

## Waterfowl Production for Food Security

Heinz Pingel, Landsberg, Germany

### Introduction

Domestic ducks and geese trace back to two species of waterfowl each: the mallard duck (*Anas platyrhynchos*) and the muscovy duck (*Cairina moschata*), the greylag goose (*Anser anser*) and the swan goose (*Anser cygnoides*). Ducks and geese were known in ancient China and Egypt, where they had already achieved considerable status at that time. The use of duck and goose meat, eggs as well as feathers and downs has been traced back to very early times in history.

Meat and eggs of waterfowl have high nutritional value as human food. People eat meat of ducks and geese not only because they like the taste, but also for its high nutritional value in terms of optimal composition of essential amino acids as well as favourable composition of fatty acids, with a high percentage of polyunsaturated fatty acids and a favourable ratio of omega 6- to omega 3-fatty acids. Duck and goose meat has a unique flavour and a delicious taste. It is economical, and quick and easy to prepare and serve. Processing of waterfowl eggs as salted eggs, "thousand year eggs" (pidan) and balut has a long tradition in some Asian countries. Waterfowl is also widely used as a source of down feathers.

Feed for ducks and geese is not commonly used for human consumption and there is no strong competition between waterfowl and human nutrition. Waterfowl can utilize cheap feed resources on rural farms. Waterfowl kept on fish ponds increases the amount of plankton as feed for fish. In view of these advantages, we can expect that ducks and geese will become increasingly important for reducing hunger and improve food security for many rural families.

Generally, poultry convert feed to human food efficiently and need only short periods to adjust to market demands. Laying ducks provide a steady source of food. Meat ducks and geese need only a relatively short time to produce edible food.

### Development of waterfowl meat production

Millions of people in the world are currently suffering from starvation or malnutrition. Can waterfowl production contribute to the improvement of nutritional standards and food security of a growing world population? Especially in countries of Eastern and Southern Asia, significant amounts of meat and eggs are produced from ducks and geese and are important for the economy of these countries. The development of waterfowl production since 1991 is shown in the following table 1.

**Table 1: Development of global waterfowl meat production (million tons) (FAOSTAT 2011)**

	1991	2001	2009
Total Poultry meat	43.1	71.5	92.0
Duck meat	1.33	2.98	3.81
Pct. of total poultry	3.09	4.16	4.14
Goose meat	0.77	1.91	2.47
Pct. of total poultry	1.78	2.67	2.68

The share of duck and goose meat of total poultry meat production increased from 4.87 % in 1991 to 6.83 % in 2001 and 6.82 % in 2009.

Although ducks and geese are well known all over the world, their economic importance and contribution to food security varies considerably between continents and countries. To show the role of waterfowl meat and eggs for food security, we consider the changes of total and per capita produc-

tion from 1991 to 2007. Especially the change in per capita production characterizes the role in the actual contribution for food security, because it takes the growing human population into account. Tables 2 and 3 will demonstrate the contribution of each continent to global duck and goose meat production. Asia is the leading continent in duck meat production with a share of 82.2 %, followed by Europe with 12.4 %. Asia has also the highest increase of total and of per capita duck meat. Almost 10 per cent of poultry meat in Asia is produced by ducks compared with 4.1 % in the world. Duck meat production in Africa and Latin America is negligible.

**Table 2: Duck meat production per continent between 1991 and 2007  
(Calculations based on FAOSTAT data, 2009).**

	Total 2007 1000 t	Relative to 1991 %	Duck per cap. g	Relative to 1991 %	Share of poultry %	Relative to 1991 %
World Total	3,580	269	540	215	4.09	133
Asia	2,942	308	733	244	9.68	112
Europe	445	194	606	192	3.21	165
North America	91	191	270	169	0.43	110
Africa	58	127	60	83	1.60	70
Latin America	38	84	66	64	0.21	28
Oceania	11	238	320	180	1.09	114

Also for goose meat the regional pattern varies considerably (Table 3).

