of Economic Affairs, and colleagues from Wageningen UR for their valuable inputs; and of course my fellow authors, each with his or her unique contributions. Special mention should be made of the inspiring contact with Mr Geert Westenbrink, our contact person at the ministry.

It should be noted that this is just a quick scan, a desk study that cannot do justice to the interesting diversity and complexity of livestock production in these nine countries and that of the many Dutch companies and organizations active abroad. Nevertheless, conclusions as well as mistakes in this report of course remain the sole responsibility of the authors.

Jan van der Lee
Wageningen, May 2013

Samenvatting

Al vaak is gesteld dat wereldwijde consumptie van dierlijke producten de komende decennia sterk zal stijgen. Groeiende inkomens zullen de vraag naar zuivelproducten, vlees en eieren stimuleren en veranderen. Boeren en landbouwbedrijfsleven over de hele wereld zouden veel baat kunnen hebben bij deze ontwikkelingen. Vanwege de Nederlandse ervaring met efficiënte veehouderijsystemen, zouden Nederlandse bedrijven een belangrijke rol kunnen spelen in deze *Veehouderij Revolutie*.

Dit report verkent kansen en bedreigingen voor Nederlandse bedrijven en organisaties die met productie en vermarkting van dierlijke producten bezig zijn, door naar een selectie van landen te kijken (9 in totaal): *BRIC landen* Rusland en China, *Next 11 landen* Zuid Korea*,* Vietnam, Indonesië, Turkije en Mexico, en ontwikkelingslanden Ethiopië en Kenia. Op grond van deze negen landenstudies identificeert dit rapport een aantal belangrijke kansen.

Zich meer op de markt richtende veehouders vormen een groeiende markt voor leveranciers van inputs als voer, vee, apparatuur, voorlichting, KI, diergezondheidszorg, en financiële diensten. Vermarktte producten bieden kansen voor verwerkers en handelaars verderop in de keten, die zich richten op de groeiende groep consumenten in de middenklasse en de 'Base of the Pyramid'.

Naast heel veel kansen zijn er ook uitdagingen waar rekening mee moet worden gehouden als we aan duurzame veehouderijproductie in andere landen willen werken. Deze uitdagingen omvatten een aantal *People issues* zoals gezondheid & voedselveiligheid, betrekken van kleinschalige producenten, en dierwelzijn; *Planet issues* zoals de eindigheid van fosfaat, milieueffecten, klimaatsverandering, en verlies van biodiversiteit, en *Profit issues* zoals conflicterende aanspraken voor voedsel-, voer- en brandstofproductie.

Nederlandse bedrijven die in de negen landen actief zijn, houden zich bezig met leverantie van voer, medicijnen, genetisch materiaal, apparatuur, en kennis. Dit richt zich met name op grootschalige productie. Nederland staat goed bekend voor haar expertise rond veehouderij – Nederlandse partijen hebben goede capaciteiten om bij te dragen aan geïntegreerde oplossingen die de duurzaamheid van voedselsystemen vergroten, in het bijzonder in een verstedelijkende omgeving. Deze expertise wordt steeds aangevuld door de voortdurende inspanningen die geleverd moeten worden, teneinde om te kunnen gaan met een aantal weerbarstige problemen die we in Nederland tegenkomen. Te denken valt aan dierziektebestrijding, gebruik van antibiotica, milieuproblemen, dierwelzijn, en de maatschappelijke acceptatie van veehouderij.

Aanbevelingen voor publieke en private partijen die bij willen dragen aan de duurzame ontwikkeling van de veehouderijsector in andere landen zijn onder meer :

- **Voedsel voorop** – realiseer je dat voldoende voedsel van goede kwaliteit een belangrijke prioriteit is op lokaal, nationaal en globaal niveau.
- **Kennis en technologie** – bied de modernste technologie en kennis aan, inclusief de lessen uit de Nederlandse veehouderij, aangepast aan de specifieke vraag in markten. Belangrijke thema's: ketenontwikkeling; inputs, technologie en diensten gericht op productie efficiëntie; controlesystemen voor besmettelijke dierziekten en chemicaliën; mestverwerkingssystemen; bodem & water verbeteringstechnologie, en verwerkingsmethoden.
- **Basale zaken en duurzaamheidsoplossingen**– focus op de echte kracht van de Nederlandse veehouderijsector: ontwikkeling van geïntegreerde totaaloplossingen die bijdragen aan efficiëntie, effectiviteit en duurzaamheid van het systeem; dat alles gebaseerd op *Good Agricultural Practices.*
- **Betrek kleinschalige producenten** – Kleinschalige producenten in de keten betrekken is niet alleen een belangrijke strategie voor leveringszekerheid, maar ook een politieke en sociale noodzaak.
- **Samen sterk** – zoek naar wegen om samen te werken rond positionering in internationale markten.
- **Leer van het verleden** – deel de lessen die er in verschillende veehouderijactiviteiten opgedaan zijn, aangestuurd door de sector zelf, zowel in Nederland als overzee.
- **Ontwikkel capaciteit**– focus op capaciteitsopbouw van lokaal personeel en versterking van instituten.

Summary

Many are the claims that global consumption and production of livestock products will increase vastly over the next decades. Rising incomes are expected to increase and change demand for dairy products, meat and eggs. Farmers and agribusiness worldwide would have much to gain from these developments. Due to the experiences with efficient livestock production systems in the Netherlands, Dutch companies could be important participants in this Livestock Revolution.

This report explores opportunities and associated challenges for Dutch companies and organizations engaged in livestock production and marketing, by looking at a cross-section of countries (total 9): *BRIC countries* Russia and China, *Next 11 countries* South Korea, Vietnam, Indonesia, Turkey and Mexico, and *developing countries* Ethiopia and Kenya.

Based on nine country studies, this report outlines key opportunities around production of food that meets consumer demands for quality and food safety; control of Infectious animal diseases; waste management systems, capitalizing on recognition of Dutch organizations in capacity building, and learning from how other sectors position themselves better in international markets.

Commercializing livestock farmers offer a growing market for suppliers of inputs like feed, stock, and equipment, and for providers of extension, training, AI, veterinary, and financial services. The marketed products offer opportunities for value addition for processors and retailors downstream, who target the growing urban middle class or Base of the Pyramid consumers.

While opportunities abound, a number of challenges need to be taken into account in achieving sustainable livestock production in third countries. These challenges include *People issues* like human health and food safety, inclusion of small-scale producers, and animal welfare; *Planet issues* like phosphate scarcity, environment side effects, climate change and loss of biodiversity, and *Profit issues* like competing claims for food, feed and fuel.

Dutch companies operating in the nine countries studied engage in provision of genetics, , equipment, and know-how, primarily for large-scale animal production. The Netherlands are well-known for their expertise in livestock production - Dutch actors have good capacities to contribute to integrated solutions that increase the sustainability of food systems, especially in increasingly urbanized contexts. This expertise is strengthened by the continuous efforts the livestock sector needs to make to deal with persistent issues in the Netherlands, which include animal disease control and use of antibiotics, environmental side effects, animal welfare, and social acceptance of livestock production.

Recommendations for public and private actors who like to engage in contributing to sustainable development of the livestock sector in third countries include:

- **Food first** – realize that sufficient food of good quality is one of the first priorities at local, national and global levels.
- **Know-how and technology** – offer the latest technologies and know-how, including lessons learnt in Dutch livestock production, tailored to specific market demands. Important areas include value chain development, production inputs, technologies and services that focus on production efficiency, control systems for infectious animal diseases and chemicals, animal waste management systems, soil & water improvement technologies, and proper processing.
- **Getting the basics right and system solutions for sustainability** – focus on the real strength of the Dutch livestock sector: developing integrated and integral solutions that address efficiency, effectiveness, and sustainability of the production system; grounded in Good Agricultural Practices.
- **Include smallholders** – Inclusion of smallholders in supply chains as strategy for sustainable sourcing and as political and social imperative.
- **Act together** – look for ways to improve collaboration for better positioning in international markets.
- **Learn from the past** – increase sharing of the lessons learnt in various animal production ventures and projects, facilitated by the sector itself, both in the Netherlands and abroad.
- **Develop capacity** – focus on capacity building of local staff and on strengthening of institutions.

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1 Introduction

Many are the claims that global consumption and production of livestock products will increase vastly over the next decades. Rising incomes are expected to increase and change demand for dairy products, meat and eggs. Farmers and agribusiness worldwide would have much to gain from these developments.

Due to the experiences with efficient livestock production systems in the Netherlands, Dutch companies could be important participants in this Livestock Revolution [1].

Will that demand growth really happen and what will be required from private and public actors to meet it? This report outlines opportunities and associated challenges for Dutch companies and organizations engaged in livestock production and marketing by looking at a cross-section of countries. It was made on request of the Directorate General Agro of the Ministry of Economic Affairs, which aims to support Dutch agribusiness in developing well-informed and appropriate strategies for international engagement. This quick scan looks at the livestock sector of nine countries, representing BRIC countries, the so-called Next 11, and developing countries. Box 1 gives more information on why these countries were selected and how this quick scan was conducted.

Chapter 2 of this report presents a general overview of current issues in livestock production and consumption. In chapter 3 the country summaries are presented; an info graphic and several tables with key figures are given for each country, followed by key characteristics and opportunities. These summaries are based on a more elaborate review of the countries, of which the results are presented in Part II of this report. Chapter 4 summarizes the opportunities and challenges and chapter 5 the recommendations of this Quick Scan.

Box 1 - A note on methodology

Country selection: The countries for this quick scan are a cross-section of the countries with significant current Dutch agro-food involvement, in combination with a division between BRIC, Next 11 and developing countries. In this way the following countries were included:

- BRIC countries: China, Russia
- Next 11 countries: Indonesia, Vietnam., South Korea, Turkey, Mexico *)
- Developing countries: Ethiopia and Kenya.

Quick scan: This quick scan does not aim to be a scientific study. It rather provides an overview of issues related to livestock production and current Dutch involvement in the selected countries. The information for each of the country scans was drawn from a wide range of sources, varying from scientific studies, plans from Dutch embassies, popular literature, as well as 'grey literature' from organisations working in the sector. This was then analysed and brought together in a referenced overview.

- The initial information produced on each country was reviewed and adapted by researchers, ministry officials, Dutch Embassy staff, and people otherwise engaged in livestock production in the country at hand, although in some cases it was not possible to fully check all findings.
- The analysis of the country scans were then analysed and brought together in the conclusions of this report in chapter 4 and 5: opportunities and challenges (ch.4) and recommendations (ch.6).
- The main focus of this quick scan is on cattle-, pig- and poultry production – species and products in which the Netherlands has expertise. Therefore, it does not include information on other species, such as camels, water buffaloes etc., in spite of their importance in the livestock production systems in a number of countries.

Info-Graphics: The info graphics were produced using data from the CIA World Factbook database [16], the UNDP Human Development Reports database [17] and the FAO database [18].

*) The ***Next Eleven*** *(known also by the numeronym N-11) are the eleven countries – Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, Turkey, South Korea and Vietnam – identified by Goldman Sachs investment bank and economist Jim O'Neill in a research paper as having a high potential of becoming, along with the BRICs/BRICS, the world's largest economies in the 21st century. The bank chose these states, all with promising outlooks for investment and future growth, on December 12, 2005. At the end of 2011, the four major countries (Mexico, Indonesia, (South) Korea and Turkey) also known as MIKT, made up 73% of all Next Eleven GDP. BRIC GDP was $13.5 trillion, while MIKT GDP was at almost 30% of that: $3.9 trillion.*

The criteria Goldman Sachs used were macroeconomic stability, political maturity, openness of trade and investment policies, and quality of education. The N-11 paper is a follow-up to the bank's 2003 paper on the four emerging BRIC economies, Brazil, Russia, India and China. It can be compared with the CIVETS list coined by Robert Ward, global forecasting director for the Economist Intelligence Unit, having a few differences, but many similarities (http://en.wikipedia.org/wiki/Next_Eleven,retrieved April 18, 2013).

2 Trends and issues in livestock production and consumption

2.1 Growing demand offers opportunities

Three developments drive the growing demand for animal derived products: the growth of the world population to an expected 9 billion in 2050, urbanisation leading to changing food patterns, and the growing middle class in emerging economies (like the BRICS and the Next 11), who spend a growing part of their growing income on livestock products [1].

This growing demand for livestock products creates a number opportunities and challenges to governments (policy makers), private sector parties, and knowledge and development institutions. Questions that societies have to face include: What level of self-sufficiency is desirable, what should we import? What type and scale of production systems should be promoted to increase local production - large-scale or small-scale, intensive or extensive? What inputs, services, regulations, and knowledge base are required to facilitate local livestock production? How should these production systems develop in relation to societal demands regarding human health risks, animal welfare, employment and income generation, and care for the environment? How can nutrition improve for vulnerable groups in society, like children in the first 1000 days?

The growing demand offers opportunities for a range of actors around the value chain. Commercializing livestock farmers offer a new market for suppliers of inputs like feed, stock, and equipment, and for providers of extension, AI, veterinary, or financial services. The marketed products offer opportunities for value addition for processors and retailors downstream, who target the growing urban middle class or Base of the Pyramid (low income) consumers. For smallholder and emerging farmers, livestock offers a way out of poverty and malnutrition, especially in developing countries, as Udo *et al.* [2] illustrate using the metaphor of the “Livestock Ladder”. Meanwhile, livestock continues to play an important role in terms of manure being a nutrient source for crop production or fuel, value addition of crop residues and by-products, provider of draft power and transport, as well as provider of a financial safety-net.

Smallholder farms (<2 ha) account for significant and often growing shares of agricultural production. In Africa, for instance, it has been estimated that 90 per cent of all agricultural production is derived from small farms. Turkey is almost completely self-sufficient in food production; this production is dominated by smallholders. Historical trends in farm size suggest that in Africa and Asia small farms will continue to dominate the agricultural landscape for at least the next two to three decades [7].

2.2 What about threats and side effects related to livestock production?

While opportunities abound, a number of threats and side effects caution us to handle with care. Livestock production is not risk-free and new ventures, especially those related to intensification and scale enlargement, require careful attention in order to work towards sustainable practices.

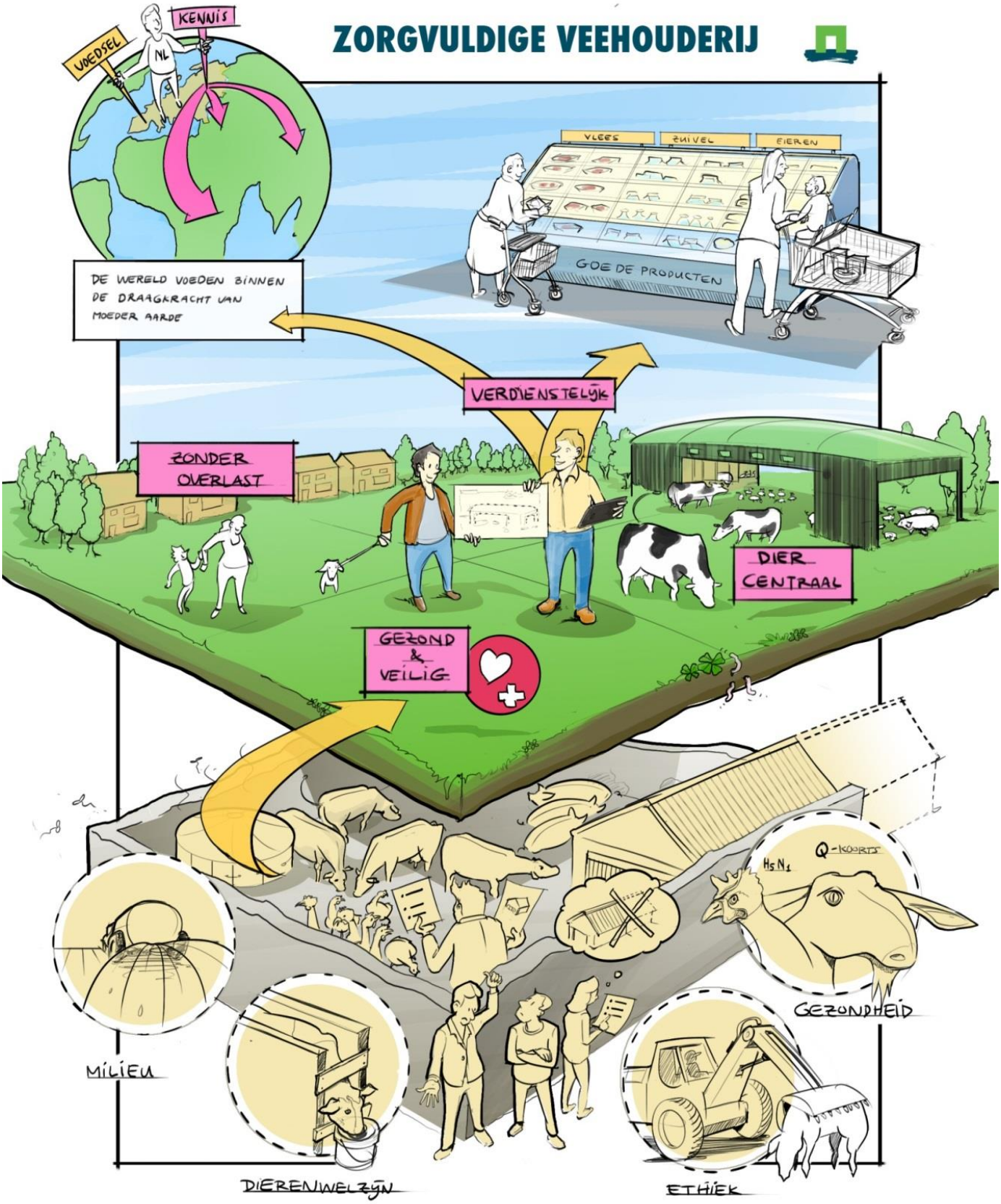
We highlight a number of issues around *people, profit,* and *planet* that warrant significant attention in order to work towards sustainable livestock production systems and sustainable intensification[1]:

People

1. **Health and food safety risks** - The increased and poorly managed use of antibiotics and other chemicals in animal production imply significant risks – for animal health (infectious animal diseases) but also for human health, mainly due to the development of multi-resistant strains of microbes. Zoonosis control is often deficient.
2. **If smallholders loose, all may lose -** Smallholder farmers have adapted their production system to the risk-prone areas they are living in, and to societies where resources and education are scarce. A drastic change in animal production system can increase farm economic risks (due to credit burden and rising grain and fossil fuel prices). The process of intensification of livestock production and centralisation of the market chain may lead to significant loss of employment and growing income disparity. If few other employment opportunities exist and no medium size class of farmers can secure food production, the resulting problems in employment, livelihood, and food security could easily affect the wider society.

[1] For more background on these issues see for example [1][2][3][4][5][6][7][8]

Figure 1. An example framework on the future of livestock production [12]



3. **Animal welfare issues** - Unlike the Netherlands, animal welfare issues are relatively new to the countries in this quick scan. Concern is expected to grow, especially amongst well-off urban consumers, as practices now prohibited in the EU (such as battery cages in egg production) are becoming more mainstream in these countries.

Profit

4. **Competing claims for food, feed and fuel** - In the process of intensification of livestock production, animal feeds include larger quantities of protein-suppliers (especially soy) as well as other grains (especially maize) that could also be used for human consumption and fuel production.

Planet

5. **Phosphate scarcity** - The natural basis of phosphate, one of the central elements in artificial fertilizers, is scarce and can be sourced from only a few locations globally.
6. **Climate change & adverse weather conditions** - Livestock is an important producer of greenhouse gasses, as has been broadly communicated [6]. Meanwhile, livestock also can help in adaptation to climate change, especially for populations in risk-prone areas (e.g. manure for soil fertility and capital buffer). It can contribute to mitigation of greenhouse gasses through rangeland management and soil fertility improvement. Care needs to be taken not to affect these effects in the process of changing production systems.
7. **Environmental problems / water- and soil quality** – Indiscriminate scale enlargement in animal production systems easily results in production of excess manure, which can affect water- and soil quality. Grazing areas erode when overstocked and poorly managed.
8. **Loss of biodiversity and animal genetic resources** - The intensification of livestock production may affect livestock biodiversity. Especially local animal breeds have important genetic traits in resistance to local climatic conditions, diseases and parasites, and provide special quality products.

2.3 The way forward? – The need for sustainable solutions

Innovations in the Netherlands centre on balancing the various requirements regarding *People, Profit* and *Planet* (PPP concept), particularly by fitting intensive and efficient livestock production into a peri-urban context [10]. A number of Dutch actors have strong capacities to contribute to integrated solutions that work towards the sustainability of food systems in (peri-) urbanized contexts [11].

- **Private sector:** develops integrated and sustainable solutions for efficiency, quality assurance, and value addition in integrated chains.
- **Government:** directs its policies towards sustainable livestock production, both in the Netherlands and in international contexts (e.g. Livestock Dialogue and Global Research Alliance).
- **Knowledge institutes:** among others, offer capacity building, system innovations and solutions, both in the domestic and international context.

These actors work best when they cooperate and act together. The (facilitated) cooperation between government, private sector, and knowledge institutions is often hailed as the 'Golden Triangle'.

- **Development cooperation***:* In the international context this "Golden Triangle" is often better portrayed as the 'Golden Diamond' or 'Golden Pyramid', taking into account the roles of NGOs and farmer organizations, which in many countries are not considered as part of the private sector [14].

An example framework for working towards achieving sustainable livestock production systems based on the PPP concept is '*Zorgvuldige Veehouderij*' ("Careful Livestock Production"), as developed by Wageningen UR for the Dutch context (see figure 1) [11][12]. Livestock production systems meeting the requirements of 'Careful Livestock Production' produce animal products with respect for the animal ("*dier centraal*"), with minimal emissions to the environment ("*zonder overlast*"), with efficient use of resources, adding value across the entire chain ("*verdienstelijk*"), and which are socially accepted ("*gezond en veilig*") [13].

