# Annexes



*Pictures on this and previous double page: Manure handling (Pictures by: Torsten Hemme and Katja Seifert)*

# A.1 The International Farm Comparison Network (IFCN)

### What is IFCN?

IFCN stands for International Farm Comparison Network and has the vision to develop a global research network which links farm economic researchers. The Dairy branch of the IFCN was founded in 1997 and is well established. Our mission is to create a better understanding of milk production world-wide.

### Why is the IFCN useful for a dairy region?

To have a prospering dairy region, a clear strategy of all stakeholders is required. The participation in IFCN provides information about the global developments of the dairy sector and the competitive position of a dairy region in it. Moreover, it identifies potential points for improvement.

### What are the values of the IFCN?

IFCN is an open scientific system for the exchange of ideas and the creation of knowledge. IFCN is independent from third parties (policy makers, lobby groups, industry) and committed to truth, science and reliable results.

### What are the IFCN research activities?

- Global benchmarking of dairy farming systems
- Monitoring of prices and farm structure
- Analysing dairy farm and dairy sector developments
- Supporting dairy development in specific regions
- Policy impact analysis

### What are the priorities in IFCN?

1. Sustainability of the network infrastructure.
2. Reliability of data and quality of the results.
3. Inclusion of more countries and farms.
4. In-depth analysis and special projects.

### How is the IFCN organised?

The IFCN Dairy Research Center, being linked to Kiel University, coordinates the scientific work and provides a professional management for the network. The network co-ordination is mainly funded by the consortium fees from the participating research organisations, partnership with agribusiness and institutional partners. All partners have agreed on the vision, mission, values and priorities of IFCN.

### Who benefits from the IFCN work?

**1. Dairy farmers:** Dairy farmers benefit from knowing about their competitiveness in a globalized dairy world. Moreover, they get access to information about alternative production systems.

**2. Milk processors:** Information about the production costs in specific milk regions is a key element for the competitiveness of the milk processor.

**3. Farm input suppliers:** Information about farm economics and global dairy developments are very good tools to guide strategic discussion and decisions within the company.

**4. Policy makers:** The link with the IFCN knowledge provides the policy makers with facts and figures for political discussions. Moreover, the IFCN tools permit the evaluation of alternative policy scenarios.

**5. Research organisations:** Cooperation with IFCN offers access to methods, models and data which increases the capacity in dairy research and teaching.

### Partnership with the IFCN network

The IFCN offers different kinds of partnership for the various stakeholders of the dairy chain.

### Research partnership

The participation in the IFCN is based on the win-win idea and offers 2 levels of partnership: A) Associated Partner and B) Consortium Partner. So far researchers / institutions from over 70 countries have joined the IFCN.

### Agribusiness partnership

For agribusiness companies the IFCN provides access to its knowledge in various forms such as reports, conferences, e-mail hotline, newsletter, power-point material, etc. The IFCN offers two levels of partnership: A) Main supporting partners for one company per branch and B) IFCN Supporter status. So far more than 60 companies have become partners of the IFCN.

# A.2 FAO's Pro-Poor Livestock Policy Initiative (PPLPI)

With the adoption of the Millennium Development Goals, the international community made the eradication of extreme poverty and hunger one of its primary targets. Livestock contribute to the livelihoods of an estimated 70% of the world's 800 million rural poor by providing a small but steady stream of food and income, raising whole farm productivity, increasing assets and diversifying risks. Livestock also have an important role in improving the nutritional status of low-income households, confer status, are of cultural importance, and create employment opportunities within and beyond the immediate household.

The increasing demand for animal protein in low- and middle-income countries provides an opportunity for the rural poor to improve their livelihoods. However, the nature of livestock farming is determined by policy and institutional frameworks that rarely favour of the poor. Therefore, in 2001, the Food and Agricultural Organisation (FAO) of the United Nations launched the Pro-Poor Livestock Policy Initiative (PPLPI) to facilitate and support the formulation and implementation of livestock-related policies and institutional changes that have a positive impact on the world's poor. To achieve this goal, the Initiative combines stakeholder engagement with research and analysis, information dissemination, and capacity strengthening.

A central facility of the PPLPI, funded by the UK Department for International Development, has been established at FAO headquarters in Rome with the responsibility of guiding and co-ordinating the Initiative's activities, and with the ambition to become a point of reference for livestock-related pro-poor policy development. In order to cover the different levels of policy-making, extending from international, through regional and national to sub-national levels, and to engage directly with relevant stakeholders, the Initiative complements the work of the central facility with active participation in selected policy processes in a number of strategically chosen 'focus countries'.