**Table 3: Goose meat production per continent between 1991 and 2007  
(Calculations based on FAOSTAT data, 2009).**

	Total Goose 1000 t	Relative to 1991 %	Goose per cap. g	Relative to 1991 %	Share of poultry %	Relative to 1991 %
World	2,230	290	336	233	2.54	143
Asia	2,104	323	525	256	6.92	117
Europe	72	90	97	88	0.52	75
Africa	56	147	59	97	1.57	82
Latin America	1.03	112	1.8	86	0.006	40
North America	0.90	106	2.7	90	0.004	57
Oceania	0.12	150	3.4	113	0.012	75

With 94 % of total goose meat production, Asia accounts for a dominant share of global goose production. Goose production dropped by 10% in Europe between 1991 and 2007, but increased in Asia by 223 % and contributed 6.9 % to total poultry meat. Goose consumption in America and Oceania is very low and has no commercial significance.

Table 4 shows the growth in different Asian countries. China alone has 65 % of the global duck meat, followed by Malaysia, Thailand and Vietnam. With the exception of Thailand and Bangladesh, duck meat production increased in all these countries, especially in Laos, Myanmar and Korea. Malaysia has the highest per capita production with 4.4 kg, followed by Taiwan with 3.4 kg and China with 1.8 kg. Myanmar, Thailand and Republic of Korea have more than 1 kg per capita. The drop in duck meat production in Thailand is apparently the result of Avian Influenza control programs, whereas Bangladesh has a preference for duck eggs. Duck meat accounts for the highest share of total poultry meat in Cambodia (32.5 %), North Korea (25 %), Vietnam and Laos (19 %) and China (15.5 %).

**Table 4: Duck meat production in Asian countries between 1991 and 2007  
(Calculations based on FAOSTAT data, 2009).**

Country	Duck meat 1000 t	Relative to 1991 %	Duck per cap. g	Relative to 1991 %	Share of poultry %	Relative to 1991 %
China	2329	348	1800	310	15.5	104
Malaysia	111	285	4400	200	10.7	118
Thailand	85	88	1300	75	7.9	71
Vietnam	84	210	970	162	19.0	79
Myanmar	74	617	1400	483	9.2	64
India	73	252	70	206	3.2	43
Taiwan <sup>1,2</sup>	62	85	2690	80	9.9	98
Korea Rep.	57	570	1160	504	10.0	322
Indonesia	44	400	190	317	3.6	189
Philippines	31	238	380	181	4.5	180
Bangladesh	14	101	100	77	8.7	51
N. Korea	11	190	440	157	25.0	128
Cambodia	8.3	198	670	140	32.5	135
Laos	4.0	800	610	508	18.7	275

1) TAI (1999), 2) JENG FENG HUANG (2011)

The major non-Asian countries with high duck meat production are listed in Table 5.

**Table 5: Duck meat production between 1991 and 2007 in some non-Asian countries  
(Calculated from FAOSTAT data, 2009).**

Country	Duck meat 1000 t	Relative to 1991 %	Duck per cap. g	Relative to 1991 %	Share of poultry %	Relative to 1991 %
France	234	198	3700	179	15.7	222
Germany	56	267	680	262	5.0	125
Hungary	51	165	5200	174	13.5	153
UK	35	152	600	150	2.4	109
Netherlands	15	167	915	153	2.2	138
Ukraine <sup>3</sup>	60		1200		24.0	
USA	83	198	290	171	0.4	114
Canada	7.4	145	225	123	0.6	87
Argentina	7.5	129	190	107	0.6	42
Mexico	21	117	200	95	0.8	39
Egypt	39	170	520	88	5.9	55
Madagascar	11	150	550	90	15.3	89
Reunion	3.3	122	4325	96	16.4	73
Australia	10	267	490	188	1.2	120

3) ZAKHATSKY, 1999

The leading country in Europe is France, where Muscovy and Mule ducks are also used for fatty liver production by forced feeding. Hungary has the highest per capita production in the world (5.2 kg) and has a strong tradition as exporter of fatty liver products. In both countries, ducks account for 14-15 % share of poultry meat production. The USA and Australia have also doubled their duck meat production to satisfy the demand of Asian immigrants, but the share of total poultry meat is relatively low due to very high broiler and turkey meat consumption. Remarkable is the high duck meat production in Reunion with 16.4 % share of poultry meat. Egypt and Madagascar are the only two other African countries with appreciable duck meat production.