This framework could be a source of inspiration for sustainable intensification of livestock systems in other contexts, taking into account general criteria for sustainable livestock development like:

a. *Context specific* – the “right choices” on how livestock production fits in its ecological, cultural and social context differ from country to country[10];

b. *Getting the basics right plus system innovation* – production and marketing systems often need significant change; however, such change is dependent on a firm foundation of Good Agricultural Practices;

c. *Using diversity* – sustainability builds on the diversity available in systems;

d. *Innovative* - clever combinations of innovations within the value chain and sector [13];

e. *A variety of actors is involved and cooperate* [13] [14] – “Golden Triangle”, “Golden Diamond”, or “Golden Pyramid”.

3 Country summaries

In this chapter we present summaries of the country studies reported in Livestock, the World, and the Dutch - Part II: Background Country Studies (Katrien van ‘t Hooft, 2013). The summaries are preceded by some key figures in an info graphic and tables. The data used for the info graphics and tables are sourced from the CIA World Factbook database [16], the UNDP Human Development Reports database [17] and the FAO database [18].

The countries are not ordered according to importance or priority. Rather, they are ordered in the following geographical ‘loop’: first moving East from the Netherlands (Russia, China, and South Korea), then moving South (Vietnam and Indonesia), and then moving West (Turkey, Ethiopia, Kenya, and Mexico).

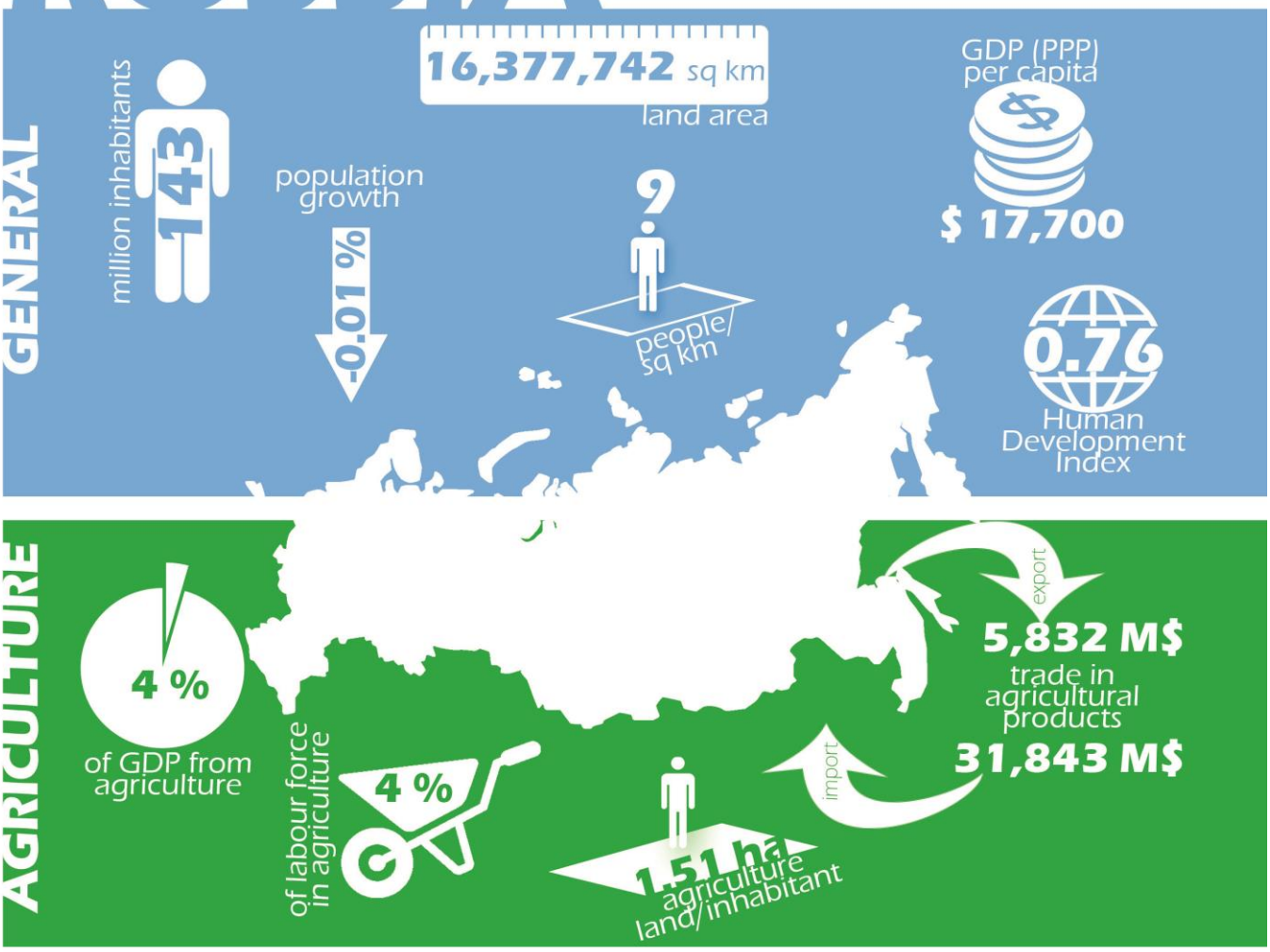
Zero grazing on medium size dairy farm (Indonesia)

Pig manure is sold to crop farmers in plastic bags (Vietnam)

Silage making is on the rise in Ethiopia, as forage prices soar

Daily chore: dropping of milk at the collection centre on the way to school (Ethiopia)

RUSSIA



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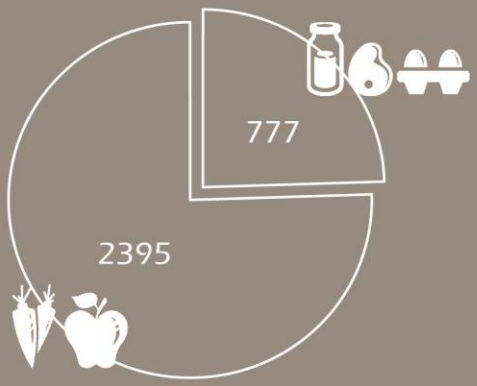
	production (1000 t)	self sufficiency	consumption (kg/cap/yr)
	1,741	69.5 %	18
	2,313	70.5 %	23
	2,169	76.2 %	20
	2,210	100 %	15
	32,798	96.1 %	178

consumption (kcal/cap/day)



figures reflect situation in 2012, except HDI (2011); labor force in agriculture (2007-2011); trade (2010); production, self-sufficiency and consumption (2009)
sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in Russia

	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	346,000*	428,495*	444,819*	29%
Pigs	18,271,400	17,231,000	17,217,900	-6%
Cattle & Buffaloes	28,048,800	20,681,840	19,976,644	-29%
Sheep & Goats	14,750,500	21,986,340	21,819,840	48%

**) poultry are in 1000 heads*

Agricultural area in Russia

	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	217,162	213,780	215,250	-1%
Arable land and Permanent crops	126,238	121,780	123,270	-2%
Permanent meadows and pastures	90,924	92,000	91,980	1%

Trade in livestock products in Russia, import and export values

		2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	7,233,760	31,843,086	340%
	Export	1,076,535	5,832,416	442%
Total Meat	Import	1,002,226	5,233,424	422%
	Export	24,843	70,307	183%
Bovine Meat	Import	361,333	2,185,971	505%
	Export	7,636	10,659	40%
Dairy Products + Eggs	Import	243,751	2,058,740	745%
	Export	95,111	167,051	76%
Milk Equivalent	Import	242,584	1,954,380	706%
	Export	158,205	163,317	3%
Pig Meat	Import	256,762	2,020,903	687%
	Export	11,923	37,106	211%
Poultry Meat	Import	371,084	901,499	143%
	Export	3,731	10,006	168%

Producer prices in Russia

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	503	1843	267%
Chicken Live Weight	728	1745	140%
Cow milk, whole, fresh	129	407	215%
Hen eggs, in shell	621	1377	122%
Pig Live Weight	716	2297	221%

General

- **Transition to a player of global proportions** - Since the fall of the Soviet Union in 1991, Russia underwent the transition from socialism to a market-based economy. The country's agricultural sector followed a similar course as the nation's economy as it moved from state-owned farms in a command economy to individually owned farms in a market economy. The first decade of the transition was marked by a sharp decline in output, particularly in the livestock sector, as heavy government subsidies ceased to exist. At the turn of the century, the sector grew stronger gradually as output rose and performance of farming systems improved, although some farming systems show a systematic underperformance. Russia gradually came back as the global player in world agricultural markets we know today, that is not only in terms of demand, but also in terms of supply (mainly grains).
- **Great challenges for feeding the nation** - Russia has 10% of the world's agricultural lands though 40% of the land is un-used. Gradually Russia is moving towards self-sufficiency, but still import about 50% of its food. Policy aims at reaching 80% self-sufficiency in basic foodstuffs by 2020. This would represent an overall increase of 20% in current production. Main issues for further development: improvement of productivity and efficiency, viability of large farms, unskilled workers, a shortage of skilled labour, and deficient commercial services and public institutions to support the sector.
- **Small farms play an important role in livelihood** - In terms of numbers of farms, small plots represent the vast majority; in 2002 98% of farms in Russia had less than 2 hectares of land. While small farms are important in terms of livelihood, large farms are responsible for the majority of production. In 2008, 86% of total poultry meat was produced by large-scale, industrial-type enterprises, 14% by farmers and backyard producers. In the pig sector, the 15 largest companies represented almost half of the pig meat market in 2011 and they are expected to grow further.
- **Soviet-shaped institutional environment mismatches the post-Soviet era** - After the fall of the Soviet Union, research and development institutions fell short in supporting the sector; they struggled in the new post-Soviet reality as they were used to serving large farms in a centrally planned economy. Furthermore, entrepreneurship in agricultural development is hampered due to a tendency to rely on the government for financial support. Those government bodies that have the task to support the agricultural sector often lack information or the capacity to perform adequately. There is a tendency for companies without prior experience in the livestock industry to engage in the sector, upon stimulation of the government.

Livestock systems

- Russian agriculture today is characterized by three types of farms:
    1. Corporate farms – dating from the Soviet time, when they existed as collective and state farms.
    2. Household plots (or dachas). About 50% of Russian urban families have dachas (0.9 - 2.7 ha).
    3. Peasant farms - emerged after the Soviet transition.
- Household plots and peasants represent the vast majority in terms of numbers; in 2002 98% of the farms had less than 2 ha of land. In 2005 these two types of farms were responsible for over half of the countries' agricultural production, using only 20% of the land.

Dairy

- Decline in livestock population and production since the fall of the Soviet Union. Russia wants to increase national dairy production by 20% to 38 million tons from 2012 to 2020.
- In 2012 over 129 million Euros was used to support dairy farmers. Policies aim at strengthening national production, regulating competition from other countries and strengthening export. An example is the Family Dairy Farming Project which aims to promote family dairy farms by co-financing 30% of construction costs. Also, several regulations to increase competitiveness of Russian dairy products are envisaged in the Draft Programme "Development of Agriculture in 2012-2020", such as the instalment of import duties, the introduction of a traceability system and the support of certification schemes.
- Milk yield per cow rose 2.1% in the period 2006-2011 to a yield of 4.31 tonnes per cow per year in 2011.

- Consumer prices for milk have risen 4-fold between 2000 and 2011. As a result, low income families have limited access dairy and in general consumption of dairy products has remained flat. This is expected to continue into 2013.
- Half of the dairy reaches the market through formal chains, which are well-organised and have modern facilities and management.
- Trade in informal chains is occurs mostly in rural areas. Modern milking installations and reliable cooling facilities are scarce.

Pigs

- Similar to dairy, the pork production in Russia dropped drastically between 1992 and 2005. Commercial pig production was effected most by this trend.
- Due to outbreaks of African Swine Fever between 2007 and 2011 production in all types of farming systems dropped further.
- Pork consumption grew at the beginning of the 21st century due to increasing incomes. However, from 2003 onward, consumption stagnated as decreasing imports lowered availability of pork. Still, nearly 1 million tons of pork was imported in 2011, making Russia the largest pork importer.
- Over 8 billion of dollars was invested in the pig production industry between 2006-2011 in the context of the National Priority Project on Agricultural Sector Development (2006-2008) and state program of Agricultural Development (2008-2011). 750 swine breeding facilities were put in place with a gain in pork production of 58%.
- The pig sector fears major losses due to entering the WTO and competition from western Europe, which will result in the drop of prices on the domestic market.

Poultry

- Poultry production is dominated by large agricultural enterprises. In 2009, these large farms accounted for 88% of total production.
- It is projected that poultry production (chicken and turkey) will increase 7.3% between 2012 and 2013. The growth of the sector is supported by the government (“Development of Poultry to 2012 and to 2018-2020” program). The targeted level of self-sufficiency is 85%.

Critical points for improvement

Shortage of skilled labour

- There are not enough motivated and well-trained agricultural workers in the Russian livestock sector. Both technical and management skills are underdeveloped

Marketing barriers

- Since August 2012 Russia has closed borders for Dutch day-old chicks and eggs for brooding as well as non-heat treated poultry products because of low-pathogen avian flu in the Netherlands.
- Export of live heifers is stopped due to the prevalence of Schmallenberg virus in Russia.
- There is a ban on live animals (except breeding animals) from the EU since March 2012.

Environmental problems

- Russia is facing loss and degradation of agricultural areas, due to erosion, neglect and destruction by mining, road building, etc.
- Also, livestock diversity is seriously threatened with six local cattle breeds and one pig breed. endangered; 13 local cattle and 10 pig species have already become extinct.

Infectious animal diseases

- In 2007 there was a major outbreak of African Swine Fever which still is not under control.
- A low-pathogenic form of bird flu has been reported on a large-scale farm in June 2012 In November 2012 bird flu was also found amongst wild birds in province of Krasnodar.

Health issues and zoonosis

- Russia has exceptionally high heart disease death rates amongst men over 30 years of age, rate due to cardio-vascular diseases (61% of all deaths), also compared to other western societies, which can be prevented through a healthy diet, regular exercise and reducing tobacco use.
- Dangerous zoonotic diseases such as Rabies are still prevalent in Russia. Tuberculosis also continues to be a problem, especially amongst HIV positive people.

Antibiotic resistance

- Antibiotic resistant micro-organisms are an issue of major concern in Russia.

Key Dutch involvement

The Netherlands is a major investor in Russia, with 11.6 billion dollars invested in 2009. Approx. 80 million was invested in primary food production. Current Dutch involvement focusses on support of large-scale animal production and on establishing educational programs and demonstration farms.

Several institutions created or coordinated by the Dutch government or Dutch companies are active in Russia:

- Livestock Expertise Center - transfer of Dutch knowledge and technologies on dairy and pigs.
- Dutch Trade Board - support of Dutch companies that want to enter the Russian market.
- Foundation Dutch-Russian Livestock - consortium of Dutch companies who jointly focus on Russia.
- Landbouwwerkgroep Nederland Rusland - discusses market issues and cooperation between the Netherlands and Russia.
- Dutch Poultry Centre - consortium of Dutch companies in poultry who jointly focus on Russia.

Direct investments in Animal Production

- Dairy - Bles Dairies, Cowhouse BV,Campina in Stupino (Moscow region), Nutricia (now Danone) in Istra (Moscow region).
- Poultry - OAO “Ptitsefabrika Severnaya” in St. Petersburg.
- Animal feed - De Heus, Denkavit Netherlands BV, Provimi, Hifeed Trouw Nutrition, Sloten.
- Genetics and forage seed - Hendrix Genetics, Topigs, CRV Delta, Koepon, Barenbrug, Bejo.
- Equipment & IT - Fancom, Hotraco Agri BV, JOZ, NEDAP, Nooyen, Trioliet Mullos, JOZ, Agriprom, Broekens, van ‘t Riet, Cowhouse, De Laval, Delta, E-kwadraat, Lely, VDK.
- Meat/food processing - MPS (Meat processing System), Ecolab.
- Expertise - BLGG AgroXperts, ECOlab (Water&Energy technologies), EM Agriton/EMRO.
- Food - Unilever (The company has launched a new investment project in the Tula region: a multi-purpose ice cream production complex).
- Animal health - Intervet (MSD Animal Health), GD lab and Feed lab (LEC project).

Research, Education, Advice

- Education/consultancy/research - PTC+, the Friesian, Wageningen UR (setting up MBA programs in agriculture on Russian universities), Schothorst, GD Deventer.
- Livestock Expertise Center and Trio Farms - model dairy farm and training center (total 3000 cows).
- Melken over de Grens – Rusland - website for Dutch farmers working abroad.
- Roodbont Publishers.

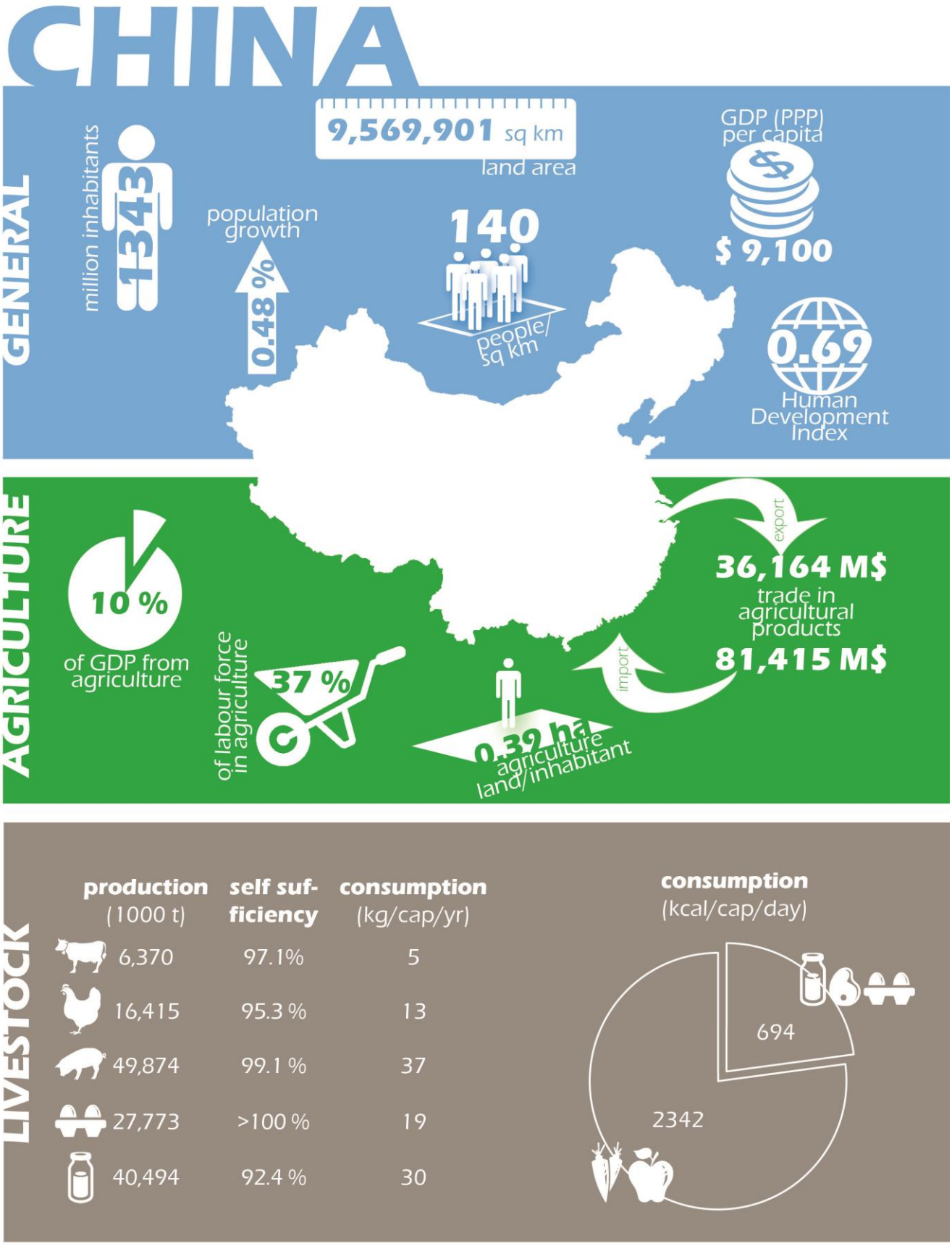
Opportunities for future Dutch involvement in Russia

a. *Training and skill development* focused on entrepreneurship and competencies at farm level; including theoretical and practical skills, management skills and market intelligence.

b. *Support large-scale systems in finding ways to produce more efficiently*, at lower cost in order for them to be competitive with the rest of the world after WTO accession.

c. *Further vertical integration along the livestock value chains*, with processing industry acquiring interests not only in their suppliers (livestock farms), but also in supplier of their suppliers (i.e. integrating concentrate feed production) and in distributors (integrating retail).

d. *Support the production of feed-ingredients* so as to limit the need for the import of soy and other feed-ingredients from other countries.



figures reflect situation in 2012, except HDI (2011); labor force in agriculture (2007-2011); trade (2010); production, self-sufficiency and consumption (2009)
sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in China

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	1,179,989*	2,532,714*	4,445,543*	5,756,922*	5,810,530*	31%
Pigs	325,677,660	360,898,080	438,910,190	476,267,000	470,960,950	7%
Cattle & Buffaloes	70,935,949	100,918,786	127,148,576	107,400,275	106,405,882	-16%
Sheep & Goats	183,330,529	211,821,806	279,573,350	284,727,772	281,070,359	1%

**) poultry are in 1000 heads*

Agricultural area in China

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	428,519	505,792	525,036	518,801	519,148	-1%
Arable land and Permanent crops	100,219	131,397	132,202	125,968	126,315	-4%
Permanent meadows and pastures	328,300	374,395	392,834	392,834	392,834	0%

Trade in livestock products in China, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	7,984,004	9,791,156	15,358,781	81,415,408	430%
	Export	4,554,139	10,207,810	13,081,327	36,163,980	176%
Total Meat	Import	38,762	216,945	875,065	2,435,829	178%
	Export	511,658	1,474,650	1,254,865	2,473,009	97%
Bovine Meat	Import	31,065	147,905	214,353	621,366	190%
	Export	24,317	242,802	66,430	172,839	160%
Dairy Products + Eggs	Import	121,793	308,913	432,788	2,396,093	454%
	Export	59,093	58,055	86,106	195,927	128%
Milk Equivalent	Import	122,270	307,264	438,306	2,412,938	451%
	Export	3,092	13,378	62,645	69,939	12%
Pig Meat	Import	41	976	102,251	357,556	250%
	Export	327,470	1,050,753	196,589	817,035	316%
Poultry Meat	Import	378	48,268	507,030	1,200,214	137%
	Export	68,878	109,004	887,494	1,332,953	50%

Producer prices in China

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	846	2090	147%
Chicken Live Weight	478	2031	325%
Cow milk, whole, fresh	294	458	56%
Hen eggs, in shell	460	1004	118%
Pig Live Weight	626	1561	150%

General

- **Rapid social and economic development** - China has experienced an extra-ordinary economic growth with an increase of per-capita income around 8.3% between 1981 and 2005. Poverty fell from 65 to 10% of the population in that same period. Meanwhile there are limits to growth – even in China. Economic growth is slowing down, from 10.4% in 2010 to an expected 8.5% in 2013.
- **Growing differences between rural and urban populations** - China stimulates rural economy by all kinds of subsidy to decrease the income differences between town and country side.
- *Shortages of arable land* - China invests (buying and leasing) in foreign land and foreign resources (for example phosphate) especially in Africa, to produce food and feed for its population.
- **History of agro-ecological and organic agriculture** - Chinese farmers have long history of agro-ecological farming, including integrated technologies, for instance rice-duck farming.
- **Government policies** - The government aims to invest in agriculture to become more self-sufficient, as well for food as for (animal) feed production. Moreover, due to several food scandals, Chinese government puts emphasis on improving food safety.
- **Market for organic farming and organic food products is expanding rapidly**.