Livestock sector development has far-reaching externalities that give rise to conflict at many levels. Global concerns are increasingly influencing national agendas, while national concerns may become the subject of international debate. Informed public policy-making is therefore becoming increasingly complex, and the processes of negotiation around livestock and public goods issues need to be adapted such that they combine stakeholder engagement and negotiation with research and analysis. To assist policy makers in tackling poverty through evidence-based policy and institutional reforms the PPLPI compiles information on livestock–poverty relationships and conducts and commissions research in four interrelated thematic areas.

The first thematic area encompasses the role of livestock in the household, community, and in national economies. A clear understanding of the role of livestock at various levels is essential to appreciate the choices made by the various actors at these levels, and to identify development pathways that are most likely to offer pro-poor benefits.

Second, the PPLPI conducts research into the political economy of livestock sector-related policy making. A detailed appreciation of actual vs. stated policies, their impacts, and the interests and influence of various players is a prerequisite for the project's engagement in policy and institutional reform processes.

The third thematic area relates to markets and standards, which are key determinants of the balance between subsistence and market-oriented production. Markets provide the crucial link between sectors and sub-sectors and between rural and urban populations. Linking poor livestock keepers to expanding urban markets is likely to be one of the most promising avenues for rural poverty reduction.

The fourth major thematic area covers livestock services. These constitute a wide variety of basic inputs to livestock production, such as feeds, dugs, health services, credit and insurance, which are often not accessible to poor livestock keepers.

The PPLPI compiles information and conducts research and analysis relevant to these themes both in support of specific policy processes in selected countries, and generically, to enhance decision-making by the national and international livestock and rural development communities.

China

# A.3 Further reading / papers by IFCN and PPLPI

## IFCN method in general


Hemme T (2000): IFCN - A concept for international analysis of the policy and technology impacts in agriculture. Ein Konzept zur international vergleichenden Analyse von Politik- und Technikfolgen in der Landwirtschaft. Landbauforschung Völkenrode, Sonderheft 215, Braunschweig. (Dissertation)


## Important IFCN publications 1996 - 2005


IAAE: Hemme T, Christoffers K, Deeken E (2003): Competitiveness of Dairy Farming - Farm Level Analysis of 21 Countries (IFCN). Poster Presentation at International Conference of Agricultural Economists (IAAE), Durban, South Africa

AAEA: Ochoa RF, Anderson, DP, Knutson RD, Hemme T (1999): International Farm Level Competitiveness in Dairy. Annual meeting, American Agricultural Economics Association (AAEA), Nashville/Tennessee, USA

EAAE: Reyes E, Milán MJ, Baucells J, Calsamiglia S (2002): An evaluation of the financial performance of Spanish dairy farms using IFCN methodological approach. Poster presentation at 10th Congress of the European Association of Agricultural Economists (EAAE)– August 2002 in Zaragoza Spain

GEWISOLA: Hemme T, Deblitz C, Goertz D, Isermeyer F, Knutson RD, Anderson DP (1998): Politik und Technikfolgenanalysen für typische Betriebe im Rahmen des »International Farm Comparison Network (IFCN)«. Schr Ges Wirtsch Sozialwiss Landbau 35:157-164, German Association of Agricultural Economist conference (GEWISOLA) 30.9. - 2.10.1998

Buiatrics: Hemme T (2002): Comparison of dairy farming systems world-wide. Poster at XXII World Buiatrics Congress: Hanover, Germany, 18-23 August 2002; abstracts, pp 1

HEWPEM: Saha A, Hemme T (2003): Technical Efficiency and Cost Competitiveness of Milk Production by Dairy Farms in Main Milk Producing Countries. Paper at 2nd Hellenic Workshop on Productivity & Efficiency Measurement (HE.W.P.E.M.), Athens Greece 30.5 - 1. 6.2003.