With regard to geese production China has a share of 93.9% of the world, followed by Ukraine and Egypt. The goose meat production in the world was increased by 293 %. This was caused by the high share of China with a growth to 328 % (Table 6).

**Table 6: Development of goose meat production in the top countries between 1991 and 2007 (Calculated based on data of FAOSTAT, 2009).**

	Goose meat 1000 t	Relative to 1991 %	Goose per cap. g	Relative to 1991 %	Share of poultry %	Relative to 1991 %
World	2230	290	336	233	2.54	143
China	2092	328	1580	287	13.9	98
Ukraine <sup>3</sup>	97	-	1900			
Egypt	43	148	570	110	6.8	71
Hungary	27	61	2800	67	7.16	57
Poland	19	231	500	238	2.09	88
Taiwan <sup>1,2</sup>	17	57	740	57	2,7	67
Italy	12.8	-	220	-	1.24	-
Madagascar	12.6	137	630	86	17.5	81
Israel	3.4	79	520	57	0.64	29
Iran	2.5	96	30	75	0.17	30
Myanmar	2.5	156	50	125	0.31	16
UK	2.4	77	40	80	0.16	53
Czech Rep.	2.3	-	230	-	3.1	-
France	2.3	33	40	33	0.15	11
Germany	2.1	37	30	50	0.18	17
Turkey	2.0	57	30	50	0.18	21
Ireland	1.2	188	270	147	0.86	134
Canada	0.9	106	270	87	0.07	58
Thailand	0.8	67	12	55	0.07	50
Argentina	0.5	104	40	88	0.045	40

1) TAI, 1999; 2) JENG FENG HUANG, 2011; 3) ZAKHATZKY, 1999

With regard to per capita goose meat production, Hungary leads with 2.8 kg, followed by the Ukraine with 1.9 kg and China with 1.58 kg. Increased production was observed in China, Egypt, Poland, Myanmar and Ireland only. The share of goose meat to poultry meat decreased in all countries, except China and Ireland. Ukraine and Taiwan are missing in FAO-Statistics. Therefore, changes could not be calculated.

The FAO-Statistics rank the top 20 countries in duck and goose meat production as shown in Table 7.

**Table 7: Top 20 duck and goose meat producing countries in 2007 (FAOSTAT, 2009)**

Duck meat			Goose meat		
Country	Share, %	Prod. Mill. \$	Country	Share, %	Prod. Mill. \$
World	100	4,485	World	100	4,254
China	65.0	3,028	China	93.9	3,997
France	6.5	303	Egypt	1.88	80.1
Malaysia	3.5	162	Hungary	1.63	69.5
USA	2.4	111	Poland	0.83	35.1
Viet Nam	2.3	109	Madagascar	0.54	24.0
Thailand	2.3	108	France	0,27	11.4
India	2.1	97	Israel	0.15	6.5
Myanmar	1.85	87	Iran	0.11	4.8
South Korea	1.58	74	Myanmar	0.10	4.3
Hungary	1.48	69	UK	0.09	4.0
Germany	1.18	55	Turkey	0.09	3.8
Egypt	1.09	51	Germany	0.08	3.3
UK	1.0	47	Ireland	0.05	2.0
Philippines	0.86	40	Canada	0.04	1.7
Indonesia	0.71	33	Thailand	0.04	1.5
Bangladesh	0.61	29	Bulgaria	0.03	1.3
Mexico	0.57	27	Croatia	0.03	1.1
Poland	0.51	24	Argentina	0.02	1.0
Netherlands	0.35	17	South Africa	0.02	0.9
North Korea	0.31	14	Philippines	0.02	0.7
Top 20, %	96.1			99.9	