Livestock systems

- Current Livestock production is mainly based on small scale farms (backyard farming), but the number of large scale farms is increasing. The government is aiming at large scale farms and has established regulations to encourage this transition. Some Chinese regions aim at a small number of very large farms, and other regions give a limitation of the farm size.
- Note that in statistics, the definition of a large farm varies (in the province Sichuan a large farm produces over 50 pigs a year).
- Animal production chains are modernized and especially the slaughtering stage is given a prominent role. Generally there is still a lack of knowledge and expertise to build and to work in integrated chains.

Pigs

- From the past Chinese prefer pork and the demand for pork is high. Nevertheless, the consumption of other meat products is increasing.
- There are 48 native pig breeds remaining in China all with different features and qualities, which are still greatly favoured by many consumers.
- The number of pigs in large scale industrial farms increases although there are still many backyard farmers selling their pork on local markets.

Poultry

- China's poultry industry is beginning to develop its own growth path out of the shadows of the pork industry. The demand for poultry is increasing.
- Poultry production in China is still less industrialised and has not yet reached the standards as other poultry producing countries (such as the US, Thailand or Brazil) in terms of farm management, productivity, food safety and disease prevention.
- Vertical integration is quickly gaining popularity, but contract farming is likely to remain the dominant business model as a result of prohibitive capital requirements, a lack of experience and rising land costs.
- Disease outbreaks have brought serious consequences to producers and processors in the past few years.
- Consumers have raising concerns over the use of growth promoter and medicines in poultry production.

Dairy and beef

- Dairy consumption per capita is growing. Recently, the demands for beef increased rapidly.
- Most dairy production takes place in northern China, while most dairy consumption is located in the South.
- The average farm in China has 2.8 milking cows and there are 2.3 million holdings with less than 20 cows. There has been massive investments in large-scale units; there are already 700 herds with more than 1,000 cows. International investors are involved in some of these massive units.

Critical points for improvement

Trade barriers

- Long procedures with difficulties to get permits for import of livestock products.
- Pesticide residues, low food hygiene and contamination of products caused trade restrictions. Nowadays, China introduced new legislation and regulations for both Chinese producers and imported products.
- As of May 2013, new regulations will be in effect for imported dairy into China. Dairy that is to be imported into China must comply with quality and food safety requirements which have been applicable since 2011 for domestic products. This has major consequences for the Dutch dairy exports to China.

Land issues

- China is facing a shortages of arable land and has difficulties to maintain the soil fertilized.
- China is highly dependent on imports of food and animal feed.

Environmental

- Introduction of fertilisers, pesticides, irrigation, machinery and new varieties resulted in a dramatic increase in yields and commercial output from agriculture. However, also soil erosion, desertification, overgrazing, over-fertilization, deforestation, over-fishing, and soil fertility decrease occurs in many places.
- Livestock diversity is threatened in China, with 9 local poultry and 1 pig breeds at risk or endangered; 9 local cattle and 5 poultry breeds and 10 pig breeds have become extinct.
- Water quality problems due to deficient manure handling in large-scale animal units are increasing. Currently over 50% of animal manure is dumped directly in surface waters.

Infectious animal diseases

- China is facing severe problems with several infectious animal diseases, such as Foot&Mouth Disease, PRRS and Avian Influenza. To control animal diseases, strict protocols and transparency are crucial.

Health issues and zoonosis

- Chinese livestock gets nearly half of all antibiotics produced for livestock worldwide. Indiscriminate use of antibiotics and other chemicals (such as growth-hormones) in animal production systems caused multi-resistant strains, such as MRSA.
- Obesity in China is still low (2.9% in adults) though it is a growing problem.

Key Dutch involvement

- Dairy - FrieslandCampina (offices in Bejing and Shanghai).
- Feed – DeHeus, Agrifirm, GMP+, VanDrie
- Genetics and forage seed – Topigs, CRV Delta, Koepon, Barenbrug.
- Orange Pig is an initiative of 10 firms that are investing in developing the pig production chain in China, including Topigs, De Heus, Botraco, VION, Provimi, NEDAP, Nooyen, MPS, VDL, Fancoom.
- NL presented itself with a Dutch Pavilion during VIV China 2012, a major event on animal industries Feed to Meat; Dutch Poultry Centre was present. Dutch poultry farmers, such as ECO group presented itself; Chinese version of training called “Chicken signals International” presented.
- NEDAP China Ltd. Is a subsidiary of NEDAP NV, IT for animal husbandry, especially pigs and dairy. NEDAP works in coordination with WUR-LR.
- Equipment – Agriprom, De Laval, Delta, JOZ, E-kwadraat, Jansen’s Poultry Equipment.
- Solidaridad works with 1) Chinese soy producing companies towards sustainable soy production according to RTRS standards; 2) Bionext on developing organic layer feed chain that complies to ecological and social criteria; 3) China Soybean Inidustry Association on multiyear partnership
- Roodbont Publishers.

Opportunities for future Dutch involvement in China

Given the differences between the Chinese and Dutch (West European) perspectives, working in a consortium with both Dutch and Chinese partners is most promising.

China is focusing on mega-farms for food-security, but lacks experience in this direction. The Netherlands could work on providing inputs, services and technical support. The following aspects have to be taken into account:

- Limited experience with and commitment of Chinese workers for very large-scale units.
- Most mega farms are situated in the dry plains of northern China. Due to climatic circumstances and lack of land, most soy and other protein sources for animal feeds have to be imported.
- Strong competition from other countries (New Zealand, US, Israel, Denmark) in this field, while the mega-farms desired in some parts of China do not exist in the Netherlands.

The following opportunities could be taken into account for future Dutch involvement:

a. *Learn from past experiences* - e.g. difficulties with Sino-Dutch Animal Husbandry Training & Demonstration Centre (SIDAC).

b. Integrated approach instead of only large-scale systems

- Support moderately-sized large-scale systems for metropolitan food supply with emphasis on food safety, closing nutrient cycles, animal welfare, soil-fertility and climate provisions.
- Improvements for all animal production systems in the field of food safety, disease control, breeding, feeding, mechanisation, water and energy management and supply chain development; combinations that promote sustainability and transparency.
- Support the upcoming organic production systems, building on new trends for direct marketing and shortening food chains.
- Support small-scale systems with ‘niche products’ such as meat from black Hill Pig with reliable traceability systems.
- Support to promote and establish local food production for local population, so-called “local for local”.

c. Support manure handling systems

- Appropriate waste management of animal manure in large-scale animal systems, including appropriate utilization of animal manure for crop production based on crop demand, in order to prevent further environmental damage.

d. Food safety

- The need for implementing food safety control and traceability in supply chains is an opportunity for the Dutch to provide expertise and technical systems.
- Besides control the Dutch have expertise on improving animal health, reduction of medicine use (including antibiotics) and use of other chemicals e.g. in feed production. WUR has already established a food-safety lab in Beijing.
- Using by-products of the food industry in animal feed preventing food safety risks.

e. Training and education

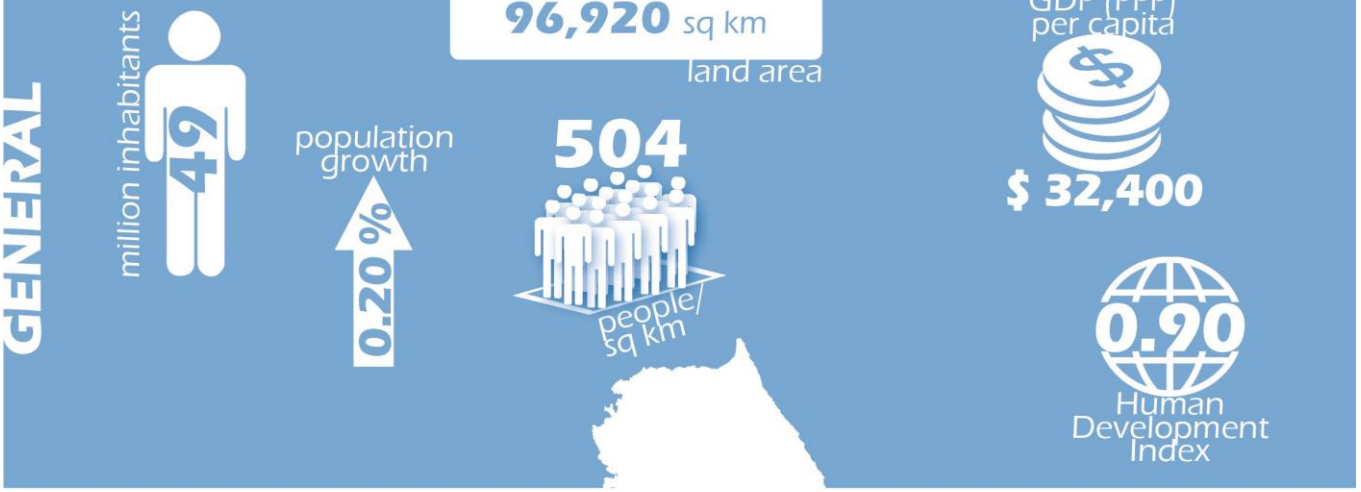
- Training is an obvious component with an emphasis on practical training. E.g. at demo-farms with appropriate technology and educational opportunities. This training has to be adapted to local circumstances and include the various animal production systems. The lessons learnt in terms of environment and social effects of animal industries in the Netherlands can be shared.

f. Other opportunities

- The Dutch involvement is to be focused on developing in-land food security strategies rather than promoting exports from the Netherlands to China. Although for some products, like veal, the Chinese production can’t keep up with the demand, which may be an opportunity for Dutch companies.

SOUTH KOREA

GENERAL

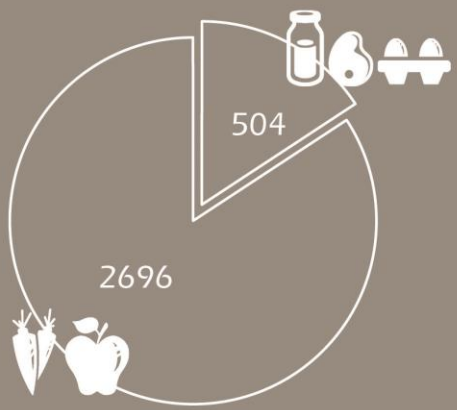


AGRICULTURE

LIVESTOCK

	production (1000 t)	self sufficiency	consumption (kg/cap/yr)
	283	49.8 %	12
	553	89.9 %	13
	1,000	71.5 %	29
	598	99.5 %	11
	2,174	81.4 %	23

consumption (kcal/cap/day)



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sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in South Korea

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	40,574*	75,189*	107,706*	163,610*	169,317*	57%
Pigs	1,783,540	4,528,010	8,214,370	9,880,630	8,170,980	-1%
Cattle & Buffaloes	1,634,050	2,125,600	2,133,720	3,351,390	3,353,350	57%
Sheep & Goats	206,735	214,517	445,662	246,820	248,400	-44%

**) poultry are in 1000 heads*

Agricultural area in South Korea

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	2,247	2,179	1,973	1,773	1,756	-11%
Arable land and Permanent crops	2,196	2,109	1,918	1,715	1,698	-11%
Permanent meadows and pastures	51	70	55	58	58	5%

Trade in livestock products in South Korea, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	3,300,101	6,459,079	8,297,544	18,795,842	127%
	Export	640,823	1,145,283	1,533,349	3,851,151	151%
Total Meat	Import	22,718	350,791	1,088,047	2,043,035	88%
	Export	32,118	55,247	82,586	44,369	-46%
Bovine Meat	Import	7,162	306,735	735,862	1,090,535	48%
	Export	348	205	3,059	10,453	242%
Dairy Products + Eggs	Import	6,988	19,005	140,777	454,626	223%
	Export	85	303	5,539	23,684	328%
Milk Equivalent	Import	8,179	19,952	147,476	462,324	213%
	Export	75	85	5,458	23,031	322%
Pig Meat	Import	97	14,237	262,725	705,522	169%
	Export	1,116	31,352	73,825	1,726	-98%
Poultry Meat	Import	54	9,912	80,063	219,845	175%
	Export	6	276	3,274	31,961	876%

Producer prices in South Korea

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	5028	7261	44%
Chicken Live Weight	1041	1675	61%
Cow milk, whole, fresh	265	733	176%
Hen eggs, in shell	1119	1849	65%
Pig Live Weight	1498	2607	74%

General

- **Export-driven economy** - South Korea is one of the major economies worldwide. It has one of the world's highest population density and a rapidly aging population. The economy is export-driven, with production focusing on electronics, automobiles, ships, machinery, petrochemicals and robotics. It is a high income country, however there is a gap in income between farm and urban households. Food processing companies are relatively small and investments are low. The retail sector, particularly hypermarkets and convenience stores, has been developing very rapidly.
- **Land shortage and transformation to industrialised society** - At the end of the 20th century, there was a rapid transformation from an agrarian to an industrialised society. South Korea's agricultural part of the GDP shrunk from 25% to 3%, with rice as the main product. About 62% of Korean farms were less than 1 ha in size and only 7% had more than 3 hectares. Farm size and the number of specialised farms is increasing.
- **Rising production and continued need for food imports** - Although Korea has doubled its agricultural production between 1970-2005 and attain self-sufficiency for some major products such as rice, it still needs to import most of its food.
- **Need to increase competitiveness of agriculture** - A growing number of bilateral free trade agreements increasingly exposed Korea's agriculture to international competition, making it urgent for policy makers to increase the competitiveness of this sector.
- **Changing food consumption patterns** -Korea's food consumption patterns are changing. While rice continues to be the staple food, the consumption of livestock products, fruits and vegetables has greatly increased. Obesity is a major problem. Food-safety, health food, and environmental impact of food production have become more important considerations than food availability.
- **Animal disease control measures** - The government announced measures to improve the nation's livestock disease controls, including farm registration, minimum space requirements per animal, increased training, stronger FMD Standard Operating Procedures, and cost sharing for vaccination expenses. The most significant change for the local livestock industry is the farm licensing system, which will be gradually instituted from 2012 through 2015.

Livestock systems

Dairy

- The Korean dairy sector is relatively young – in the 1980's rice farmers started adapting to dairy.
- In 2011, South Korea had about 404,000 dairy cows; milk yield was about 4.59 ton/cow.
- Most dairy farmers are family farmers with up to 50 dairy cattle and 1 ha of land. All feed, including grass, is imported from the US. Due to lack of land, manure is being with crop farmers.
- There is a milk quota to limit production. Overproduction has led to a powder-milk reserve used for food-aid to North Korea.
- All milk is processed in the 11 major processors.
- Dairy consumption has been actively stimulated by the government – which resulted in a large increase in consumption.
- In 2010, beef consumption was 434,000 tons. More than half of this was imported. Growth in beef consumption is dampened by high prices.
- The Korean Dairy Committee (KDC) was created in 1999 to handle the marketing of milk between producers and processors.

Pigs

- In 2011 South Korea consumed around 100.000 tons of pork per month, 75% of which comes from local farmers and 25% is imported.
- The pig sector in South Korea grew up to 2003 (growth stopped due to the outbreak of swine flu) in term of numbers of animals and the weight of hogs slaughtered. Pig farming turned into a full-time activity. Pig production concentrated on fewer farms with more animals (mostly more than 1,000 hogs but some even have more than 10,000 hogs) which could produce with lower costs. Production

is concentrated in the province surrounding Seoul, and, secondarily, in the southeast and central parts of the country.

- Pork used to be a major export product in the 1990's, but this decreased due to competition from China and the outbreak of swine fever.
- Consumption of pork is higher than that of other meat, mostly because of the lower price and better availability (compared to e.g. beef).
- Since June 2012 place-of-origin labelling is compulsory for pork. It already applied to rice and beef.

Poultry

- Both poultry production and consumption increases in the country.
- Most chicken production is on farms with 40,000 or more birds. About 3,000 chicken farms (broiler and layer) dominate production. Despite government restrictions on the maximum farm size because of environmental concerns, the trend toward larger, more efficient farms continues.
- Improved local poultry breed was successfully promoted for export of safe chicken meat as Premium Korean Chicken Brand 'Handak', to countries like Vietnam, Japan, China and Taiwan.
- Since June 2012 place-of-origin labelling is compulsory for chicken.

Critical points for improvement

Marketing barriers

- Animal disease outbreaks early in 2000 have seriously disrupted trade, production, and consumption of meat in South Korea.
- South Korea had closed its borders for Dutch poultry meat between 2003 and 2013 due to the HPAI epidemic.
- The country recently reduced its pork imports from the EU because its own pork production rose after the MFD outbreak in 2011.
- Bovine semen is not yet open due to the outbreak of Schmallenberg virus in Europe.

Environmental problems

- High use of fertilizers, pesticides and water in agriculture.
- In 2009 the country has signed an agreement with the US and accepted the import of genetically modified soy.
- Insufficient manure processing facilities result in environmental problems due to manure.

Infectious animal diseases

- South Korea has seen outbreaks of FMD (it was officially declared FMD free in 2011),Classical Swine Fever was reported in 2003 and HPAI is not under control.

Health issues and zoonosis

- Obesity is a major problem. One out of every five children in South Korea is overweight.
- The frequency of food poisoning and outbreaks in restaurants and school meals due to various micro-organisms and chemicals is increasing.
- South Korean government banned animal feed containing antibiotics, to control antibiotic resistance and increase acceptance of meat production amongst population.

Antibiotic resistance

- South Korean government has banned animal feed containing antibiotics, to control antibiotic resistance and increase acceptance of meat production amongst population.

Key Dutch involvement

After the US and Japan, the Netherlands is third largest investor in South Korea. Currently the main focus of Dutch involvement with South Korea is related to input provision, training services and development of agro-parks or food valleys. Dutch inputs, technology and training are already known in South Korea. There is specific interest in high tech, for example the joint development of IT applications in agriculture.

The following livestock related Dutch activities could be identified:

Export of Dutch products

- Eight Dutch firms export poultry products after approval of Korean authorities in December 2012.
- South Korean government and organizations are particularly interested in the experiences and knowledge in terms of agricultural policy innovation in changing conditions.
- Praktijkschool PTC+ receives groups of students from South Korea for special training courses.
- Direct investments in animal production; some Dutch companies including Nedap and Jansen's Poultry Equipment are introducing state of the art feeding and detection systems for better production efficiency.

Public Private Partnerships on various agriculture related themes

- Landreclamation project Saemangeum - The Netherlands Ministry of Economic Affairs and the Korean Prime Minister's Office signed an MoU in 2010 to facilitate cooperation in several aspects of the sustainable development of Saemangeum (e.g. energy, water, ecology and agriculture).
- The Netherlands food and consumer product safety authority and the Korean Animal, plant and fisheries quarantine and inspection agency (QIA) signed an MoU in 2012 on electronic certification of information exchange in the trade of agriculture products.
- The Smart City project provides for training and consultancy in agri-food (agro-parks) in the cities of New Songdo, Saemangeum and Sejong City.
- NIZO Food Research and Oost NV have signed an MoU in 2012 with Foodpolis to develop a Food Valley Region with agro-food clusters in the Jeonbuk province.