IDF: Hemme T, Holzner J (2001): Costs of milk production: A world-wide study (invited paper) at IDF – International Dairy Federation- World Dairy Summit: Farming Conference; Farming for Profit from Fresh Pasture; Auckland, New Zealand, 27.10. - 1.11.2001 / Proceedings. Brussels, Belgium: International Dairy Federation

IDF: Hemme T et al. (2003): (R)evolution dairy farming, (invited paper) at IDF – International Dairy Federation – World Dairy Summit & Centenary, conference on The Dairy (R)evolution - 100 years of change. Brugge 7-12 September 2003

IFMA: Hemme T, Deeken E (2005): Selected results of the IFCN Dairy Network. Milk prices and costs of milk production in 2003. In: 15th Congress of the International Farm Management Association, 14-19 August 2005, Campinas, Sao Paulo, Brazil

IAMA: Hemme T (2006): IFCN Dairy Network. Invited paper at IAMA (International Food and Agribusiness Management Association) 16th Annual World Forum and Symposium, June 10-13, 2006 Buenos Aires

EAAP: Hemme T (2006): Global trends in beef and dairy production. Invited paper at EAAP European Federation of Animal Science, Cattle workshop, 15.09.2006, Antalya, Turkey

IAMO: Ramanovich M, Hemme T (2006): How competitive is milk production in the Central and Eastern European countries in comparison to Western Europe? In: Agriculture in the Face of Changing Markets, Institutions and Policies, Challenges and Strategies, Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 33, pp. 271-282, IAMO, Halle, Germany


## FAO publications


Garcia, O.; Hemme, T.; Reil, A.; Stoll, J. (2007) Predicted Impact of Liberalisation on Dairy Farm Incomes in Germany, Vietnam, Thailand and New Zealand. FAO-PPLPI Working Paper 42. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp42.pdf http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp42.pdf

Garcia, O.; Saha, A.; Mahmood, K.; Ndambi, A.; Hemme, T. (2006) Policies Dairy Development Programs in Andhra Pradesh, India: Impacts and Risks for Small-scale Dairy Farms. FAO-PPLPI Working Paper 38. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp38.pdf http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp38.pdf

Garcia, O.; Gomez, C.A. (2006) The Economics of Milk Production in Cajamarca, Peru, with Particular Emphasis on Small-scale Producers. FAO-PPLPI Working Paper 34. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp34.pdf; http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp34.pdf

Garcia, O.; Hemme, T.; Tat Nho, L.; Thi Huong Tra, H. (2006) The Economics of Milk Production in Hanoi, Vietnam, with Particular Emphasis on Small-scale Producers. FAO-PPLPI Working Paper 33. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp33.pdf http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp33.pdf

Garcia, O.; Hemme, T.; Rojanasthien, S.; Younggad, J. (2005) The Economics of Milk Production in Chiang Mai, Thailand, with Particular Emphasis on Small-scale Producers. FAO-PPLPI Working Paper 20. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp20.pdf http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp20.pdf

Garcia, O.; Mahmood, K.; Hemme, T. (2003) A Review of Milk Production in Pakistan with Particular Emphasis on Small-scale Producers. FAO-PPLPI Working Paper 3. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp03.pdf; http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp3.pdf

Hemme, T.; Garcia, O.; Khan, A.R. (2004) A Review of Milk Production in Bangladesh with Particular Emphasis on Small-scale Producers. FAO-PPLPI Working Paper 7. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp07.pdf http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp7.pdf

Hemme, T.; Garcia, O.; Saha, A. (2003) A Review of Milk Production in India with Particular Emphasis on Small-scale Producers. FAO-PPLPI Working Paper 2. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp02.pdf http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp2.pdf

Knips, V. (2006) Developing Countries and the Global Dairy Sector, Part II: Country Case Studies. FAO-PPLPI Working Paper 31. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp31.pdf; http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp31.pdf

Knips, V. (2005) Developing Countries and the Global Dairy Sector, Part I: Global Overview. FAO-PPLPI Working Paper 30. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp30.pdf; http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp30.pdf

Staal, S.J.; Nin Pratt, A.; Jabbar, M. (2008) Dairy Development for the Resource Poor - A Comparison of Dairy Policies and Development in South Asia and East Africa. (3 part series) FAO-PPLPI Working Paper 44. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/execsumm_wp44.pdf

Part 1: A Comparison of Dairy Policies and Development in South Asia and East Africa. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp44_1.pdf

Part 2: Kenya and Ethiopia Dairy Development Case Studies. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp44_2.pdf

Part 3: Pakistan and India Dairy Development Case Studies. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp44_3.pdf

India

# A.4 Researchers who have contributed

78 research institutions from 72 Countries

## Western Europe

Baldur Helgi Benjaminsson
Association of Icelandic Dairy and Beef Cattle Farmers, Reykjavik, **Iceland**

Ola Flaten, Bjørn Gunnar Hansen
NILF – Norwegian Agricultural Economics Research Institute; TINE, Norwegian Dairies, Oslo, **Norway**