The top 20 countries produced 96.1 % duck meat and 99.9 % goose meat of total world production, and represent an estimated value of 4.485 and 4.254 billion US\$, respectively. China alone contributes 65 % of global duck production, followed by France, Malaysia, USA, Vietnam and Thailand, and 93.9% of goose production, followed by Egypt, Hungary, Poland and Madagascar.

## Development of waterfowl egg production

Processing of duck eggs to produce “salted eggs” and “thousand year eggs” or alkalized eggs has a long tradition in China and other Asian countries. In some countries like Philippines pre-incubated eggs (Balut) are used for consumption. In the other continents waterfowl eggs are used more or less for incubation only.

Between 1991 and 2009 total production of eggs for consumption increased by 74 %, hen eggs by 72 % and “other” eggs (mainly duck eggs) by 102 %.

**Table 8: Development of world egg production between 1991 and 2009 (million tons) (FAOSTAT 2011)**

World egg production	1991	2001	2009
Total eggs	39.10	56.40	68.0
Chicken eggs	36.53	52.26	62.83
Other eggs	2.57	4.14	5.19
Share of total , %	6.57	7.34	7.63

About 95 % of non-hen eggs were produced in Asia, of which China alone contributed 83.2 %. As shown in Table 8, per capita production increased by 47 %, from 0.47 kg to 0.69 kg.

**Table 9: Production of “other” (mainly duck) eggs in Asian countries 1991 and 2009 (Calculations based on FAOSTAT data, 2009).**

Country	Total other eggs 1000 t	Relative to 1991 %	Per cap. eggs g	Relative to 1991 %	Share of total eggs %	Relative to 1991 %
World	4,590	178	692	147	7.2	109
Asia	4,354	182	1085	144	11.3	83
China	3,821	204	2899	155	14.9	75
Thailand	310	105	4720	89	36.5	96
Indonesia	208	175	900	138	15.0	63
Bangladesh	76	317	510	232	29.7	108
Philippines	73	133	820	92	12.1	79
Vietnam	70	-	820	-	27.5	-
Taiwan <sup>2</sup>	31	-	1347	-	7.4	
Rep. Korea	28	712	570	633	5.2	577
Myanmar	18	300	330	94	7.0	49
Malaysia	11	110	410	75	2.3	77

<sup>2</sup> JENG FENG HUANG, 2011

The per capita production shows considerable variation. Thailand, Philippines, Myanmar and Malaysia reduced per capita production. China ranked second with 2.9 kg behind Thailand with 4.7 kg per head. The biggest jump made the Republic of Korea with an increase to 712 % for total duck eggs and to 633 % of duck eggs per head. China, Thailand, Indonesia, the Philippines, Bangladesh and

Vietnam account for more than 99 % of the world total production of “other” or duck eggs. In countries like Thailand (36.5 %), Bangladesh (29.7 %) and Vietnam (27.5 %), duck eggs contribute significantly to total egg consumption.

### Trade of waterfowl products

The comparison of export and import of duck and goose meat between 2001 and 2007 shows some changes (Table 10). China could increase duck and goose meat export to 141 and 108 %, respectively. The Netherlands doubled duck meat export, but France, Hungary and Thailand reduced duck meat export to 81 %, 66 % and 23 %, respectively. Japan and Hong Kong have been the main importer for duck meat in Asia. In Europe Germany und UK are the main duck meat importer.