Opportunities for future Dutch involvement in South Korea

a. *Training and knowledge sharing.*
   - Korea is particularly interested in the Dutch experiences related to agriculture in general, including livestock. It wants to build it's food security on latest technologies and insights. Capacity building with emphasis on practical training adapted to local circumstances and including the various animal productions systems, taking into account all lessons learnt.

b. *Manure management systems.*
   - Co-research with Korean research institutes.
   - Sales of installations such as for biogas production.

c. *Modernization of livestock housing, feeding system and breeding*
   - The Korean government is putting efforts in modernizing the facilities in the livestock sector, including housing and feeding systems.
   - Import of good quality bovine breeding materials and technical support of breeding companies in poultry and pig.
   - In case of pig and poultry breeding there will be opportunities in technical cooperation between breeding companies.

d. *Organic food chain*
   - Especially for baby-food.

VIETNAM

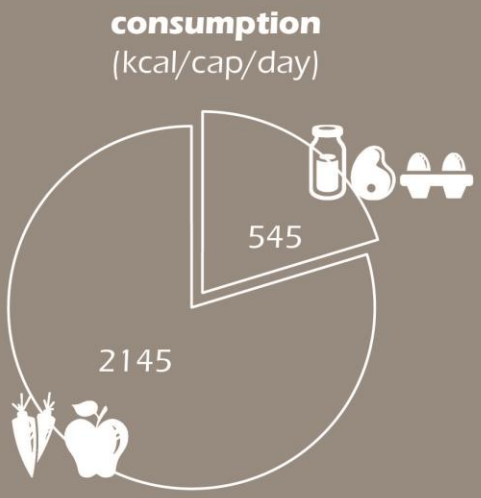
GENERAL

310,070 sq km
land area

AGRICULTURE

LIVESTOCK

	production (1000 t)	self sufficiency	consumption (kg/cap/yr)
	369	98.9 %	4
	620	69.7 %	10
	3,036	>100 %	35
	309	>100 %	3
	311	30.6 %	12



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sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in Vietnam

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	64,500*	107,400*	196,100*	286,834*	322,600*	65%
Pigs	10,001,200	12,260,500	20,193,800	27,373,300	27,056,000	34%
Cattle & Buffaloes	3,977,200	5,971,000	7,025,100	8,685,300	8,148,600	16%
Sheep & Goats	173,400	372,300	543,867	1,288,350	1,267,800	133%

**) poultry are in 1000 heads*

Agricultural area in Vietnam

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	6,858	6,726	8,780	10,768	10,842	23%
Arable land and Permanent crops	6,570	6,384	8,138	10,126	10,200	25%
Permanent meadows and pastures	288	342	642	642	642	0%

Trade in livestock products in Vietnam, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	326,909	236,642	1,422,306	9,072,748	538%
	Export	99,229	737,434	2,298,541	10,411,031	353%
Total Meat	Import	906	230	390	911,582	233639%
	Export	380	28,542	119,525	28,442	-76%
Bovine Meat	Import	906	230	170	274,142	161160%
	Export	27	30	10	1,928	19180%
Dairy Products + Eggs	Import	10,135	7,990	142,385	493,161	246%
	Export	0	3,991	4,097	11,977	192%
Milk Equivalent	Import	10,135	7,990	142,265	493,155	247%
	Export	0	102	1,497	7,103	374%
Pig Meat	Import	0	0	25	1,466	5764%
	Export	303	27,832	119,275	26,150	-78%
Poultry Meat	Import	0	0	25	615,338	2461252%
	Export	0	30	0	352	-

NB: Producer prices were not available for Vietnam

General

- *From agriculture to industry and services* - Since the nineties Vietnam is a market economy based on socialist principles, which means a relative small private sector with many links to government, strong governmental directives and most land still owned by the state. Two decades of rapid economic growth and market integration have transformed Vietnam from a developing country to an emerging economy with lower-middle income country status.
- *Agriculture: important source for labour and income, using more external inputs* **-** Despite the rapidly changing environment, 70% of the population continues to live in the rural areas and derives its livelihood from agriculture, which remains an important source of income and job creation for the large rural labour force. The government aims to invest in agriculture to become less affected by price fluctuations on the world market and to reduce inflation.
- *Poverty mainly a rural phenomenon* - In the period 1993 – 2010, national poverty incidence declined from 58% to less than 10% – lifting some 30 million Vietnamese people out of poverty. However, poverty remains predominantly a rural phenomenon, Rural people comprised 91% of total poor in 2010 – a figure that has shown little decline since 1993 when it stood at 95%.
- *Traditional integrated farming (VAC system) still in place* - Integrated farming – or the VAC system - is the traditional approach to family food production, integrating the home plot/garden ('Vuon'), pond ('Ao'), and livestock pen ('Chuong'). An estimated 85-90% of rural families maintain a garden and livestock pen, with 30-35% of them having fishponds. In many villages, 50-80% of families have the full VAC system.

Livestock systems

Three main systems prevail:

- Backyard system, mixed crop-livestock - The traditional integrated farming system is the base for family food production and surplus sales for the market, integrating garden, pond, and livestock pen. The vast majority (98%) of farms are small-scale with small numbers of livestock (1 or 2 pigs, 5-7 chickens).
- Semi-intensive (or small-scale commercial) system - more specialised small scale pig, poultry, dairy, and beef cattle farms, making use of improved inputs (e.g. day-old chicks, commercial feeds, exotic dairy cattle); producing either for the formal market (contract farming) or informal market. Small scale commercial dairy producers make up 98% of total dairy farms.
- Intensive large scale systems - Many large former state-owned and international pig farms use purebred lines from Europe and North America in nucleus and multiplier units.

Pigs

- Medium-sized pig farms (300 to 2,000 pigs) are the fastest growing segment of livestock sector.
- The rising demand and new WTO international trade agreements could force Vietnam to accept pork imports, jeopardizing continued growth in local pig production.
- In some areas (Mekong and other deltas) pig manure is traditionally used for fish-ponds; biogas for cooking is on the rise.

Poultry

- Poultry meat consumption is expected to rise with 37%, production with 27%, import volumes with 49%, between 2012 and 2021.
- Backyard system produces 65% of poultry products; small scale commercial 10-15%; large integrations: produce 20–25%.

Dairy and beef

- Dairy consumption per capita is growing with 5.7% per year (increasing incomes and education).
- Vietnamese dairy farms belong to both a) the lowest cost milk producers (<18 US$/100kg ECM) and b) the world's most profitable dairy farms (2 to 9 US$/100kg ECM entrepreneurial profits).
- Domestic beef demand is met by local supply; beef production has been growing over the last two decades – both in aggregate and per-capita terms.

Critical points for improvement

Market barriers

- Imports of veterinary products, feed ingredients, livestock, and livestock products are hampered by increased attention to sanitary issues and requirements.

Land issues

- Although 9 million hectares of agricultural land have been issued to 12 million households, the land reform process is still incomplete and requires further investment.

Environmental

- Medium-sized pig farms are the fastest growing segment of Vietnam's livestock sector. The waste that these farms produce pollutes waterways and produces millions of tonnes of greenhouse gas (GHG) emissions.

Animal health and food safety issues

- Avian Influenza is a major problem, country is most affected by HPAI after Indonesia. Food & Mouth Disease is endemic. PRRS (Abortus Blue) in pigs affects mostly Northern provinces of the country. Classical swine fever (CSF) has been endemic in Vietnam for decades, and is still of major economic importance. Vaccination efforts of smallholder pig production have encountered serious difficulties.
- Interest in short-term gains and a lack of information about antibiotics are the driving factors behind widespread antibiotic resistance.
- Consumers are increasingly concerned about food safety; main issues of concern are pig diseases, chemical residues, growth hormones, quality of milk from smallholders, and unhygienic conditions at point of sale. Widespread and unregulated use of chemicals has resulted in negative health effects for farmers.

Key Dutch involvement

Direct investments in animal production

- Hypor/Hendrix Genetics daughter Japfa Comfeed Vietnam Ltd is the second largest poultry producer in Vietnam.
- FrieslandCampina is the second large milk enterprise.
- De Heus Vietnam LCC runs four feed mills in the country.
- Provimi (part of Cargill).

Public-private partnerships and development projects

- 2012 agreement with Dutch Ministry of Economic Affairs to assist in HPAI and pig disease control, controls in slaughter and meat processing establishments, and to set up national identification and registration system for dairy in Vietnam.
- Various Public-Private Partnerships are investing in pork and dairy production chains (FrieslandCampina and partners are investing in advice to dairy farmers and in development of dairy zone).
- Together with the Ministry of Agriculture and Rural Development, SNV is implementing a domestic biogas program (over 100,000 biogas plants constructed).

Business climate

- One of the fastest growing economies in Asia. Growing consumer demand for livestock products due to increased incomes and population growth.
- Communist country with relatively open and market oriented economy.
- Member of the regional organisation ASEAN and since 2007 also of WTO and OIE.
- Young and hard-working population, increasingly educated, with the flexibility and entrepreneurial spirit to run small and medium enterprises.
- Intensive bi-lateral contacts with the Vietnamese authorities are required to deal with market access issues.
- Various support structures are in place, such as the *Netherlands-Vietnam Chamber of Commerce* and *Dutch Business Association Vietnam.*

Opportunities for future Dutch involvement in Vietnam

The Netherlands is one of the major European investors. Vietnam is increasingly interested in applying high-tech solutions to agriculture and specifically recognizes the Netherlands as a supplier of high-tech agricultural innovations and knowledge. The aim of both governments is to sign a Strategic Partnership Arrangement (SPA) on agriculture in 2013.

Vietnam offers many opportunities for development of its livestock and aquaculture sector, due to growing demand and government policies directed at increasing food security. The government is prioritising swine and dairy sectors with the objective of boosting pig meat exports and reducing reliance on imported milk products.

The expected increase in livestock production will offer a large market for feeds and feed supplements.

Opportunities for Dutch agri-business, knowledge institutions and development organisations include:

a. *Dairy supply chains*

- Expansion of local milk production for foreign milk processors.
- Support to moderately-sized large-scale systems for urban supply - with emphasis on closing nutrient cycles, soil fertility, fodder supply etc.
- Inclusion of smallholder producers in modern value chains and increasing the productivity of small scale production systems; attention for manure management, dairy chain development, niche products etc.
- Establishment of Education, Research and Information facilities for dairy farmers.

b. *Pork supply chains, including manure handling*

- Large pork integrations offer opportunities for suppliers of genetics, inputs for chain control systems, equipment, manure handling, and processing equipment.
- Support to small-scale VAC systems, for example with marketing support for ‘niche products’ originating from local pig breeds with reliable traceability systems; follow-up on biogas systems.

c. *Poultry supply chains*

- More commercial production will provide market for suppliers of genetics, equipment and inputs.

d. *Feed industry*

- Expansion of market for feeds and feed supplements.

e. *Environment*

- Knowledge and technology on environmentally friendly waste management (nutrient cycling, technology).

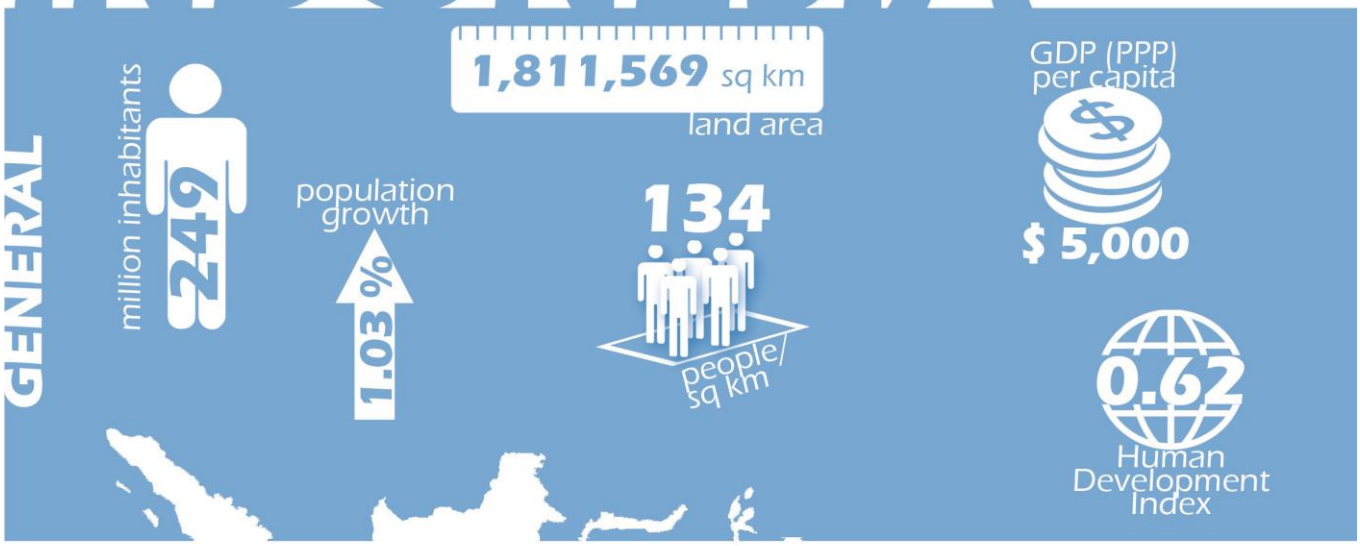
f. *Food safety promotion*

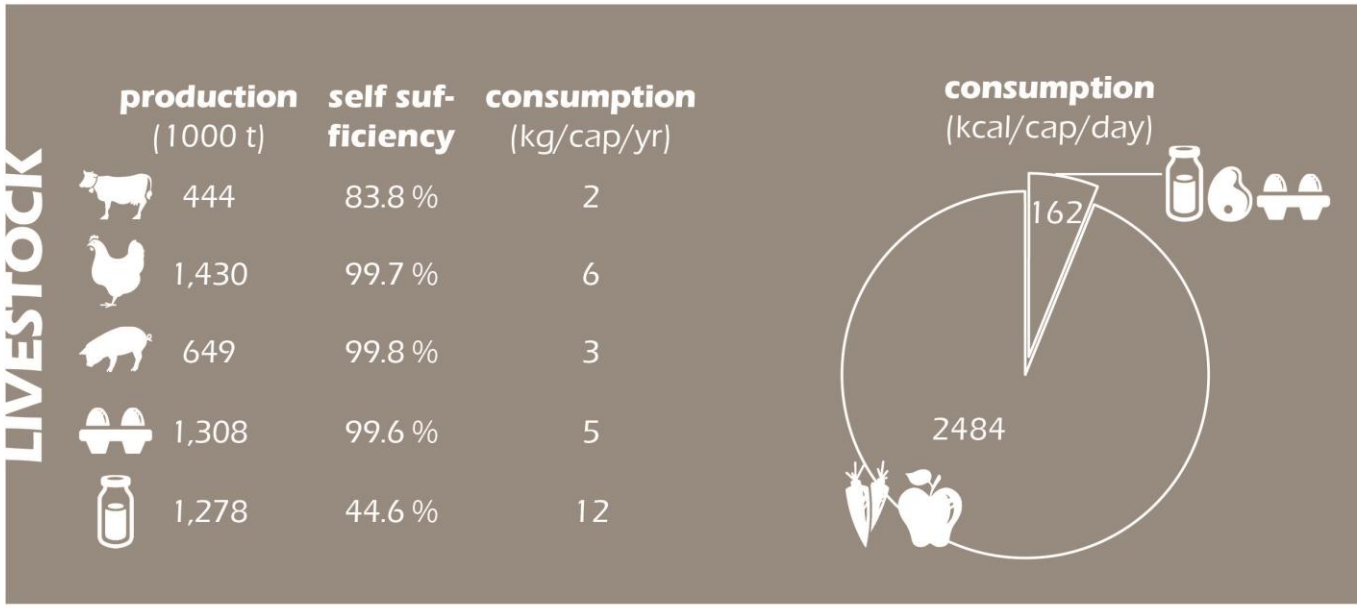
- Knowledge and technology on quality assurance systems, including tracking and tracing systems (I&R), quality analysis equipment, control of use of antibiotics, chemicals, and other residues, and inspection and enforcement systems.
- Support to preventive control, including laboratories for animal feeds and other inputs.

g. *Disease control*

- Disease control (HPAI, FMD, pig diseases) becoming more important, offering opportunities for further assistance of the Netherlands with expertise and control programs.
- With enough interest from the private sector the on-going cooperation on Avian Influenza could be expanded. FAO has expressed interest in cooperating on AI vaccine production in Vietnam.
- Changes to the poultry sector will change the social fabric and the livelihoods portfolio of many vulnerable people, and so they need to be carefully considered and backed up by supporting measures where existing coping strategies will not be enough.

INDONESIA





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Key figures (source FAOSTAT)

Livestock resources in Indonesia

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	170,328*	596,716*	888,532*	1,393,932*	1,476,552*	66%
Pigs	3,155,000	7,135,640	5,356,830	7,477,000	7,758,000	45%
Cattle & Buffaloes	8,897,000	13,745,280	13,413,280	15,587,000	16,129,000	20%
Sheep & Goats	11,815,000	17,303,590	19,992,590	27,345,000	28,855,000	44%

**) poultry are in 1000 heads*

Agricultural area in Indonesia

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	38,000	45,083	45,677	54,600	54,500	19%
Arable land and Permanent crops	26,000	31,973	34,500	43,600	43,500	26%
Permanent meadows and pastures	12,000	13,110	11,177	11,000	11,000	-2%

Trade in livestock products in Indonesia, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	1,555,276	1,591,058	4,054,469	12,474,853	208%
	Export	2,736,910	2,802,390	4,946,439	30,722,359	521%
Total Meat	Import	5,134	7,891	54,770	301,490	450%
	Export	4,778	13,756	13,313	23,847	79%
Bovine Meat	Import	2,745	5,970	42,020	293,194	598%
	Export	13	67	63	323	413%
Dairy Products + Eggs	Import	80,080	71,264	258,387	930,001	260%
	Export	157	16,605	74,905	89,114	19%
Milk Equivalent	Import	81,589	73,256	259,914	950,005	266%
	Export	157	16,288	74,767	89,052	19%
Pig Meat	Import	477	624	1,351	833	-38%
	Export	0	7	563	104	-82%
Poultry Meat	Import	766	543	10,288	1,310	-87%
	Export	0	254	1,322	189	-86%

Producer prices in Indonesia

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	921	3301	258%
Chicken Live Weight	961	3230	236%
Cow milk, whole, fresh	316	516	64%
Hen eggs, in shell	1876	2480	32%
Pig Live Weight	904	2098	132%

General

- **Large democracy** - a politically stable country with developing democracy.
- **Economic growth** - a lower middle-income country with a relative high economic growth.
- **Agriculture is key, but food insecurity prevails** - large part of cultivated land used for export crops (there is a strong expansion of oil palm). Most agricultural activity is on island of Java. National food production insufficient.
- **Focus on small-scale farming and food security** - the main priorities of agricultural policy concern food security, income generation, food diversification, value-adding and competitiveness, and farmers' welfare.

Livestock systems

Indonesia is a very large country with significant variation. In broad strokes the main systems are:

1) General agricultural systems smallholder farming; semi commercial farms producing mainly rice, vegetables, and fruit.
2) Smallholder cash cropping – mainly focused on export crops such as rubber, cocoa and palm oil.
3) Large-scale plantations - owned by private investors or state companies producing export crops like palm oil, rubber, coffee etc.; no livestock.

Cattle – beef and dairy

- Many small-scale mixed crop livestock farmers keep beef-cattle as a source of draught power, manure, and backup cash when needed. Next to cattle, goats and sheep play an important role in the livelihoods of families (income opportunities for particularly women and children). On the island of Java, cattle production is highly integrated with intensive crop production. Especially in the lowlands, cattle management is intensive, using a cut-and-carry feeding system with backyard barns. Specialized fattening is limited to number of small- to medium-scale fattening operations (10-20 cattle) and some large scale commercial feedlots (up to 3,000 cattle).
- The Indonesian dairy industry is growing, but so far only limited to the island of Java (especially West and East Java). Several new dairy farms are entering the industry and some major dairy manufacturers are expanding their capacity. Expansion to other islands is still small scale.
- Government policy aims at improvement of production per cow, of raw milk quality, and higher farm gate milk prices. Government training centres train extension staff and farmers. The country aspires to be 50% self-sufficient in dairy by 2020. In 2013, the Government initiates a direct feed subsidy program in 4 provinces. The trials targeted 100 small farmer groups who produce their roughage and concentrate from own silage. The aim of the program is to improve the quality of concentrate through price subsidy. When successful, the Ministry of Agriculture wants to expand the program to more farmer groups nationwide.
- Per capita consumption of milk is below consumption rates of neighbouring countries, as many dairy products have costs prohibitive for the majority of consumers. Availability is an issue for consumers outside Java. Consumption of milk is likely to increase with income growth and expansion of dairy industry to other parts outside Java.

Pigs

- Pork is consumed only by the minority populations of the Christian, Hindu and Chinese. Pig production is relatively low and pork imports are discouraged. From that point of view the FAOSTAT pig and pork data presented on the previous 2 pages are surprisingly high.
- Approximately 250,000 live pigs are exported to Singapore annually from North-Sumatra and Pulau Bulan, an island close to Singapore.
- In 2009 the sector faced an outbreak of swine flu. This resulted in decreasing prices for pork due to public scares. Nipah virus emerged in 2012, transmitted through bats and mosquitos.

- In some cases large amounts of pigs (up to 22,000 animals) are slaughtered as part of a ritual ceremony such as the Hindu Galungan festival.