Christian Gazzarin
Agroscope Reckenholz-Tänikon Research Station (ART), Agricultural Economics, Tänikon, **Switzerland**

Sami Ovaska, Timo Sipiläinen, Matti Ryhänen
Agrifood Research Finland, MTT Economic Research, Helsinki, **Finland** Seinäjoki University of Applied Sciences, School of Agriculture and Forestry, Ilmajoki, **Finland**

Leopold Kirner
Federal Institute of Agricultural Economics, Vienna, **Austria**

Henrike Burchardi
IFCN Dairy Research Center, Kiel, **Germany**

Michel de Haan
Animal Sciences Group, Wageningen-UR, Lelystad, **The Netherlands**

Simone Adam
Ministère de l'Agriculture, Service d'Economie Rurale, **Luxembourg**

Jean-Luc Reuillon
Institut de l'Élevage, Département Actions Régionales, Aubière, **France**

Ernesto Reyes
Animal Health and Livestock Services, TRAGSEGA, Madrid, **Spain**

Alberto Menghi
CRPA – Centro Ricerche Produzioni Animali, Reggio Emilia, **Italy**

Kay Carson
DairyCo, Cirencester, England, **United Kingdom**

Fiona Thorne
Rural Economy Research Centre, Teagasc, Dublin, **Ireland**

Michael Friis Pedersen
Danish Agricultural Advisory Service, National Centre, Aarhus, **Denmark**

Agneta Hjellström
Swedish Dairy Association, Stockholm, **Sweden**

## Central and Eastern Europe and Middle East

Michal Switlyk, Malgorzata Karolewska
University of Agriculture in Szczecin, Department of Management, Szczecin, **Poland**

Iveta Bosková
VUZE – Research Institute of Agricultural Economics, Prague, **Czech Republic**

Zlatan D. Vassilev
PhD student University Hohenheim, Germany; **Bulgaria**

Rade Popovic
University of Novi Sad, Faculty of Economics, Subotica, **Serbia**

Olga Kozak
National Scientific Centre "Institute of Agrarian Economics", Kyiv, **Ukraine**

Mikhail Ramanovich
IFCN Dairy Research Center, Kiel, Germany, **Belarus**

Evgeny Smirnov
Russian Dairy Union, Moscow, **Russian Federation**

Galiya Akimbekova
Scientific Research Institute of Agricultural Economics, Almaty, **Kazakhstan**

Cagla Yuksel Kaya-Kuyululu
Cattle Breeders' Association of Turkey, Ankara, **Turkey**

Liron Tamir
Israel Dairy Board, Rishon-Le´Zion, **Israel**

Othman Alqaisi
IFCN Dairy Research Center, Kiel, Germany, **Jordan**

## Africa

David Balikowa
Dairy Development Authority, Kampala, **Uganda**

Asaah Ndambi, Henri Bayemi
IFCN Dairy Research Center, Kiel, Germany; Institute of Agricultural Research for Development (IRAD) Bambui, **Cameroon**

Koos Coetzee
Milk Producers' Organisation, Pretoria, **South Africa**

# A.4 Researchers who have contributed

### North and South America

Richard Sanchez, Geneviève Rainville,
Dairy Farmers of Canada, Ottawa, Canada; FPLQ, Quebec, **Canada**

Ed Jesse
Babcock Institute for International Dairy Research and Development, University of Wisconsin-Madison, **USA**

Jaime Jurado Arredondo
Universidad Autonoma de Chihuahua, Chihuahua, **Mexico**

Hugo Quattrochi
Unión Productores de Leche Cuenca Mar y Sierras, **Argentina**

Bernardo Ostrowski
Universidad Buenos Aires (UBA), Cátedra de Administración Rural, Facultad de Agronomia, Buenos Aires, **Argentina**

Fernando Ferreira
University of Applied Science of Weihenstephan, Germany; **Paraguay**

Mario E. Olivares
Cooprinsem, Osorno,
**Chile**

Lorildo A. Stock, Glauco R. Carvalho
Embrapa Gado de Leite (Embrapa Dairy Cattle), Juiz de Fora, Minas Gerais, **Brazil**

Carlos A. Gomez
Universidad Nacional Agraria La Molina, Lima,
**Peru**

### Asia

CL Dadhich, TN Datta, AK Saha
National Dairy Development Board, Anand,
**India**

Saadia Hanif
ASLP Dairy Improvement Project, Livestock and Dairy Development Board, Lahore, **Pakistan**