**Table 10: The leading duck meat exporting and importing countries in 2007 (FAOSTAT, 2009)**

Country	Export 1000 t	Country	Import 1000 t
World	123.4	World	127.8
China	30.8	Hong Kong	41.6
Thailand	4.6	Japan	6.6
Netherlands	16.8	Germany	14.9
Hungary	16.1	UK	8.8
France	12.5	Spain	5.4

Table 11 shows the most important countries for export and import of goose meat. The main exporting countries are Poland, China and Hungary, while Germany is the main importing country. Germany imports duck meat mainly from France and The Netherlands, geese from Hungary and Poland. Self-sufficiency of duck and goose meat in Germany is only 60 % and 13 %, respectively.

**Table 11: The leading goose meat exporting and importing countries in 2007 (FAOSTAT, 2009)**

Country	Export 1000 t	Country	Import 1000 t
World	44.1	World	31.3
Poland	18.0	Germany	20.5
China	14.0		
Hungary	10.6		

In some countries, especially France, Hungary and China, geese and ducks are force-fed to produce fatty livers. Forced feeding utilizes the ability of waterfowl to take in large amounts of feed and to deposit a lot of fat in the liver. This is essential for wild migrating ducks and geese. In France more than 30 million Muscovy and Mule drakes are used for fatty liver production per year. In 2007 France exported 2510 tons fatty liver (Foie Grass), followed by China and Thailand with 712 tons each (FAOSTAT, 2009). In Europe, the practice of forced feeding is opposed by poultry welfare and illegal in several countries.

Waterfowl is also widely used as a source of feathers and downs. They are obtained at the time of slaughter as a valuable by-product. The harvesting of feathers and downs from live ducks and geese during the partial moulting at intervals of about seven weeks can be an additional source of income from fattening geese kept on pastures beyond 22 weeks of age and from breeding or laying ducks



and geese in small-scale farms. In 2000 the value of world trade of 55,000 tons downs and feathers was 600 million US\$ (WEZYK and CYWA-BENKO, 2002).

### **Contribution of waterfowl production for food security**

Our analysis of available statistics on waterfowl production indicates extreme differences in their importance for food security. Duck and goose meat producers in industrialized countries can focus on seasonal demand for special products to recover the higher production cost, e.g. the Christmas goose or smoked goose breast in Germany and in central Europe and the Peking duck in East Asia. The increasingly popular Asian restaurants in Europe and North America offer a wide range of special dishes and contribute to a growing demand for duck meat. In China and other Asian countries with a high percentage of Chinese people, intensive production of duck meat and duck eggs is expected to increase.

Intensive production systems have been developed during the past 50 years through activities of breeders, nutritionists and specialists for management and health. Fully integrated duck operations have been established, with own parent-stock. Further genetic progress can be expected in feed efficiency, meatiness, egg number, fertility, hatchability and reduced incidence of disorders by selection for "robustness" (HALL, 2006). While producers of waterfowl meat and eggs focus on full utilization of the current genetic potential, primary breeders, nutritionists and management specialists will focus on further improvement of efficiency, with due attention to animal welfare and environmental considerations.

Consumers in developed countries are not only interested in the price and quality of the final product, but also in the manner in which meat is produced. That means that intensive production systems for ducks and geese have to be organized in such a way that the welfare of the birds is not compromised and negative influences on the environment are minimized (RODENBERG *et al.*, 2005). Some people with high income may prefer meat from organic or ecological production systems. Traditional producers of ducks and geese in free range with access to water for bathing can focus on this niche market.

In developing countries, extensive production in small-scale or family farms is common. In some countries of south-east Asia more than 80 % of poultry is kept in small-scale family farms. DINESH *et al.* (2008) described an FAO supported project in five provinces of Cambodia, involving almost 100 duck farms. About 80 % of the ducks were common laying type ducks and about 20 % Muscovy ducks. The ducks are reared on free range and survive mainly by scavenging, but most farmers give extra feed, mainly grain from their own farm. The average flock size in the provinces ranged between 10 and 204. Very few farmers used improved breeds for upgrading the flock. More than 40 % of the farmers hatched the ducklings in their own farm, using a Muscovy duck or a brooding hen. Others bought ducklings from the neighbor or local market. The houses were usually constructed with on-farm material, but 7 % did not provide any shelter. More than 70 % of the farmers did not use veterinary service and vaccination programs. The average egg number per duck was less than 50; the average female body weight between 1.3 and 1.4 kg. After meeting the family requirements, 57 farmers sold surplus eggs and 53 sold growers, drakes and spent ducks either at the local village market or to a local trader.