Poultry

- Poultry meat and eggs represent an important source of protein in Indonesia. As the population grows and the population increasingly prefers chicken over other animal meats, the consumption of poultry meat and eggs is expected to rise.
- Indonesia has one of the largest poultry populations in the world. Most poultry is reared in backyard farming systems. In 2007 the government banned backyard poultry and home slaughtering in Jakarta to contain an HPAI outbreak.
- Only 3-5% of poultry is slaughtered and processed under industrial conditions. The remaining 95% is transported as live birds into larger residential areas and slaughtered under poor hygienic conditions (among others wet markets). An estimated 800.000 birds are consumed in Jakarta daily.
- The poultry industry is characterized by tight competition and rising prices for feed (ingredients).
- Indonesia has no large scale poultry integrations but companies like CP, Japfa and Sierad make contracts with small scale commercial farms and provide them with day-old-chickens and feed.

Critical points for improvement

Land issues

- Competing claims affecting land availability for feed production - a range of stakeholders – logging companies, farmers, mining companies, settlement programs and local populations - have competing claims on (agricultural) land or natural resources.
- The availability of roughage poses problems for the Indonesian dairy and beef sector. The land available for growing grasses, legumes, etc. for roughages is very limited as there is competition from other crop production, tourism or settlement. Also, the land is segmented and many are under government possession by law.

Environmental problems

- Indonesia is – after US and China – the world's largest contributor to greenhouse gas emissions – especially due to deforestation, slash and burn agriculture and rice cultivation.

Infectious animal diseases

- The Indonesian livestock sector has seen outbreaks of swine flu and bird flu (Avian influenza) in the past years. Bird flu has caused numerous human victims since the turn of the century.
- Avian influenza impacts small and medium scale poultry producers, as their flocks died or were killed during control and eradication procedures.
- Government abilities to control Avian Influenza (HPAI) have been limited. The generally poor sanitary conditions, under which the animals are slaughtered in the Poultry Collector Facilities (PCFs), should be considered a public health risk.
- Indonesia is free of FMD. Tuberculosis and Rabies occur.

Key Dutch involvement

The Netherlands is an important investor in Indonesia. It is attractive because of its growing economy and large consumer market (the largest in South East Asia) with over 20 million affluent consumers. According to the Multi-Annual plan of the Dutch Embassy, Netherlands government support in the agro-sector (with the aim to improve food security and commodity development) will focus on sustainable chain development and increasing Dutch knowledge inputs.

Several Dutch-Indonesian organisations and network facilitate the business climate, e.g.:

- Indonesia Netherlands Association (INA) - the official Benelux Chamber of Commerce in Indonesia aims to encourage and support business cooperation between Indonesia and Benelux countries.

- Indonesia – Netherlands Society - aims to organize symposia and contacts for private enterprise, education, knowledge institutes etc.

Direct investment in the livestock sector

- FrieslandCampina is active in Indonesia since the colonial period. Milk is sourced from several cooperatives based only on the island of Java. Yearly, 600 million litres of milk is processed into dairy products.
- ISA (Hendrix Genetics), Hybro and Intervet have offices in Indonesia. The first two provide poultry genetics. Intervet provides animal health products and services.

Development Cooperation sector

- Indonesia is one of the fifteen 'partner countries' for Dutch development cooperation. For Indonesia, the priority themes are water and food security.
- In the food security program, the embassy is developing projects in poultry and dairy/cattle feed. Wageningen UR is taking a lead in identifying potential activities and partners for the program.
- FrieslandCampina has been developing a big Dairy Development Program (DDP) which aim at increasing productivity and quality of the milk in West Java. Additional support from Dutch government to DDP is expected to be known soon after summer 2013 (under PPP food security program).
- The Friesian - Milk quality improvement project, including dairy demo farms.
- Agriterra, together with FrieslandCampina, supports two dairy cooperatives in Java.
- Hivos and SNV Netherlands Development Organisation run a Biogas Programme. The aim is to set up 8000 biogas units in total on small scale dairy farms supplying milk to Nestle. In 2011, half of this number was reached. Next to construction of the unit, training is provided. Access to finance is facilitated by Nestle.
- WUR has been engaged in an Indonesia-Dutch partnership program on HPAI (2005-2011) aimed to help contain the HPAI threat to humans and livestock in Indonesia.

Opportunities for future Dutch involvement in Indonesia

Dutch involvement in the livestock sector is related to agri-business involvement (dairy, genetics, and feed) and livestock related development projects funded by the Netherlands government (HPAI project, dairy development projects, biogas production from manure, food safety and capacity building).

Due to the experience of development organisations with small scale farming systems in the country, the combination with private enterprises within various public private partnerships seems to work well.

Areas of opportunities include:

a. *Disease control and food safety*
   - provision of knowledge of methodologies, especially on Avian Influenza and New Castle Disease

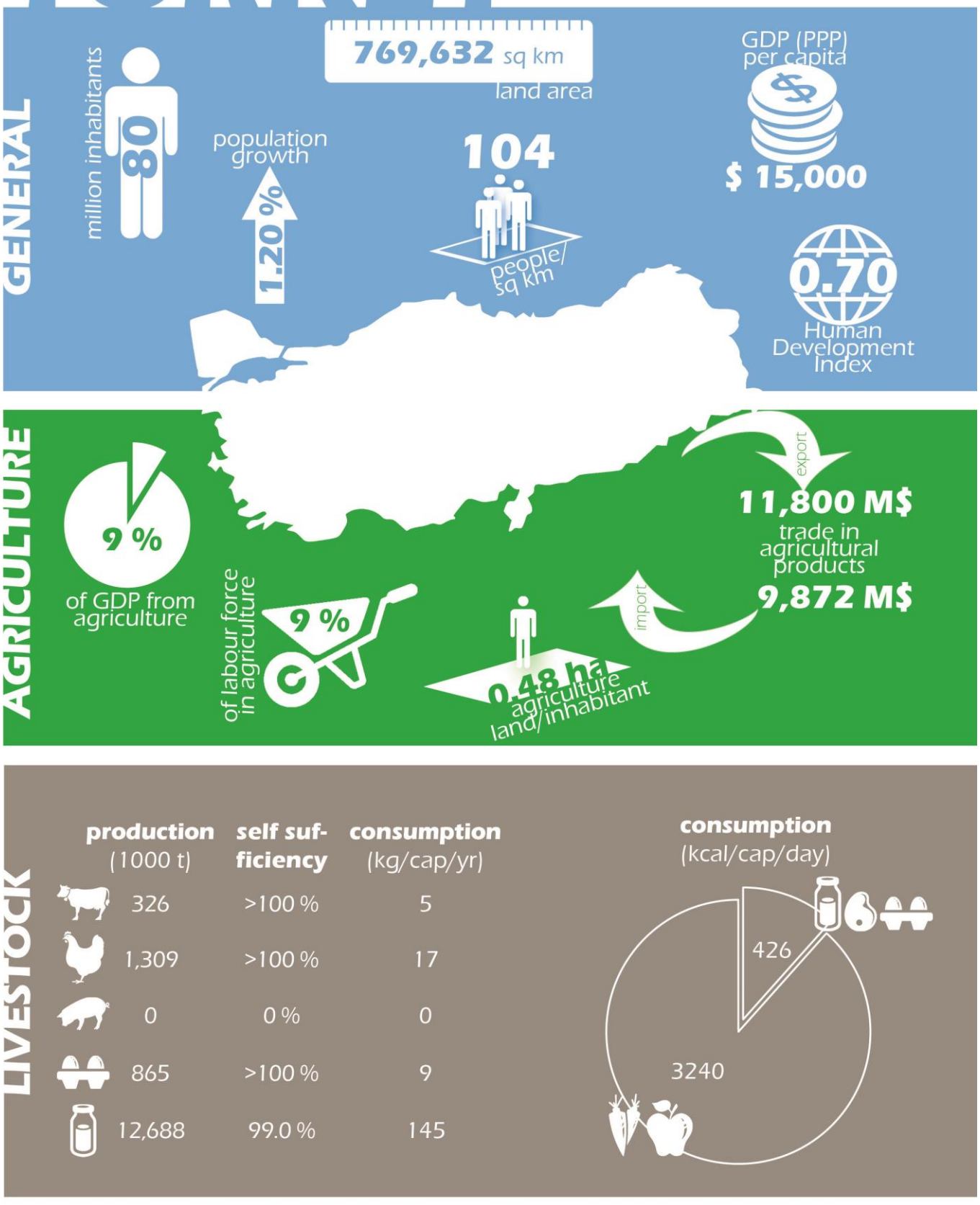
b. Value chain development
   - improving local dairy value chains (milk production, collection)
   - Quality assurance and traceability systems for niche products of local poultry breeds

c. *Provision of feed inputs, equipment and genetic material* (poultry, dairy)

d. *Manure management* - making energy from waste (bio gas, nutrient cycling)

e. *Capacity building* - vocational training of actors in the value chains.

TURKEY



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sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in Turkey

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	58,284*	69,529*	246,477*	234,082*	238,973*	-3%
Pigs	13,000	8,000	3,000	1,896	1,558	-48%
Cattle & Buffaloes	16,607,000	12,602,000	11,219,000	10,811,207	11,454,526	2%
Sheep & Goats	64,801,000	55,589,000	38,030,000	26,922,790	29,382,930	-23%

**) poultry are in 1000 heads*

Agricultural area in Turkey

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	38,579	39,677	40,479	39,012	38,247	-6%
Arable land and Permanent crops	28,479	27,677	26,379	24,395	23,630	-10%
Permanent meadows and pastures	10,100	12,000	14,100	14,617	14,617	4%

Trade in livestock products in Turkey, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	335,656	2,262,147	3,231,090	9,871,917	206%
	Export	1,834,270	3,119,982	3,620,535	11,799,732	226%
Total Meat	Import	0	14,435	1,158	251,236	21596%
	Export	20,635	21,255	12,501	233,120	1765%
Bovine Meat	Import	0	13,683	22	249,600	1134445%
	Export	0	1,199	695	2,849	310%
Dairy Products + Eggs	Import	1,548	18,237	35,718	127,844	258%
	Export	1,446	12,111	18,318	297,673	1525%
Milk Equivalent	Import	1,748	18,074	32,708	133,817	309%
	Export	1,446	8,049	14,674	141,634	865%
Pig Meat	Import	0	481	99	661	568%
	Export	212	285	934	16,881	1707%
Poultry Meat	Import	0	202	1,005	921	-8%
	Export	0	901	6,216	210,867	3292%

Producer prices in Turkey

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	2597	6801	162%
Chicken Live Weight	4008	4652	16%
Cow milk, whole, fresh	355	609	72%
Hen eggs, in shell	1138	1341	18%
Pig Live Weight	-	-	-

General

- **Rapidly growing economy, poverty is decreasing**. The Turkish economy is now 15th in the world and is growing fast with 8-12% over the past years. Due to the rapid economic growth after the 2001 crisis, Turkey's social outcomes have improved. Poverty decreased from 28% in 2003 to 18% in 2009, while extreme poverty virtually disappeared.

- **Self-sufficient in food production.** Turkey is almost completely self-sufficient in food production, and the agricultural sector is dominated by small-scale production. The Turkish government is prioritising and structurally investing in further strengthening the agro-food chain into an internationally competitive sector based on the sustainable use of natural resources.
- **Organic agriculture – a promising market?** Organic livestock production is still very limited, but substantial increases were experienced in bovines and poultry between 2004 and 2010, indicating that it is a promising market, especially for the EU market.
- **Turkey is part of the Customs Union and is negotiating entrance to the EU.**
- **Turkey is more oriented at the Central Asian than at the European markets.**

Livestock systems

Turkey has a very large livestock population. Turkey's agricultural sector is dominated by small-scale production - some 4 million agricultural enterprises that almost all are mixed crop-livestock operations. About two-thirds is smaller than 5 hectares in size. The structure of agricultural production differs from one region to the other: while in the Eastern part traditional methods prevail, in the Western part - close to the big metropolitan centres – farms make use of the newest technologies for agricultural production.

Cattle – beef and dairy

- Dairy products (milk, yoghurt, and cheese) are of special importance, contributing 40-45 % to the value of total livestock production. Turkey is self-sufficient in dairy products.
- Problems of the Turkish dairy sector include poor milk quality, low milk yields per cow, and high seasonality of production, as most farmers lack the means for supplementary feeding in Winter. Other problems include insufficient grassland and pastures, lack of capital, particularly for investment in technology.
- The Turkish government is interested in supporting improvement of local cattle breeds through breeding, animal health and feeding. The introduction of government credits for animal husbandry and irrigation projects is important to the dairy sector. The introduction of these credits increased the number of farms with 50 or more animals from 4,300 to at least 19,000 in a decade
- Milk is processed and marketed by modern and by traditional processors (on-farm or small scale village processors (mandiras)). Only an estimated 50% of milk produced is being processed by the industry, 20% is utilised on-farm, and the remaining 30% is sold on street markets or to mandiras. Most of the medium and large scale farmers have contracts with the dairy processing industry.
- The modern processing companies have an extensive collection network from farms, through dairy cooperatives or through their own village level collection centres. Competition is strong, with excess processing capacity. As sourcing is important, processors often offer coops and farmers training programs at own training farms and provide on-farm advice, with a focus on milk quality.

Pigs

- As 99.8% of Turkey's population are Muslim (mostly Sunni), pigs play a minor role. Pork is mainly consumed by foreign tourists and the local Christian minority. This is affected by new regulations and international standards. A few years ago new strict hygiene laws were forcing most of Turkey's pig farms to close. The number of pigs decreased from over 50,000 in 1980 to negligible numbers in 2010.

Poultry

- Turkey is for over 100% self-sufficient in eggs and poultry meat (mostly chicken).
- The industrialisation of Turkey's poultry sector started in the 1970s (hybrid layers and broilers and new production technologies). Over the last decade, it has been the fastest growing sub-sector of livestock production with an average growth of 12% per year. By 2006, the poultry sector was one of the most

developed agricultural sectors. In 2011, an estimated 80 million laying hens, 160 million broilers, 2.5 million turkeys, 0.7 million geese and 0.4 million ducks were present.

- Backyard production with minimal inputs continues to be important in the rural areas. Before the avian influenza outbreak in 2005, an estimated 60 million poultry were kept in backyard systems (flocks from 2 to 50 birds).
- Industrial poultry production is concentrated in the Middle North, Agean, Marmara and Mediterranean regions of Turkey. Over 500,000 people are employed in the sector (including producers and traders). Annual turnover is around 3 billion USD. The broiler sector seems to be entirely privately owned. About 93% of the poultry meat is produced in vertically integrated production enterprises using contract farmers. Some of the laying hens are owned by cooperatives.
- There has been a major transformation of the genetic resource of poultry from traditional scavenging types to highly productive hybrid strains. Hybrid layer birds represent about 30% of the modern poultry subsector, broilers about 70%. Turkey has also developed and registered three of its own layer hybrids for the industrial sector: ‘Atak’, ‘Atak-s’ and ‘Atabey’ and two native fowl breeds – ‘Denizli’ and ‘Gerze’.
- The White Meat Processors and Breeders Association (BESD-BIR) has 41 members and represents 80% of Turkish poultry meat. About 21 members have own slaughterhouses. International competitiveness is reduced due to high production costs (import tariffs on feed are up to 130%).

Critical points for improvement

Trade barriers

- At present, trade restrictions on export of live animals to Turkey exist, due to Schmallenberg virus.
- In November 2010, after 14 years of import restrictions due to BSE – Turkey has opened its border for EU beef. Within two years’ time it was the main export destination for the EU for beef and veal. The export of Dutch veal to Turkey is subject to a 100% import tariff.
- Since 2009, some Turkish companies have EU approval to export processed poultry products to the EU. Import regulations for fresh poultry are hampering export of fresh poultry from Turkey to EU.

Environmental issues

- Waste disposal is a problem in regions with intensive poultry production. There is a need for improved systems for manure management.

Infectious animal diseases, health issues and zoonosis

- There are regular cases of FMD in the Asian part of Turkey. The European part of Turkey is free of FMD; there are vaccination campaigns in areas close to Bulgarian border.
- Avian influenza H5N1 has been reported in 2005-2006 and again in 2008.
- A large part of the milk is sold raw through informal channels, among others by street vendors. There are no regulations to register them nor to control the quality.
- As a response to the 2005 avian influenza outbreak, live bird markets and the selling of live birds were banned and backyard poultry keepers were no longer allowed to sell their products in local markets. This affected especially the income of women.
- The biosecurity measures of the top 10 poultry companies that dominate the sector are conform European standards. The biosecurity level of a small number of small-scale poultry companies does not reach these standards.

Key Dutch involvement

The Netherlands is one of the largest foreign investors in Turkey, which offers economic opportunities for, in particular, small and medium-sized companies, including those owned by successful Turkish-Dutch businesspeople. Apart from economic relations, there are a growing number of cultural and social ties. The Netherlands is home to 380,000 people of Turkish origin, and more and more Dutch tourists are taking holidays in Turkey. Agri-food is one of the themes of Turkish-Dutch cooperation; several high level trade missions were organized over the past years. Turkey has its own development cooperation agency (TIKA) with activities focused mainly on central Asia.

Direct investment in animal production

- Equipment - Agriprom, DSD Stalinrichting BV, Delta, VDK Products BV, Cow House, Lely Industries, Trioliet.
- Slaughtering - VION.
- Genetics & Forage seed - CRV Delta, Barenbrug Holland.
- Training and support - Vetvice BV, Koepon Holding & Alta genetics provide dairy training through interactive training tours in coordination with major Turkish dairy firm Anadolu Hayvancilik.

Public Private Partnerships and other activities of Dutch stakeholders on various themes

- Green Knowledge Exchange is a cooperation between NL and Turkey in the field of Biodiversity protection and conservation.
- Ministry EZ/ Zanders Poultry BV – Consortium with cooperation with Aytav for alternative poultry layer barn and equipment – to prepare Turkey for EU entry in banning cage egg production and animal welfare according to EU standards.
- BGP Engineers developed the first Biogas Plant (operational in 2011) on basis of cow manure in Turkey in the framework of PSO-M program by Agency NL in cooperation with dairy company Sutas.
- CVI, LEI, Veteffect - Support for the general strategy for brucellosis and tuberculosis control – financed by EVD. Future cooperation on veterinary issues – agreement on vector research on Schmallenberg virus.
- AERES Group/CAH Dronten - Assessment of training needs, around rural development policy, institutions, and functions – in support of the Turkey's Ministry of Agriculture and Rural Development to align with European Union regulations on rural development. Funded by EL&I.

Opportunities for Dutch involvement in Turkey

Currently the main focus of Dutch involvement in Turkey is related to dairy production and animal disease control. Other opportunities of Dutch involvement in Turkey include:

a. *Improvements in feeding, breeding and housing (good farming practices)* in various dairy/milk-producing and poultry production systems.

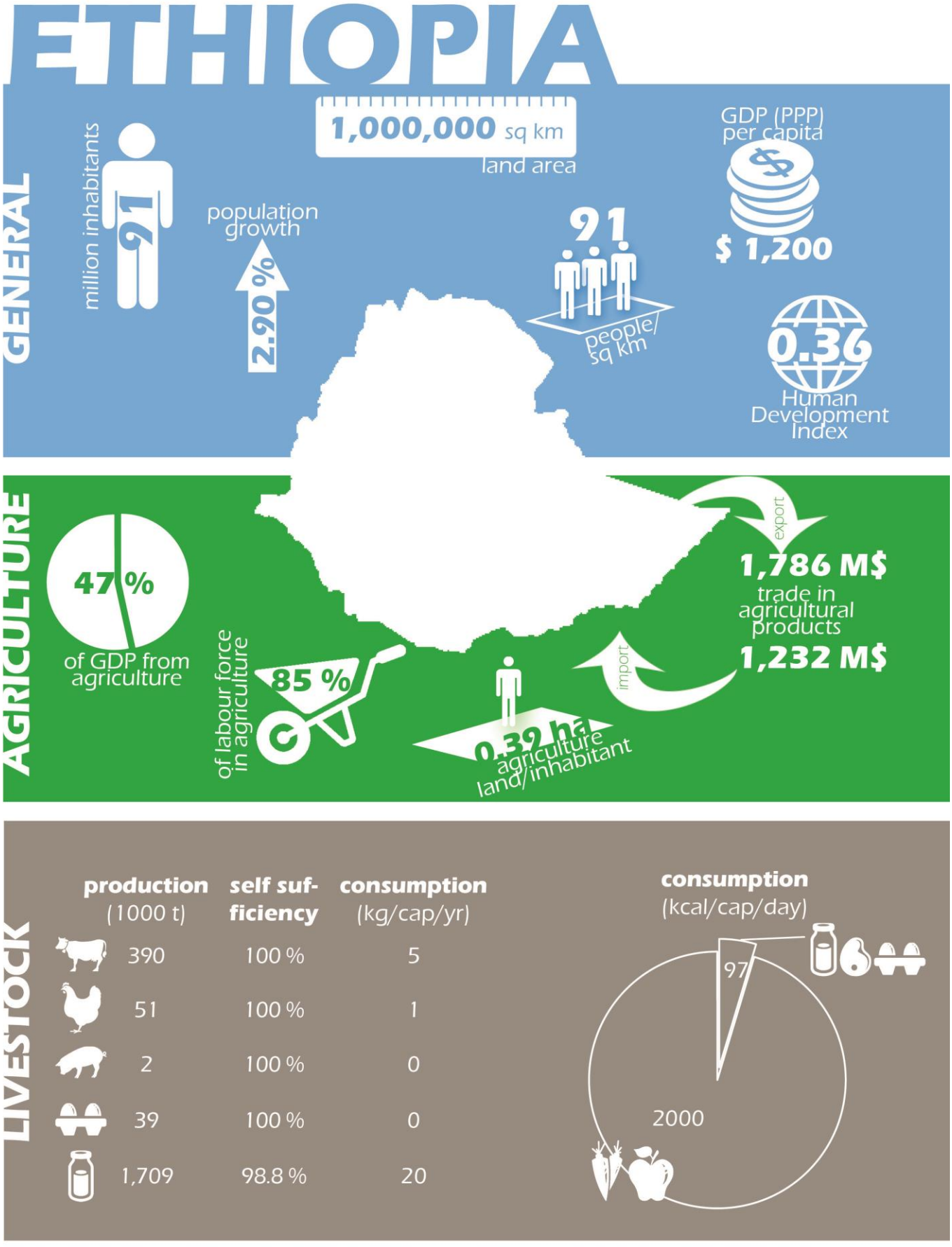
b. *Animal disease control programs* - Adaptation to EU regulations.

c. *Manure management to reduce water pollution* - Especially poultry industry.

d. *Training and education* - Demand driven capacity development with emphasis on practical training adapted to local circumstances and including the various animal productions systems.

e. *Support to the organic sector* – including for export to the EU.

ETHIOPIA



figures reflect situation in 2012, except HDI (2011); labor force in agriculture (2007-2011); trade (2010); production, self-sufficiency and consumption (2009)
sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in Ethiopia

	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	28,543*	42,053*	49,287*	73%
Pigs	25,000	31,000	32,000	28%
Cattle & Buffaloes	33,075,300	50,884,000	53,382,200	61%
Sheep & Goats	19,548,470	47,940,600	48,295,900	147%

**) poultry are in 1000 heads*

Agricultural area in Ethiopia

	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	30,662	34,985	35,683	16%
Arable land and Permanent crops	10,662	14,985	15,683	47%
Permanent meadows and pastures	20,000	20,000	20,000	0%

Trade in livestock products in Ethiopia, import and export values

		2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	326,643	1,231,531	277%
	Export	341,098	1,786,304	424%
Total Meat	Import	152	582	283%
	Export	2,363	46,431	1865%
Bovine Meat	Import	68	163	140%
	Export	10	2,276	22660%
Dairy Products + Eggs	Import	2,518	16,834	569%
	Export	4	787	19575%
Milk Equivalent	Import	2,518	16,793	567%
	Export	4	293	7225%
Pig Meat	Import	80	280	250%
	Export	0	32	-
Poultry Meat	Import	4	99	2375%
	Export	0	0	-

Producer prices in Ethiopia

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	274	-	-
Chicken Live Weight	673	1393	107%
Cow milk, whole, fresh	297	362	22%
Hen eggs, in shell	777	1035	33%
Pig Live Weight	-	-	-

Large livestock population, export commodity

- Livestock production contributes about 15% of GDP; draught animal power is critical for the mixed crop-livestock and (peri-)urban systems.
- Multi-functionality - third of livestock output is animal draught power for crop cultivation; credit benefits '*live bank*' as high as direct off-take value; 'insurance value' of around 10% of capital value.
- Large livestock population, but productivity is low; cattle play the most important role in the farming economy, followed by sheep and goats.
- Middle Eastern countries are traditional destinations for meat and livestock exports, increasing over the years; livestock sector contributes 61% of total export (primarily live animals, meat & hides).

Livestock systems

1) *Mixed crop–livestock systems* - 1/3 of country is highlands - smallholder rain-fed farming systems dominant (85% of the population, 95% of agricultural GDP, 75% of all livestock).
2) *Pastoral and agro-pastoral system* –rangelands (2/3 of country) support about 10 million people (12% of total population); provide about 90% of livestock exports in live animals; pastoralists' mobility and independence is being challenged by recurring drought and increased competition for land, while their position has been largely marginalized by development policies and strategies; camel marketing is an important commercial activity– 2010 trade valued at 61 million USD.
3) *Urban and peri-urban systems* – Formal chains exist in urban and peri-urban areas, where commercial poultry and dairy production take place; still small but growing fast, making use of crossbreds and exotic breeds; the 20 private large scale poultry farms are all located close to the Addis market; small-scale commercial poultry farms with 50-1000 chickens under relatively modern management are present around major cities and towns.

Beef and dairy

- Cattle primarily indigenous breeds - Boran, Fogera, Horro, Sheko, and Afar; limited number of crossbreds and grade cattle (zebu, Friesian, and Jersey), very few pure-breds.
- Dairy consumption (especially liquid milk products) is low, among others due to Orthodox fasting periods that increase seasonal fluctuations in supply and demand.
- Most of the milk is produced by urban and peri-urban small and medium scale dairy farmers collected by dairy processors or dairy cooperatives; average milk production per cow of indigenous breeds is low: 1.54 l/day (6 months lactation); milk production of crossbreds 1500-2500 l/lactation.
- Major causes of low productivity - Feed scarcity, water shortages, disease incidence (high mortality), poor reproductive performance, lack of access to land, training, inputs, services and credit services.
- Livestock prices are highest during Muslim fasting; dairy prices are lowest during Orthodox fasting.
- Milk entering formal marketing channels amounts to 120-150 tons of milk daily, mainly marketed in Addis Abeba. Sebeta Agro Industry , the largest dairy plant processes around 30 000 litres per day.
- Milk sales by farmers and dairy cooperatives are highly affected by low milk quantity, by distance to the market, and by fluctuations due to the fasting seasons of the Orthodox Church.

Poultry

- Most agricultural households are engaged in small scale poultry production (4 to 8 birds); mean survival rate of baby chicks is about 40%, due to predators and infectious diseases, especially NCD; 96.4% indigenous breeds, and 3% and 0.5% hybrid and exotic breeds respectively.
- Poultry is an important source of self-reliance for women; also used for strengthening marriage partnerships and social relationships; producers face significant market constraints.
- Rising demand has led to poultry meat prices increasing fivefold over the past decade. Still, broiler meat production remains fairly low volume, as most consumers favour traditional poultry meat.

Pigs

- Traditionally, Ethiopians do not eat any pork or seafood (aside from fish), as most Ethiopians have historically adhered to Islam, the Ethiopian Orthodox Church, or Judaism, all of which prohibit consumption of pork. Therefore pig farming is limited to only a few farms.

Critical points for improvement

One of the poorest countries

- Ethiopia is one of the poorest countries in the world with still a large rural population practising semi-subsistence farming as main livelihood.
- Urbanisation in Ethiopia is low, but increasing due to economic development.
- Livelihood development - marked differences exist between rural and urban areas.
- Foreign direct investment is increasing (industry and farming).
- High inflation rate and increasingly frequent droughts are two main challenges that could seriously impact development progress.

Land issues

- All land belongs to the State; can be leased for certain number of years; land pressure has increased; the average farm holding has declined from 0.5 ha per person in the 1960s to 0.08 ha at present; general perception of insecurity regarding land tenure amongst farmers, which tends to discourage investments in land improvements and soil conservation; recent reforms have introduced land title certificates and longer-term land leases.
- The government has offered 3 million hectares for foreign investments for agricultural development – about the size of the Netherlands. According to Human Rights Watch, tens of thousands of people are forced off their land to lease it to foreign investors, leaving former landowners destitute.

Environmental problems

- Soil degradation rates are one of the highest in the world due to high rates soil nutrient depletion and soil erosion. Annual erosion ranges from 16 to 300 tons per hectare. Land degradation exacerbated by overgrazing, deforestation, population pressure, and perceived land tenure insecurity.
- The vast majority of the Ethiopian arid lands is subject to severe droughts.
- Biodiversity - Of the very large resource of animal breeds, many are at risk of being lost. The potential and use of existing animal genetic resources for livestock development has been explored to a limited extent only and needs more attention.

Productivity and value-chain development

- Value chain development (dairy and poultry) is still at an infant stage and needs further support at various parts in the chain (production, collection, processing and marketing).
- Increase of production by sustainable intensification and increase of production capacity needed.
- The Government invests heavily in extension – each village has a livestock extension worker.
- Many livestock development issues are left to development projects and NGOs that have limited scope, coverage and duration. Credit facilities to support livestock development have been provided at very limited scale by microfinance institutions, food security projects, small-scale micro enterprises, and NGOs. Private sector contribution have been limited to supplies of veterinary drugs and services, roughage and concentrate feeds, and equipment.

Infectious animal diseases and zoonoses

- Large incidence of infectious animal diseases, like FMD; RVF (Rift Valley Fever) resulted in a ban by the Gulf States in 2000 that critically affected export of red meat; HPAI ‘false alarm’ in 2006.
- Due to its large livestock density Ethiopia is identified as one of the hot-spots of zoonosis, including ‘endemic zoonosis’ (such as rabies, brucellosis and cyst-causing tapeworms), ‘epidemic zoonosis’ (such as anthrax and Rift Valley fever); relatively rare are ‘emerging zoonoses, such as HPAI.

Key Dutch involvement

Direct investments in animal production (mainly Debre Zeit)

- Dairy industry - Holland Dairy (5,000 ltr/day); Velocity (developing, 70,000 litre/day).
- Feed industry - AKF (Alama Koudijs Feeds).
- Dairy and poultry farms - Maranatha (poultry, dairy and vegetable); Alpha farm (nucleus dairy and pigs, emphasis on fodder); Cowgrow (breeding dairy cattle, crossing Holstein, Jersey and Borana).

Public Private Partnerships and development projects:

- EDGET-EADD - Dairy sector development project (2012-2017) implemented by SNV-Ethiopia, Heifer Project International and Wageningen UR (funded by Netherlands Embassy and others). SNV further engaged in biogas and development of Ethiopian honey value chain.

- Nuffic-Niche Agribizz project strengthens agri-business education in 8 universities among others dairy business and chain development (funded by Nuffic/DGIS).
- Holland-Africa Poultry Partners - consortium of Dutch poultry related companies and knowledge institutes with leading party Netherlands African Business Council (funded by Agency NL).
- BoP Innovation Centre involved in project with Wageningen UR LEI and Mueller/Meko in developing small-scale dairy cooling units (Netherlands funded).
- AgroEco LouisBolk Institute - organic trade chains, nutrient recycling project.
- Prolinnova network - promoting innovations of smallholder farmers and pastoralists – incl. livestock.
- PUM (Netherlands senior experts program) – short term management support to agribusiness.
- Agri-Hub Ethiopia - platform for farmer entrepreneurship, AgriProFocus; 500+ members; key topics: contract farming, business development services, finance, and gender.

Dutch Embassy (EKN) supports a number of food security related programs:

1. Productive Safety Net Program - To reduce household vulnerability in food insecure areas.
2. Agricultural productivity and market access in surplus producing areas, which include development programs like EDGET and the honey value chain development etc.
3. Public-Private Partnerships (PPP) with emphasis on horticulture, input seed, oilseeds and dairy.

General Business climate

- Strong government regulated agricultural and rural development, with strong support of donors (Word Bank, USA, Netherlands etc.). Some 10% of the budget is spent on agriculture (in line with CAADP commitment); GoE launched Agricultural Growth Program as part of the Growth & Transformation Plan 2010-2015, which focuses on development of 83 districts with high agricultural potential and channels much of the GoE and donor investments into agriculture and livestock.
- Export opportunities are the major driving force for increase of agribusiness in the livestock sector. The government is giving priority to the horticultural sector and export products like meat & leather.
- Ease of Doing Business Ranking - Ethiopia ranks 116/181. Political unrest is reason for concern.
- Extensive farmer cooperative network plays crucial role in economic and social development.

Opportunities for Dutch involvement

a. Supply chains with smallholder inclusion (dairy farming, various poultry systems)

- One third of country is arable land - tremendous potential for agricultural development – with very rich agro-biodiversity due to variety in geography, climatic, ethnicity, and strong food culture.
- Increased donor support to develop dairy and meat sector. This will give spin off for input (AI, semen, feed) and equipment suppliers (cooling & slaughter house equipment).
- Policy priority has changed in favour of pro-poor, gender sensitive and ecologically sustainable commercialization of smallholder systems. Policy envisions an increasing role for private sector.
- Creation of special labels and trade-marks of niche-products based on local (poultry) breeds.

b. Combine input of Dutch businesses with expertise developed by development cooperation.

- Opportunities for NL agribusiness will increase due to donor support for livestock development. In the dairy and cattle meat industry there will be massive investments of donors (US, Netherlands, Canada) to develop dairy and meat sector. This will give spin off for input (AI, semen, feed) equipment suppliers (cooling equipment, slaughter house equipment), vocational training etc.

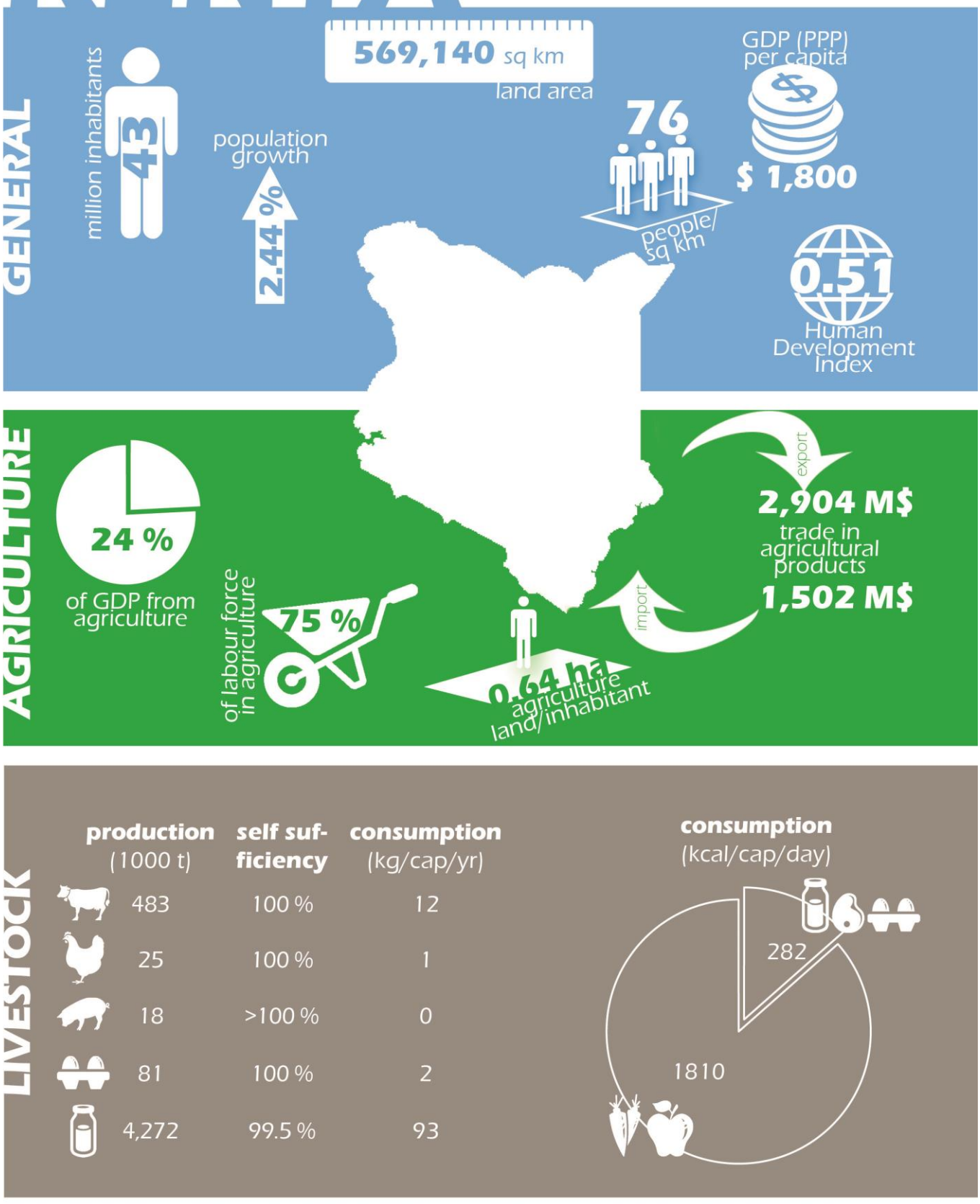
c. Training and education

- Demand driven capacity development with emphasis on practical training adapted to local circumstances and addressing the various animal productions systems.
- Further expansion of the universities will continue to generate demands for higher education of university staff (PhD studies) and curriculum development around livestock production.

d. Animal genetic resources and animal health

- Support creation of special labels and trade-marks of niche-products based on local breeds.
- Animal disease control programs.

KENYA



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sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in Kenya

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	16,400*	25,228*	26,291*	30,398*	30,000*	14%
Pigs	74,000	128,168	419,584	347,400	350,000	-17%
Cattle & Buffaloes	10,000,000	13,793,000	11,706,400	17,862,900	18,000,000	54%
Sheep & Goats	13,000,000	19,235,710	17,778,610	23,199,300	23,400,000	32%

**) poultry are in 1000 heads*

Agricultural area in Kenya

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	25,580	26,770	26,671	27,450	27,450	3%
Arable land and Permanent crops	4,280	5,470	5,371	6,150	6,150	15%
Permanent meadows and pastures	21,300	21,300	21,300	21,300	21,300	0%

Trade in livestock products in Kenya, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	213,500	228,833	500,957	1,501,937	200%
	Export	693,428	687,497	1,018,004	2,904,377	185%
Total Meat	Import	77	17	301	874	190%
	Export	4,309	4,902	873	18,398	2007%
Bovine Meat	Import	43	6	36	126	250%
	Export	2,961	4,361	101	3,531	3396%
Dairy Products + Eggs	Import	15,068	256	5,486	14,851	171%
	Export	947	1,387	1,481	17,567	1086%
Milk Equivalent	Import	14,556	485	5,421	15,416	184%
	Export	747	1,351	1,441	17,012	1081%
Pig Meat	Import	34	2	6	716	11833%
	Export	814	162	705	10,225	1350%
Poultry Meat	Import	0	0	19	26	37%
	Export	201	49	11	291	2545%

Producer prices in Kenya

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	921	3301	258%
Chicken Live Weight	961	3230	236%
Cow milk, whole, fresh	316	516	64%
Hen eggs, in shell	1876	2480	32%
Pig Live Weight	904	2098	132%

General

- **Well-developed economy, with extreme inequalities** - the country's economy is growing fast, but the benefits of this growth are not equally shared; agricultural and industrial sectors are relatively advanced; the country enjoys substantial income from agricultural exports and tourism.
- **Both commercial and subsistence agriculture are of great importance** - agriculture contributes one quarter of the GDP. In rural areas subsistence farming is the main source of livelihood. The livestock sector employs close to 50% of Kenya's agricultural labour force and is the primary livelihood source for 6 million (agro-) pastoralists that live in arid or semi-arid lands (ASALs).
- **Food insecurity** - about half of Kenyans is food secure.
- **Rural markets** - most livestock products are traded on rural markets. Institutions and organizations responsible for ensuring safe marketing of livestock and products are limited to urban and peri-urban areas, with less or no presence in rural areas.

Critical points for improvement

Land issues

- Land - loss of common property resources like communal grazing land and water points. Private ownership has led to fencing off big chunks of land, closing out livestock keepers.
- There is limited availability of animal feed and quality is relatively low.

Environmental problems

- Water - resources are rapidly depleting and threatened by pollution and land is rapidly degrading. Causes are e.g. poor management, overgrazing, over cultivation, urbanisation and deforestation
- The local breeds of East Africa are threatened and being replaced by foreign breeds. Local breeds can better adapt to the local circumstances and should be conserved.
- Soil nutrient depletion and overgrazing: Kenya suffers from land degradation accelerated by human activities: overgrazing, over-cultivation, inappropriate farming practices, fuel wood demands etc.

Infectious diseases, health issues and zoonosis

- Livestock suffers from various infectious animal diseases, including Rinderpest, Contagious Bovine Pleuro-Pneumonia, various tick-borne diseases, African Swine Fever and Foot and Mouth Disease.
- Kenya is one of the hot-spots of various types of zoonoses.
- Circumstances in many slaughterhouse are below standards.

Policy problems

- The country needs to enhance its political stability, reduce corruption and impunity, tackle inequality and improve legal certainty for business.
- There is a lack of micro finance, which leads to low inputs in livestock production.

Livestock systems

- Three systems - Mixed crop-livestock; (Agro-)pastoral; and (Peri-)urban production systems (see Ethiopia for explanation).
- Pastoralism - Over 80% of Kenya is classified as ASAL, which host about 70% of the national livestock population. Livestock is the backbone of local communities' economy, therefore any intervention geared towards increasing local well-being. The main constraints affecting the pastoral zones are lack of processing and marketing facilities; weak veterinary controls; insufficient bargaining power; and lack of alternative income-generating activities.
- Concentration and informal markets - livestock trade is concentrated in the capital city of Nairobi. Still, livestock value chains are characterized by informal networks and fragmentation. This situation imposes high transaction costs on the local pastoralists who attempt to participate in this trade.

Cattle: dairy and beef

- Annual per capita milk consumption is considerably higher than other Sub-Saharan African countries. Consumption is expected to grow. Currently Kenya is self-sufficient in dairy, but it is estimated that demand will outstrip supply by 2014.
- Cow milk and cattle meat are the most important agricultural sector in Kenya. The majority of milk is traded in informal markets. There it is sold raw or it is processed with low-cost processing facilities.