Extensive waterfowl production in small-scale farms plays a vital role in rural areas in Asian countries for utilization of cheap natural feed resources by scavenging, like insects, worms, snails and snakes. But the productivity under these conditions is low. The availability of low-cost or no-cost feed might compensate the disadvantage of low performance. A supplement of concentrate with minerals and vitamins will be adequate to provide a balanced ration. This is an easy and effective way to increase production and improve food security under scavenging conditions.

As GUE'YE (2009) stated, "Family poultry represent an appropriate system for supplying the fast growing human population with high quality protein and providing additional income to resource-poor small farmers, especially women. Although requiring low levels of inputs (housings, feeds, breeds, vaccines, drugs, equipment and time/attention), family poultry farmers contribute significantly to food security, poverty alleviation and the ecologically sound management of natural resources"



However, small-scale producers are often constrained by limited information, access to appropriate technologies, support services and markets, which could otherwise substantially improve productivity and income generation. Along with these basic problems, diseases like Highly Pathogenic Avian Influenza (HPAI) hurt especially rural duck farmers (DINESH *et.al*, 2008). In view of the significant increase in waterfowl meat and egg demand in recent decades, small-scale farms in south-east Asia could benefit from the application of current knowledge to generate family income from waterfowl production:

- Use of ducklings and goslings of improved genotypes from parent-stock farms.
- Use of concentrate with vitamins and minerals as feed additive for better utilization of scavenger feed to ensure a balanced nutrition. Mold growth in paddy rice, maize and peanuts should be controlled by suitable storage.
- Management should be improved, especially for ducklings and goslings during the first weeks, by providing additional heat, drinking water and protein rich feed.
- Use of veterinary services and vaccination programs to control diseases.
- Extension service supported by radio programs and demonstration farms for basic training and continuing education.

HUQUE (1996) advocated the improvement of small-farmers skill with participation of women. SHELDON (2000) emphasized education and training at all levels, including agricultural extension, full involvement of women at all stages of the development, provision of low-cost credit facilities, and the development of suitable marketing systems, including cooperatives.

Duck farming in most south and south-east Asian countries consists of large numbers of small farms and only few intensive commercial farms. Where integrated waterfowl production has been established, family farms should be included and supported. By introducing a contract purchase and sales system, family farms can be assisted in increasing their production capacity with access to the market. Non-Governmental Organizations (NGOs) can also play a significant role in supporting backyard duck production (PEETHAMBARAN and JALALUDEEN, 2005).

In Africa and Latin America we find extensive areas with similar climatic conditions as in south-east Asia, and it is surprising that we find so little waterfowl in these parts of the world. In most African countries more than 70-80 % of poultry is kept on family farms (SONAIYA, 2007), but the share of waterfowl is low. There is apparently little demand for waterfowl products, duck meat and eggs are seldom found. Perhaps there is a lack of information on the nutritional value of these products. Geese are mostly kept as pets or guards. In Latin America chicken meat production has been increased in recent decades and is much cheaper than duck meat. BONINO and VELEZ (1992) reported that in Argentina farmers have changed from Peking ducks to broiler production because consumers prefer leaner meat and vertically integrated broiler operations can produce poultry meat more efficiently.

Due to their good foraging and reliable brooding behavior, Muscovy ducks are especially suitable for scavenging systems; they also adapt better to hot climate than chickens. The Muscovy duck would be suitable for small-scale rural farmers in Africa and Latin America and could contribute to food security. In rural tropical areas where meat cannot be conserved, ducks provide an excellent protein source for a family for one or two days. The eggs are naturally incubated and the ducklings are reared and protected by the duck mother.