- The dairy industry in Kenya is growing. From 2002 to 2006 it has more than doubled, from 144 million litres to 360 million litres. Kenya is the major regional producer, processor and exporter of dairy products. The Kenyan highlands are particularly suitable for dairying.
- Improved dairy type cows account for approximately 70% of milk production. The rest of production comes from Zebus, camels and goats. Zero-grazing (stall-feeding) is the common strategy of intensifying dairying. It is widespread in the Kenya highlands, though productive capacity is limited.
- Many ethnic groups in Kenya have a tradition of keeping cows, which is generally associated with status and prestige. The dairy cow is a substantial asset to a small farmer, providing nutrition, cash income, manure to enrich the soil, and offspring for sale.
- Dairying accounts for over 30% of farm household income nationwide with some 75% of households being engaged in it, especially lower-income groups.
- Production suffers from feed shortages due to lack of rains. This requires farmers to purchase expensive feed supplements, but some are not able to. As a result milk supply is fluctuating.
- Government regulation has driven many of the key policy changes while donors, NGOs and the private sector have supported smallholder production and marketing initiatives.
- Since 1996 Heifer International Kenya has re-established the cooperative business model (Chilling-hub model), based upon farmers investing their own funds, and taking ownership of the business. Heifer leads a consortium that runs a regional dairy development program that is funded by the Bill and Melinda Gates Foundation.
- Kenyans consume an average of 15-16 kg of red meat (mainly cattle, but also sheep, goats and camels) per capita annually. The middle class is the highest consumer of beef. The Kenyan Private Sector Alliance (KEPSA) estimates that camel will surpass beef to become the most common type of meat eaten in the country by 2015.
- Over 80% of beef is produced by pastoralists, either domestically or in neighbouring countries (Ethiopia, Somalia, South Sudan and Tanzania), with the remainder coming from highland cattle.
- Although total volumes remain small (1% of meat production), meat exports are increasing since 2005. Markets include Gulf States, Egypt, Somalia, and Tanzania.
- A meat processing unit may be the best way forward to boost a local livestock-based economy in pastoral remote areas.

Poultry production

- The Kenyan poultry industry is characterized by two production systems namely indigenous poultry production and commercial poultry production. Almost three quarters of poultry eggs and meat produced comes from indigenous poultry production, mostly from rural families keeping a few animals. This activity is vital for the livelihood of many smallholder farmers.
- Consumption of poultry meat and eggs is relatively low and most poultry consumed comes from indigenous animals. There is an increasing demand of exotic breeds especially in the fast foods industry. Trade in poultry is characterized by extensive movements of live birds and poultry products within Kenya and from neighbouring countries to rural markets.
- One commercial poultry company (Kenchic) has operations that are classified as a sector one farming system. It has six breeding farms with a total flock capacity of approximately 100,000 birds and contract operations with farmers around Nairobi. The hatcheries import their parent stock from France, Britain, the Netherlands, and the United States of America.
- The impacts of the Avian Influenza scare in 2007 were short-lived, but had sharp impacts on the commercial broiler sector in particular. The indigenous sector was largely unaffected.

Pig production

- Pig production and consumption is low in Kenya, but recently sees growth. Both import and export of pork has increased. Import were mainly from Brazil and Canada, exports were mainly to COMESA countries. The pig market mainly depends on tourism. Because of this, Kenyan government has continued to encourage pig production.
- Pig farming has become a lucrative activity for smallholder farmers, especially for those near Nairobi. Up to 70% of pig farmers are engaged in small-scale production.
- Large commercial farms (5,000 to 30,000 pigs) are found around Nairobi, Kiambu in Central Province, and North Rift Valley. Farmer’s Choice is a big player in the domestic and export market.

Key Dutch involvement

Kenya's is the gateway to and main economy of East Africa. Over 150 Dutch businesses are active ; many have well-established investments in Kenya or have strong trade relations with potential to grow. Dutch interest in the private sector has a strong focus on agriculture, especially the export-oriented horticulture.

The Dutch Embassy in Nairobi focuses on private sector development and food security: Strategies include Increasing production and incomes for agribusinesses, inclusion of smallholder farmers, improvement of the business climate and market integration, expansion of Dutch trade and improved livelihoods in the ASALs.

The following livestock-related Dutch activities were identified:

Public Private Partnerships and development projects

- DSM Nutritional Products is studying the feasibility and modalities to fortify dairy products in Kenya.
- Dairy production (incl cheese) by HappyCow. Soil analysis and animal feed laboratory by BLGG.
- RABO Development wishes to set up a Guarantee Fund in partnership with one or more Kenyan financial institutions, and develop financial products for operators in the dairy value chain.
- SNV Kenya is engaged in support of dairy business hubs, milk quality, feed & fodder, Base-of-Pyramid marketing, development of vocational skills, and production of biogas. SNV also focusses on pastoralists, including camel milk production.
- WUR leads a consortium to revise the dairy curriculum of Egerton University and Dairy Training Institute Naivasha, aiming for stronger collaboration with the private sector. A dairy training facility is being set up at Bukara Agricultural College as part of a another Nuffic initiative. WUR is also engaged in the Manure Management Improvement Project (2013-2015) which explores resource use and efficient manure management.
- With NABC as lead a 2g@there consortium has been formed with Dutch dairy development partners - SNV, WUR, The Friesian, Bles Dairies, Cowhouse, Koudijs/deHeus, InterCommerce BV, van den Heuvel dairy equipment, CRV, Agriterra, PTC+ and EK Cheese.
- Agriterra is active in various sectors. Together with FrieslandCampina they won the first price in Business Development Award for a micro-franchise concept to improve the dairy distribution and reduce loss of milk and malnourishment.
- Solidaridad works with farmer organization, investors, knowledge institute, and NGO on beef chain.
- Other services are provided by Koepon, Schaap Agro Holland and PUM.

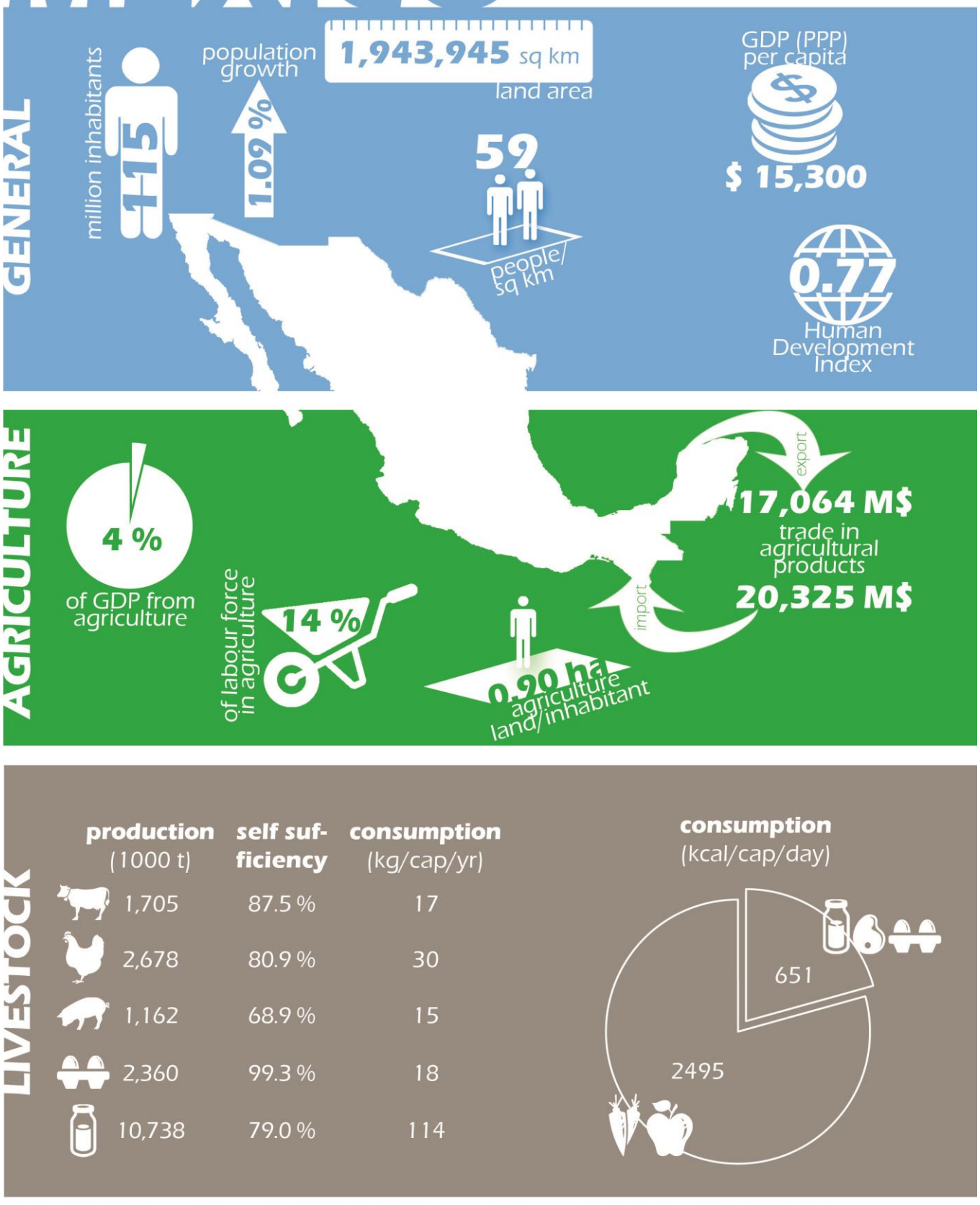
Network and exchange activities:

- AgriProFocus Agri-hub activities are centred on financial services, policy engagement, agri-business development and ICT-related business development. Partners include ICCO, SNV, ScopeInsight, Agri-Finance, Oikocredit, Pawdep, IIRR, KIT, Rise Trust, CABI, K-rep, MESPT and MediaEdge .
- Cordaid includes activities with Pastoralist groups (Afar Pastoralist Development Association) and has set up CELEP – the Coalition of European Lobbies for Eastern African Pastoralism.
- ETC Foundation supports Prolinnova–Kenya (PK) - a multi-stakeholder platform in Kenya that promotes farmer-led innovation processes in food- and agricultural systems.

Opportunities for future Dutch involvement in Kenya

a. Support emergence of medium-sized family farms with investments in technology and management.
b. Opportunities in input & service supply, including feed & fodder production & distribution, AI services, disease control systems.heifer supply, credit, equipment (for fodder, chilling & milking, processing, transportation, milk dispensing), manure management.
c. Focus on demand driven capacity development and practical training adapted to local circumstances.
d. Establish abattoirs that fit internationally accepted standards in order to enhance international competitiveness of the meat sector.
e. Continue efforts in development of smallholder dairy farming, combining the expertise from development cooperation with private sector development. Support the development of formal value chains and linking smallholder farmers to these value chains.
f. Support camel milk production, especially for of pastoralist societies
g. Help conserving indigenous breeds' genetic resources and support an increase in production yields of indigenous breeds.

MEXICO



figures reflect situation in 2012, except HDI (2011); labor force in agriculture (2007-2011); trade (2010); production, self-sufficiency and consumption (2009)
sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Key figures (source FAOSTAT)

Livestock resources in Mexico

	1980 (head)	1990 (head)	2000 (head)	2010 (head)	2011 (head)	Growth '00-'11
Poultry	192,618*	248,055*	363,500*	518,586*	522,561*	44%
Pigs	16,890,000	15,203,000	16,087,500	15,435,400	15,547,300	-3%
Cattle & Buffaloes	27,742,000	32,054,300	30,523,700	32,642,100	32,936,300	8%
Sheep & Goats	16,120,000	16,285,000	14,750,220	17,098,780	17,223,770	17%

**) poultry are in 1000 heads*

Agricultural area in Mexico

	1980 (1000 Ha)	1990 (1000 Ha)	2000 (1000 Ha)	2010 (1000 Ha)	2011 (1000 Ha)	Growth '00-'11
Agricultural area	99,199	103,800	105,800	102,982	103,166	-2%
Arable land and Permanent crops	24,700	26,300	27,400	27,982	28,166	3%
Permanent meadows and pastures	74,499	77,500	78,400	75,000	75,000	-4%

Trade in livestock products in Mexico, import and export values

		1980 (1000 $)	1990 (1000 $)	2000 (1000 $)	2010 (1000 $)	Growth '00-'10
Agricultural products, Total	Import	3,168,262	4,989,599	9,300,155	20,324,886	119%
	Export	1,833,301	2,936,330	7,394,685	17,064,207	131%
Total Meat	Import	8,729	289,105	1,483,611	2,986,887	101%
	Export	15,015	35,951	237,347	653,966	176%
Bovine Meat	Import	3,383	132,175	783,271	881,020	12%
	Export	1,770	18,581	37,267	296,111	695%
Dairy Products + Eggs	Import	235,208	721,133	593,152	1,269,442	114%
	Export	44	69	45,917	103,860	126%
Milk Equivalent	Import	243,751	747,198	629,733	1,304,690	107%
	Export	44	295	45,395	106,762	135%
Pig Meat	Import	332	76,977	338,076	1,183,377	250%
	Export	87	2,496	183,010	295,968	62%
Poultry Meat	Import	1,862	48,977	284,860	869,338	205%
	Export	111	12,149	8,890	23,846	168%

Producer prices in Mexico

	2000 (US$/tonne)	2010 (US$/tonne)	Growth '00-'10
Cattle Live Weight	1292	1407	9%
Chicken Live Weight	1186	1307	10%
Cow milk, whole, fresh	337	377	12%
Hen eggs, in shell	771	1028	33%
Pig Live Weight	1271	1474	16%

General

- **Growing economy closely linked to US -** Mexico is the 12th economy in the world. Almost one quarter of the population is rural. Economic growth was 3.9% in 2012 and is expected to continue. Growth is driven by consumption and investments - boosted by relatively stable inflation and credit growth. Approximately 10% of Mexicans live below the poverty line of USD 1 per day. Poverty is related to geographical location (Southern part), ethnicity and gender (female-headed households).
- **Origin of thousands of maize varieties and controversies over GMO maize -** Maize is central in Mexican culture and diet. Mexico is the origin of thousands of maize varieties, which explains why experiments with genetically modified maize are widely criticized by environmentalists and scientists alike. An extreme drought in 2012 forced the country to import 25% more maize to meet demands. A recent study indicated that Mexico could become independent from import by investing in water infrastructure and supporting medium- and small scale producers.
- **Strong cooperative movement -** Credits are difficult to obtain for small and medium sized enterprises, due to high interests and rigid requirements. The cooperative movement is of growing importance. There are around 15.000, mostly producer and consumer cooperatives, with around 5 million members. Moreover there are 26.000 '*ejidos*' or communities with communal land ownership. These systems engage around 15% of total workforce. The cooperatives have a joint property of around 6 billion Euros and therefore do not represent the marginalised sector.
- **Growing demand for organic food -** Demand for organic food products in Mexico has been growing recently, along with the overall trend of healthier eating. Mexico is a top 20 producer of organic foods worldwide, with 1.3 million acres of land dedicated to organic agriculture - it is the main producer and largest exporter of organic coffee and the third largest producer of organic honey; other organic products include dairy. Over the last decade, the Mexican public and private sector is further promoting organic farming. Certification has been accredited by the government, but faces difficulties in areas of controls and expertise related to export requirements to US and EU.

Livestock systems

- Mexico is not self-sufficient for animal feed (maize, sorghum), meat, dairy products and eggs and imports mainly from the US.
- Mexico exports livestock products to various countries, such as Russia, China, US.
- Backyard farming is common in rural communities. A small number of professionalised farmers accounts for a relatively large percentage of the total production of livestock products.
- Credits are difficult to obtain for small and medium size enterprises, due to high interests and rigid requirements. The cooperative movement is of growing importance.
- There is an increasing attention for the environmental pollutions issues related to animal husbandry.
- Mexico wants to decrease the imports of feed ingredients and become more self-sufficient.

Beef and dairy

- Mexico is largely self-sufficient for beef.
- Average milk production per cow is 5,000 kg.
- Mexico allows the use of BST to increase productivity.
- The dairy processing industry (over 300 dairy processors) gives employs 37,000 people directly and 200,000 indirectly.
- The 10 major processors in the country process 95% of the milk. Consumer prices have more than tripled between 1996 and 2011; while farmers' milk price has doubled. Farmers' share of consumer prices has declined from 63% to 35%.
- Milk based on (imported) milk powder is less expensive than domestic fresh milk. The farmers' share of consumer prices has declined from about 60 to 35%.

Poultry

- The poultry sector provides about half of the total meat production and is the fastest growing industry of all animal production sectors. Mexico is the world's 4th country in terms of poultry meat production and 5th in egg production.
- The large scale production farms have total vertical integration and are comparable to the EU. About 50% of the production take place in technically advanced very large scale units.
- Mexico has the highest per capita egg-consumption in the world and is nearly self-sufficient.

Pigs

- Mexico is the world's 8th country in pork production and 3rd importer of pork.
- Production and consumption of pork is increasing. Mexico imports pork mainly from the US.
- About one third of pork production backyard husbandry.
- The government promotes the use of certified slaughterhouses that meet the quality standards of western countries.

Critical points for improvement

Marketing barriers

- Meat exports to China and Russia were prohibited due to the H1N1 Hog Cholera threat in 2009. There is nowadays export of pork meat to Japan, Russia and Hong Kong.
- After bird flu crisis imports of breeding eggs and day old chickens have resumed.

Environmental problems

- Sustainability is of growing concern for both government and private sector. Mexico has the lowest environmental standards with respect to industrialized farm animal production in the region.
- Water is a scarce commodity. Lack of manure management, especially in pig production; resulting in severe water pollution. Only 20% of the waste water originating from pork production is treated.
- Energy use and sustainable energy production.
- Local animal breeds (important for especially the poorest people) have been severely affected through imported breeds and indiscriminate cross-breeding.

Productivity and value-chain development

- The demand for organic farming is growing.

Infectious animal diseases and zoonoses, animal and human health

- Obesity is an increasing health problem in Mexico (prevalence of 30%). The government is concerned and stimulates a more healthy lifestyle.
- Although Mexico has a confirmed disease free status for several animal diseases (BSE, FMD, Aujezky), the risks and prevalence of outbreaks are relatively high.
- The livestock sector is struggling with dependency on growth hormones and antibiotics, such as Clenbuterol in pig production and BSE in dairy. There seems to be a need for animal health programs including reducing need of antibiotics.
- Zoonosis and especially the neglected zoonosis are still frequently seen in marginalised populations.

Animal welfare

- Though protests are still in infancy stages, animal welfare in industrial systems is critically viewed by some organisations. Most of the industrial poultry production in Mexico implies the use of (in EU-forbidden) battery cages. This is gradually being challenged by consumers: where special restaurant offer cage-free eggs.

Key Dutch involvement

Direct investments in animal production

- Animal health and feed - Nutreco, DSM.
- Genetic materials – Topigs, Koepon.
- Equipment - Marel/Stork, Meyn, Jansen's Poultry equipment, Agriprom, De Laval, Delta instruments.
- Services – Rabobank, EM Agriton.

Public Private Partnerships and development projects

- Metropolitan Food Cluster Aguascalientes, Mexico is an integrated agro-park to be developed in the state of Aguacalientes. WUR Alterra/LEI are involved in the design and development of an Integrated Agropark (AP), its intelligent Agrologistic network (IAN) and Rural Transformation Hubs. This includes Mexican companies like Gilsa (dairy processing) and Nutrypollo (broiler chicken) as well as knowledge partners INIFAP and Universidad Autónoma de Aguascalientes.

Business climate

- Government policies support agriculture and rural development.
- The desire to reduce the dependency of import of feed and food.

- Notice the differences in culture and respond respectfully to the differences.
- Export opportunities are a driving force for increase of agribusiness in the livestock sector.
- The Dutch embassy in Mexico City plays a role in agriculture by publishing Agri News Mexico.
- Dutch agricultural sector has good reputation in Mexico as high quality and innovative.

Opportunities for future Dutch involvement in Mexico

- Enhancing grassland and roughage production and management to contribute to lower production costs and availability of roughage year round.
- Enhance the infrastructure of Artificial Insemination, increase awareness of the benefits, confidence in genetics to make AI and good genetics successful.
- Feed management and production of concentrates.
- Management tools on production level (dairy, sows) to monitor and reflect on feeding and breeding.
- Support for improving large scale farms whereas the focus is twofold - improving the production and prevention of passing adverse effects on the environment.
- Support for small scale farms by improving hygiene and health issues.
- Support animal genetic resources and animal health - Support creation of special labels and trade-marks of niche-products based on local breeds; Animal disease control programs.

4 A quick look at the Netherlands

4.1 The changing context of international engagement

- The Netherlands government, through its Top Sector Policy, stimulates the so called Golden Triangle to remain competitive in the international environment: The public-private cooperation of government, private sector and knowledge institutions focuses on innovation in the Agro Food Sector. Joint efforts of government, private sector and knowledge institutions are expected to result in better positioning of the Dutch agri-livestock business and sector in third countries. Collaboration with the development cooperation sector is growing, especially in developing countries (Golden Pyramid).
- The Netherlands government is a key contributor to the intergovernmental Livestock Dialogue and the group within the Global Research Alliance that focuses on nutrient cycles and efficient manure management. This will translate in pilot projects in Vietnam and Kenya, and in a number of PPPs on this subject. Several collaboration initiatives support biogas installations with smallholder farmers (SNV and HIVOS - African Biogas Partnership Program; Asia Biogas program in Vietnam/Indonesia).
- Food security, and hence agriculture and agribusiness, is one of the focus areas in Netherlands Development Cooperation. This is expected to remain so over the next decade.
- The role of private sector in development cooperation is becoming more prominent. Dutch agri-business, knowledge institutions, and public-private partnerships are expected to increase overseas investments, technical assistance, and trade. This will require new ways to address pre-competitive institutional issues in the livestock sector of partner countries.
- A wide variety of government instruments is (or used to be?) available to support Dutch companies to engage in international trade and investments: trade missions, fairs, public-private partnerships, feasibility studies on livestock-related topics, and investment co-financing.
- Dutch public opinion on intensive livestock production and its side effects is challenging the sector to come up with sustainable solutions and systems changes. The sector (private companies, farmer and industry associations, knowledge institutes, and government agencies) already has produced many sustainable solutions, related to resource efficiency, environmental, animal welfare and food safety issues. These may also be put to good use in the international context.
- However, when operating abroad, Dutch companies have to take into account that negative publicity can influence general public opinion. Where public sentiment and overseas investments interact, the latter can easily be influenced by Dutch public opinion, as the recent public debates on “export of mega-farms to Eastern Europe” and “pollution with horse meat” illustrate.
- A significant number of Dutch SMEs with innovations in the agricultural sector are not active at international level and should be stimulated to participate and position themselves internationally.
- Government budgets for development cooperation and other government subsidies for international engagement are likely to decrease over the next decade. The remaining subsidies are likely to be monitored and evaluated well on their effectiveness and side effects.

4.2 Key areas of Dutch expertise

- The Netherlands has extensive experience and knowledge on intensive livestock systems. This ranges from land use to feeding and from breeding to product quality. This expertise has resulted in systems with a high resource efficiency and low emissions to the environment on family farms with a medium scale of production. Many of this expertise is primarily resting with farmers and private companies. Others, like the control of infectious animal diseases, rests more with public agencies.
- The Netherlands has much experience with and knowledge of organizing efficient food chains (from feed to fork) with integrated and holistic approaches regarding quality control and reaching efficiency in the chain.
- The Netherlands has well developed large scale input (feed, genetics) and processing industries (dairy, meat) with much international experience. Quite a number of these companies have investments in countries outside the EU. Many Small and Medium-scale Enterprises (SMEs) offer special equipment and/or services, but only few have significant experience in countries outside the EU.
- Domestically, the Dutch livestock production sector has limited growth potential. Some growth is expected in the dairy sector due to abolition of the quota system; other production sectors may decrease in size. The market for large scale companies and SMEs increasingly will be outside the Netherlands and even outside

NETHERLANDS

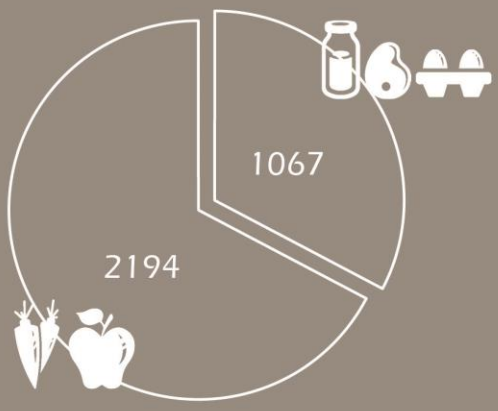
GENERAL

AGRICULTURE

LIVESTOCK

	production (1000 t)	self sufficiency	consumption (kg/cap/yr)
	402	>100 %	18
	842	>100 %	23
	1,275	>100 %	34
	612	>100 %	8
	11,604	>100 %	359

consumption (kcal/cap/day)



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sources CIA World Factbook, UNDP - International Human Development Indicators and FAOSTAT (retrieved on 19-03-2013)

Europe. Large internationally operating companies, gradually replace Dutch staff by foreign staff, who know the local context.

- Meanwhile, and in spite of its achievements in terms of productivity and product quality, the Dutch livestock sector continues to struggle with a number of issues, especially around the social acceptance of livestock production in the Netherlands; other persistent issues affecting livestock production include manure overload, animal disease outbreaks, and resistance to antibiotics. Experience and expertise that is developed by private and public sector players to solve these issues can be used in an international context as well. On the other hand, the actors in the Netherlands could also learn from experiences and expertise in a number of countries with livestock hotspots.

5 What do we learn from this quick scan?

Based on this Quick Scan of the livestock sector in the nine countries and a concise literature review, the following concluding analysis and conclusions are provided:

5.1 What are the main developments and issues in livestock production?

What's changing in the world?

1. Demand for livestock products is growing in all countries, sometimes aided by policy

- The increased production of and trade in livestock products underlines that demand for livestock products is growing quickly in most countries studied. This indeed seems to be the result of population growth, urbanisation, and rising incomes. The rise of demand in countries like China, Indonesia and Turkey is further aided by marketing campaigns that promote animal protein consumption, e.g. school milk programs.
- Quite a number of governments aim to boost local livestock production to become less dependent on import, increase local food security, and improve nutritional status, particularly for children (first 1000 days of child development, school milk programs, etc. [11]). Consumer preferences for local livestock products vs. imported products are influenced by price, availability, quality and food safety concerns and consumer perceptions (freshness in relation to taste and quality).
- All governments aim to improve food quality and safety through better controls of the slaughtering systems, including limitation of traditional/small-scale slaughter. Some governments drastically reduce the number of slaughterhouses, e.g. China aims to reduce from 20,000 to 2,000 slaughterhouses. Centralised slaughter facilities might lead to loss of employment, longer travel times for the animals (animal well-being issues), and need cooled transport facilities with higher costs and carbon footprints.
- Obesity is of increasing importance in countries where consumption of livestock products is high (like Russia and Mexico). Consumers are increasingly aware that it may be wise to reduce meat and milk consumption.
- Lactose-intolerance remains an issue in some Asian and African population groups.

2. Smallholders remain the backbone, large scale is on the rise, where are the medium-size farms?

- Most of these livestock products continue to be produced by smallholders on small to very small farms. In most countries smallholders will form the majority of farmers for many decades to come.
- Primarily in emerging market countries, a trend is to produce pigs and poultry in large integrations that are either owned by feed or food industry themselves or contracted out to commercial farmers. Small scale poultry and pig production is expected to decline.
- For dairy the situation is slightly different: Although in some countries the trend is to invest in large scale dairy farms, in most countries small and medium scale dairy farming will remain the basis for the local dairy industry - due to shortages in land needed for roughage production and in management skills needed for long-term profitability.
- It appears that in most countries medium size specialized family farms (circa 20-50 dairy cows, 100-500 pigs, 500-5,000 broilers) are relatively rare. This indicates that transition from backyard small scale farms to more specialised farms has not occurred (yet). Causes for this "*missing middle*" include poor land availability and access to land, undependable supply of essential inputs & services (including finance for investment and credit), and insufficient education to train farmers in the skills required to run such farms.
- China, Russia, Vietnam, South Korea, and Mexico offer large subsidies to re-structure smallholder and backyard farming systems into commercial and (sometimes very) large scale livestock integrations, particularly directed at poultry and pigs. Other governments, e.g. of Indonesia, Ethiopia, Kenya and to some extent Turkey, promote the transition from smallholder and low-input systems to semi-commercial and medium–sized livestock systems.

- In some cases outbreaks of infectious animal diseases or food-safety problems result in regulations that are especially unfavourable for smallholder production. For example an African Swine Fever outbreak in Russia seriously limited popular backyard pig production at home-gardens or 'dachas'; the melamine milk scandal in China resulted in regulations that seriously hamper small-scale dairy production and processing.
- The transition from backyard and low-input agriculture to more commercial livestock systems tends to favour the better-off and male-headed households; it also implies threats to local biodiversity due to replacement and crossbreeding of local breeds and higher use of antibiotics and other chemicals.

3. How to feed the country? Self-sufficiency and trade opportunities vary a lot

- Food security for livestock products is important to many governments, especially since the 2007 food crisis. Governments use a range of policy instruments to stimulate local production and achieve self-sufficiency (import tariffs, quota, etc.), although use is limited by WTO regulations and Free Trade Agreements.
- Self-sufficiency rates are related to a number of factors: scarcity of land (e.g. South Korea, Vietnam), economic and political developments (Russia, Ethiopia), changing consumption patterns (dairy as 'new product' in Southeast Asia), etc. Increasing demand will not necessarily be met by increasing local production.
- Relatively high levels of industrialisation of livestock production do not necessarily lead to high self-sufficiency (e.g. pig- and chicken production in Mexico).
- Opportunities for commodity trade of livestock products are particularly present in countries with low self-sufficiency rates. These rates vary greatly, both between countries and between products. E.g. in dairy it varies from over 100% in Turkey to less than 50% in South Korea.
- Trade opportunities also include trade in genetics, feed ingredients, equipment and other inputs.
- A challenge in local sourcing is not to threaten local 'buffer systems' for food production – that especially poor people depend on in the hard times of natural disasters, social unrest and economic uncertainties. Such systems are usually based on local animal breeds. They often have higher productivity per hectare when compared to large-scale systems (see for example Russia) and can boast high efficiency of resource use under difficult conditions. Niche markets for products based on local breeds is expected to remain.

4. Food quality scandals become more visible and have great impact

- As a result of some wide spread and large food scandals (melamine milk scandal etc.) the food safety concern in many countries has increased among consumers and governments.
- Food safety and quality assurance becomes also more and more important in international trade. Western standards (EU, USA) are often taken as starting point.
- Multi-resistance to antibiotics, resulting from indiscriminate or unregulated use, is increasingly common, and may pose an major threat to human health at global scale in the near future.

5. Organic production and marketing

- Both organic production and consumption of organic products are growing in many countries. Official certification of organic products is in place in countries with export (Kenya, Mexico) but still deficient in most other countries. Organic soy chains are being developed for China.
- In specific situations traditional production methods have characteristics of 'organic by default', usually without preferential markets.

What are the Dutch doing internationally?

6. Geographic involvement of Dutch players varies greatly

- The highest involvement of Dutch companies in development of the local livestock sectors and or supply of livestock products seems to occur in Russia and Turkey, with growing involvement in China, Mexico, Vietnam, and Indonesia. All these countries show a strong economic growth with a strong, growing middle class and potential for development of the livestock sector. A country like South Korea has high GDP, but limited competiveness due to lack of land.
- Significant development cooperation-related livestock development activities were identified in the countries that are focus countries for Dutch development cooperation: Kenya, Ethiopia, Indonesia, and to some extent Vietnam.
- Investments of large Dutch companies in specific geographies do affect the overall pattern, as SMEs often are attracted by the presence of large companies. However, most investments and trade relations are linked to individual company decisions, rather than to the presence of other companies and/or collective action.

7. Many companies make use of Dutch government support instruments. Multi-actor collaboration and partnership facilitation does occur.

- Quite a number of Dutch companies are making use of Dutch government support instruments like PSI for initial investments, often in consortia. This indicates a perceived benefit of public-private collaboration. This collaboration usually is country specific, commodity specific (dairy, pork or poultry) or input specific (feed supply or health care).
- A number of facilitating organizations are active, like NABC, Dutch Dairy Centre, Dutch Poultry Centre, and AgriProFocus. Some of these bodies operate in only a few countries. The facilitation offered by these organizations varies in scope and quality.

8. Most business activities are related to export and to large-scale production

- For most companies export of finished products (like meat and dairy ingredients) or inputs (like feed supplements, genetics, and equipment) is the main business. This is especially the case in Russia, China, Vietnam, and South Korea.
- Several countries have developed or are developing concentrations of livestock production in geographic zones with feed production potential (especially for pigs and poultry, but also for dairy) or proximity to markets (for example development of large-scale Metropolitan Food Clusters and Agro Parks in China and Mexico).
- The Netherlands has much knowledge and experience with environmental and animal friendly system solutions. Gradually and in varying degrees these concerns are getting on the agenda of other countries as well. Note should be taken that unsustainable or unethical actions of individual ventures can taint the image of the entire Dutch sector. Companies face a dilemma when there are differences in regulatory frameworks between the Netherlands and other countries regarding environmental and animal welfare issues: what is acceptable practice? For instance, it is questionable whether layer cages that have been banned in EU should be used elsewhere.
- In spite of their potential, Dutch SMEs that have specialized in the social and environmental challenges of livestock production as experienced in the Netherlands are rarely active in the international market. Examples where Dutch know-how regarding sustainable animal production is applied in third countries seem to be still limited.

9. Dutch companies are involved in quality and efficiency improvements in meat and dairy chains

- In many countries consumers prefer and are used to buying fresh meat; their home situation and cooking habits are adapted to this. Linking small-scale producers to supermarket supply chains proves to be challenging. Government policies do not necessarily match consumer preferences and farmer interests.
- Meat marketing is gradually shifting from sale of fresh meat in wet markets to sale of packaged meat products in supermarkets. Slaughter of livestock involves numerous challenges with regards to food quality, food safety, and animal welfare.

- Improvement of milk quality gets much attention of dairy companies operating in third countries. System changes are made to improve quality of raw milk supplied by smallholders, but many challenges still remain.
- Many Dutch companies are engaged in providing equipment and know-how, primarily for large-scale slaughter facilities. The Dutch government (nVWA) is engaged in a number of projects to improve quality assurance and food safety (e.g. in Vietnam), often in collaboration with consultancy firms and knowledge institutes. In such cases options of optimising existing (local) slaughter facilities and local marketing may deserve consideration.

10. Development cooperation and private sector increasingly collaborate in the smallholder sector

- Smallholder livestock production systems are found in every country and, though to different degrees, contribute significantly to food security through local markets. They face the challenge to keep up with increasing demand from (urban) consumers regarding regular supply, quality and safety.
- In dairy value chain development projects funded by Netherlands development cooperation much attention is paid to inclusion of smallholders in the value chain (e.g. Ethiopia, Kenya).
- Public Private Partnerships are a new phenomenon in development cooperation. In a number of PPPs directed at livestock development and funded by Netherlands development cooperation attention is paid to smallholder development. Delineation of the respective roles of public and private partners in practice still needs improvement.

5.2 Where lie the main opportunities?

11. Producing food that meets consumer demands for quality and food safety

- Opportunities for contributing to sustainable intensification in various subsectors, by improving resource use efficiency and profitability, and by reducing negative effects on environment and society - these include technology and know-how for (provided Dutch actors show the creativity to adapt to local context and farming systems rather than view Dutch technology as superior):
    - Technologies to improve productivity and resource efficiency (production: genetics, feed, logistics, processing and product development)
    - Technologies to reduce the environmental (water, air and soil) and social (animal welfare) side effects of livestock production.
    - Integrated chain management: quality control, tracking and tracing systems, screening (tests and equipment),information and communication systems.
    - Marketing and branding of animal products.
    - Traceability of produce and development of standards for niche-marketing of high-quality products, e.g. those based on local breeds (e.g. China).
- Critical success factor for local production is competiveness in terms of price and quality as compared to imports.

12. Control of infectious animal diseases

- All countries studied have high incidences of infectious diseases, which imply high risks for both animal production and human health. Infectious animal diseases such as HPAI (Avian Flu), African Swine Fever, New Castle Disease and Foot & Mouth Disease are often endemic and impact (inter-) national trade. Some countries (e.g. Mexico) have acquired disease-free statuses, many have a long way to go.
- The so-called neglected zoonoses (including Rabies, Brucellosis, and Cystircercosis) are still prevalent in many countries, They get relatively little attention in international cooperation. The Netherlands has much expertise and systems for control and diagnosis of infectious disease, implementation of tracking and tracing systems like identification & registration, and reduction of use of antibiotics (risk for human health of multi-resistance strains by indiscriminate use in animal production). Some examples of use of Netherlands expertise at the moment are the project to

control Brucellosis and Tuberculosis in Turkey, and implementation of a HPAI control program in Indonesia.

13. Waste management systems

- Animal waste is a growing problem in livestock industries. Interest is growing in waste management systems that reduce water & soil pollution.
- Opportunities for contributing to system solutions include improved animal manure management systems, biogas installations, and improvements in animal feeding that affect manure quality.

14. Dutch organizations can capitalize on recognition in capacity building

- Capacity building in the livestock sector is a prominent feature in several programs, both within the Netherlands and abroad. Next to the larger training institutes, several companies and NGOs are active in this field. There is a prominent focus on practical hands-on training, but also on higher education. The development cooperation sector has a relatively good experience with smallholder systems.
- Opportunities for contributing to system solutions include meeting the growing need for capacity building – training of trainers, research for development, collaboration between private sector, Dutch knowledge institutions, and local knowledge institutions, and institutional development.
- Addressing the current challenges and opportunities and taking into account the lessons learnt in intensive livestock production will result in focus on:
    - Consumer concerns including food quality and food safety issues; multi-resistance of microbes; potential of use of medicinal plants; animal welfare; and 'fair products'
    - Environmental aspects relevant to livestock production; soil fertility and manure management; closing nutrient cycles; preservation of local breeds and agro-biodiversity, potential for niche marketing; water footprint; climate change issues, incl. 'hoof print'; future shortages of minerals, especially Phosphorus
    - Ways to achieve change - multi-stakeholder cooperation between government, education/research, private enterprise and development cooperation; research & development; legislation and enforcement.
    - Poverty, employment, gender and multi-functionality of livestock (use of manure, draught power, savings etc.)

15. Learning from how other sectors position themselves better in other markets

- *Horticulture sector* – The well-organized Greenport Holland platform plays a strong role in advocating the interests of the greenhouse horticulture sector. The livestock sector could take inspiration from the way this initiative promotes the common interests of the sector, opening up many individual and collective business opportunities.
- *Water sector* – The Netherlands is promoting itself in water management and has specialised in Watershed Management. Together with the Unie van Waterschappen the sector has established the Water Governance Centre. Livestock's link to water management offers opportunities for joint profiling in this field (e.g. water footprint, manure and waste management etc.), for example around the UN Right to Water 2010 Agreement, to which the Netherlands are a signatory.
- *Environmental sector* - e.g. in manure management, for example through the EU Resource Efficiency Transition Platform (EREP) that promotes more efficient use of nutrients from waste and of inputs such as Phosphate [15].
- *Biodiversity* - Many countries, including the NL, have signed agreements on biodiversity in the CBD Biodiversity Protocol, like Vietnam in 2004, Indonesia in 2011, and Ethiopia and Mexico in 2012. This could stand at the basis of programs supporting local animal breeds.
- *Sustainable energy sector* – collaboration is already taking place in biogas support.

6 Recommendations

1. **Food first** – Private, public and civil society actors need to realize that sufficient food of good quality is one of the first priorities at local, national and global levels. This implies higher production efficiency, but also reduction of food waste through proper collection, storage, and distribution. Moreover, it extents to utilization: how can 9 billion people, including the most vulnerable groups, be nourished in a safe and affordable way? Stronger linkages between agricultural production and nutrition need to be developed, using the full range of food processing and preservation methodologies available.
2. **Know-how and technology** – Dutch private actors are encouraged to offer the latest technologies and know-how, including lessons learnt in Dutch livestock production, of course tailoring to specific market demands. These contributions can help towards system solutions, but need to be building on Good Agricultural Practices – '*getting the basics right' coupled with 'system innovation'.* Important opportunities include:
    - *Value chain development* – services and technology for chain governance, quality assurance (standards, tracking and tracing systems, quality control), value addition, and smallholder inclusion, niche market development (e.g. utilizing local breeds); including (1) organic soy production chains, with certification of organic produce for national and export markets; (2) standards, quality control, and traceability of general and niche products (e.g. local breeds)
    - *Production inputs, technologies and services* that focus on production efficiency, including animal and plant genetics, feed & fodder, animal health, milking, young stock rearing, and barn and laboratory equipment.
    - *Collection and Processing* - milk cooling and collection systems, slaughter facilities, small-scale milk processing.
    - *Control systems for infectious animal diseases and chemicals*, including drugs & vaccines and means to reduce use of antibiotics and growth hormones, e.g. control systems for antibiotics in animal products. More attention for use of medicinal plants.
    - *Animal waste management systems* – Manure handling systems, installations for production of biogas, improvements in animal feeding that affect manure quality,
    - *Soil- and water quality improvement technologies* – including composting and other means to enhance soil life, ecological measuring systems like 'hoofprint' and water-footprint.
3. **Getting the basics right and system solutions for sustainability**– In line with Top Sector policy, Dutch private sector parties are encouraged to focus on the real strength of the Dutch livestock sector: developing and promoting integrated and integral solutions that address efficiency and effectiveness of the production system, rather than piecemeal short-term solutions. Such integrated approaches call for and will benefit from collective action (see below under 5).
4. **Include smallholders** – Smallholders will continue to play an important role in food production in many countries over the coming decades. Inclusion of smallholders in supply chains and development of transition paths of smallholder systems to more efficient systems producing quality output is not only an important strategy for sustainable sourcing for companies, but in many countries also a political and social imperative. The Netherlands Ministries of Economic Affairs and Foreign Affairs could assist governments in developing appropriate inclusive / 'pro-poor' strategies that address smallholders as producers and consumers. With its strong history of family farms, The Netherlands should explore what it can contribute to development of medium-sized family farms as answer to the 'missing middle'.

5. **Act together** – The Dutch private sector for dairy, poultry and pigs is recommended to look for ways to increase their collective action. Current initiatives like Dutch Dairy Centre, Dutch Poultry Centre, Orange Pig and the NABC 2G@There pilots aim to offer integrated solutions and to position Dutch companies in new markets. These initiatives should be encouraged and strengthened to be effective beyond individual company level; the Greenport Holland initiative could act as example. Further collaboration between private companies and between companies and government agencies or development organizations ('Golden Pyramid') is likely to increase effectiveness and impact, especially for SMEs.
6. **Learn from the past** – The rich experience of the Dutch livestock sector, both in the Netherlands and abroad, is an important source of learning and inspiration. Increased sharing facilitated by the sector itself is likely to be beneficial for experienced actors and newcomers alike. Moreover, this offers ways to engage with critical groups in Dutch society.
7. **Develop capacity** – Dutch expertise should focus on capacity building of local staff and on strengthening of institutions. This will include development of systems for innovation, technical and vocational training, and extension. Important principles include: it should be demand driven, adapted to the local situation and to prevailing animal production systems, addressing the current challenges and opportunities, and taking into account the lessons learnt in intensive livestock production.

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For additional references see report 695 / Part II of this report.

Wageningen UR Livestock Research

Edelhertweg 15, 8219 PH Lelystad T 0320 238238 F 0320 238050

E info.livestockresearch@wur.nl I www.livestockresearch.wur.nl