Waterfowl is generally easier to rear than chickens, especially on small family farms in regions with hot and humid climate. Wherever such climatic conditions exist, support for waterfowl production on family farms seems justified to ensure increased productivity and food security.

## Summary

The production of waterfowl can contribute to the improvement of the nutritional standards of the human population. Feed for waterfowl is not commonly used for human consumption and there is no strong competition between waterfowl and human nutrition.

In comparison with chickens, ducks and geese play a minor role in production of meat and eggs. But in certain countries of East and South-East Asia ducks and geese produce significant amounts of meat and eggs, with a sharp rise in production during recent decades. Duck meat production increased from 1.3 million tons in 1991 to 3.8 million tons in 2009; geese meat production was 0.76 million tons in 1991 and 2.47 million tons in 2009, and total waterfowl production accounts for 6.8 % of total poultry meat. The largest duck and goose producer is China with 65 % and 94 % of the world production, respectively.

Duck egg consumption has a long tradition in China and South-East Asia with 10-30 % of total egg consumption. Waterfowl is also widely used as source for feathers and downs.

Large-scale production of ducks and geese need more efforts for higher efficiency and for improving product quality by breeding, nutrition and management according to the requirements of animal welfare and environment protection. Family poultry farmers (small-scale production) with low levels of inputs (housings, feed, breeds, vaccines, drugs, equipment and time/attention) contribute significantly to food security, poverty alleviation and ecologically sound management of natural resources. They should have more access to improved breeds, appropriate technologies and support services, which could substantially improve productivity, income and food security. Efficient waterfowl farming requires appropriate disease control, use of strains with high genetic potential and management conditions compatible with natural behaviour and welfare of the birds.

Waterfowl is easier to manage than chickens in regions with hot and humid climate. Under such conditions waterfowl can be preferred as contributor to food security.

## **Zusammenfassung**

Die Wassergeflügelproduktion kann zur Verbesserung der Ernährung der Weltbevölkerung beitragen. Da das Futter für Wassergeflügel kaum für die menschliche Ernährung verwendet wird, ist die Nahrungskonkurrenz zwischen Wassergeflügel und Menschheit von geringer Bedeutung.

Im Vergleich zum Huhn spielen Enten und Gänse nur eine untergeordnete Rolle in der Fleisch- und Eierproduktion. In verschiedenen Ländern Ost- und Südost-Asiens werden jedoch große Mengen an Fleisch und Eiern von Enten und Gänsen erzeugt mit deutlicher Produktionssteigerung in den letzten Jahrzehnten.

Von 1991 bis 2009 wurde die Entenfleischproduktion von 1,3 Mill. t auf 3,8 Mill. t und die Gänsefleischproduktion von 0,76 Mill. t auf 2,47 Mill. t gesteigert. Insgesamt beträgt der Anteil des Wassergeflügels 6,8 % der gesamten Geflügelfleischproduktion. Der größte Produzent von Enten- und Gänsefleisch ist China, mit 65 % bzw. 94 % Anteil der Weltproduktion.

China und Süd-Ost-Asien haben auch eine lange Tradition im Verzehr von Enteneiern mit 10-30 % Anteil am gesamten Eiverbrauch. Weiterhin wird Wassergeflügel genutzt als Quelle für Federn und Daunen.

Die Produktion von Enten und Gänsen in großen Unternehmen erfordert eine höhere Effizienz und Verbesserung der Produktqualität durch Züchtung, Fütterung und Management unter Berücksichtigung des Wohlbefindens der Tiere und des Umweltschutzes. Kleinproduzenten mit geringem Aufwand hinsichtlich Unterbringung, Futter, Leistungsfähigkeit der Tiere, Krankheitsprophylaxe und Betreuung tragen dennoch zur Sicherung der Ernährung, zur Minderung der Armut und zur ökologischen Nutzung natürlicher Ressourcen bei. Sie sollten aber mehr Zugang zu züchterisch verbesserten Tieren, zu geeigneten Materialien und zu Dienstleistungen haben, um über die Leistungssteigerung das Einkommen und das Niveau der Ernährung verbessern zu können. Eine effiziente Produktion erfordert auch für den Kleinbetrieb eine tierärztliche Betreuung und sachgerechte Beratung, sowie leistungsfähige Tiere und Bedingungen, die mit dem natürlichen Verhalten und dem Wohlbefinden der Tiere vereinbar sind.

Wassergeflügel ist in feucht-heißen Regionen einfacher zu halten als Landgeflügel und sollte in solchen Gebieten stärker zur Sicherung der Ernährung herangezogen werden.

## References

- BESSEI, W. and NYVOLD, S (1990) Waterfowl production – some general aspects. Proc. of FAO expert consultation on waterfowl production in Africa. 5-19.
- BONINO, M.F. and VELEZ, A.M. (1992) Influence of natural and artificial incubation on the hatchability in the Argentine Muscovy duck eggs. Proc. 9th Int. Symp. on Waterfowl, Pisa-Italy, 115-117.
- DINESH, M.T., GEERLINGS, Ellen, SCHWABENBAUER, Karin, SÖLKNER, J., THIEME, O., WURZINGER, Maria (2008) Characterization of the domestic duck production systems in Cambodia. FAO-Report, pp 96.
- FAO-Statistics 2009 und 2011,
- GUE'YE, E.F. (2009) The role of networks in information to family poultry farmers. World's Poultry Science Journal 65, 115-124.
- HALL, T. (2006) Breeding for the future. World Poultry 22, 11, 20-21.
- HUQUE, Q.M.E. (1996) Improving skills of the small farmers in poultry management. 20<sup>th</sup> World's Poultry Congress, New Delhi, India, Vol. 1, 47-60.
- JENG FENG HUANG, (2011): personal communication
- PEETHAMBARAN, P.A. and JALALUDEEN, A. (2005) Performance of Kuttanad ducks under backyard. Proc. of the 3<sup>rd</sup> World Waterfowl Conf., Guangzhou, 292-294.
- RODENBERG, T.B., BRACKE, M.B.M., BERK, J., COOPER, J., FAURE, J.M., GUÉMÉNÉ, D., GUY, G., HARLANDER, A., JONES, T., KNIERIM, U., KUHN, K., PINGEL, H., REITER, K., SERVIÈRE, J. AND RUIS, M.A.W. (2005) Welfare of ducks in European duck husbandry systems. World Poultry Science Journal, 61, 633-646.
- SHELDON, B.L. (2000) Research and development in 2000: Directions and priorities for the World's Poultry Science Community. Poultry Science 79:147-158.
- SONAIYA, E.B. (2007) Family poultry, food security and the impact of HPAI. World's Poultry Science Journal 63, 132-138.
- TAI, C., WANG, T. and HUANG, C.C. (1999) Production systems and economic characters in waterfowl. Proceeding of 1st World Waterfowl Conference, Taiwan, 19-31.
- WEZYK, S. and CYWA-BENKO, K. (2001) Global trends in waterfowl production and science. Archiv für Geflügelkunde, 66, 48-49.
- ZAKHATSKY, N.I. and BONDARENKO, Y.V. (1999) Waterfowl production in Ukraine. Proceedings of 1<sup>st</sup> World Waterfowl Conference, Taiwan, 450-453.

## Author's Address:

Prof. Dr. Heinz Pingel  
Institute of Agricultural and Nutritional Science, University of Halle (Saale),  
Theodor Lieser Street 11, 06120 Halle (Saale), Germany  
Heinz.pingel@landw.uni-halle.de

Prof. Dr. Heinz Pingel  
Tornaer Weg 37 a, 06188 Landsberg