A. R. Khan
Bangladesh Agricultural University Mymensingh,
**Bangladesh**

Istiqomah
Fakultas Ekonomi Universitas Jenderal Soedirman Purwokerto Central Java, **Indonesia**

Yang Weimin, Dinghuan Hu, Sam Shi
Chinese Academy of Agricultural Sciences, Institute of Agricultural Economics and Development, Beijing, China; Dairy Consultant, Beijing, **China**

### Oceania

Andrew Weinert
Department of Agriculture, Perth, Western
**Australia**

Nicola Shadbolt
College of Sciences, Massey University, Palmerston North,
**New Zealand**

***For references of the Dairy Report use: Hemme et al. (2008):*** *IFCN Dairy Report 2008, International Farm Comparison Network, IFCN Dairy Research Center, Kiel, Germany.*
***For references in the special studies or the country reports use f.e.:*** *Gazzarin, C. (2008): Switzerland – Country report. In: Hemme et al. (2008), IFCN Dairy Report 2008, International Farm Comparison Network, IFCN Dairy Research Center, Kiel, p. 146.*

### Researchers participating only in the country profile analysis

Ilir Kapaj
Agriculture University of Tirana,Tirana, **Albania**

Vardan Urutyan
International Center for Agribusiness, Research and Education (ICARE), Yerevan, **Armenia**

Anatoli Takun
Institute of Economics of the National Academy of Sciences, Minsk, **Belarus**

René A. Pérez R.
DMV U.N., CNLM, **Colombia**

Otto Suárez
Agrícola Ganadera Reysahiwal AGR S.A., Guayaquil, **Ecuador**

Adel Khattab
Tanta University, Tanta, **Egypt**

Zelalem Yilma
Ethiopian Institute of Agricultural Research (EIAR), Addis Ababa, **Ethiopia**

Eva Vöneki
Research Institute for Agricultural Economics, Budapest, **Hungary**

Farhad Mirzaei
Ph. D Scholar at N.D.R.I /Deemed University, India; **Iran**

Maasoomeh Nasrollah Zadeh
Food Industry Department of Ferdosi University, **Iran**

Nobuhiro Suzuki
The University of Tokyo, **Japan**

Youseon Shin
Korea Rural Economic Institute, Seoul, **Korea**

Agnese Krievina
Latvian State Institute of Agrarian Economics, Riga, **Latvia**

Deiva Mikelionyte
Lithuanian Institute of Agrarian Economics, Vilnius, **Lithuania**

Blagica Sekovska
Veterinary Faculty, Institute for Food, Skopje, **Macedonia**

Badre El Himdy
Institut Agronomique et Vétérinaire Hassan II, Rabat, **Morocco**

Eustace A. Iyayi
University of Ibadan, Ibadan, **Nigeria**

Aminu Shittu
Usmanu Danfodiyo University, Sokoto, **Nigeria**

Victor M. Perez
Prolacsa, **Panama**

Naomi K. Torreta
National Dairy Authority, Quezon City, **Philippines**

António Moitinho Rodrigues
School of Agriculture - Polytechic Institute of Castelo Branco, **Portugal**

Michel Noordman
Dairy Farmer, S.C. Boes Lapte S.R.L., **Romania**

Ben Moljk
Agricultural Institute of Slovenia, Ljubljana, **Slovenia**

Margita Stefanikova
Slovak Association of Milk Producers (SZPM), Nitra, **Slovakia**

Hemali Kothalawala
Department of Animal Production and Health, Peradeniya, **Sri Lanka**

Xenia Hsiao
Forefront Enterprise Co., Ltd., Taipei, Taiwan, **ROC**

Pius Y. Kavana
Livestock Research Centre, Tanga, **Tanzania**

Adul Vangtal
Thai Holstein Friesian Association (T.H.A.), **Thailand**

Jorge Alvarez
Universidad de la Republica, Montevideo, **Uruguay**

Evelina Budjurova
University Giessen, Germany; **Uzbekistan**

Tieu Duc Viet
Dairy Viet Nam, Hanoi, **Viet Nam**

# A.5 Farm description

| Typical farm | IN-2OR-B | IN-6OR | IN-1PU | IN-9PU | IN-2KA | IN-4KA |
|---|---|---|---|---|---|---|
| Region | Orissa | Orissa | Punjab, Ropar | Punjab | Karnataka | Karnataka, Cuttack |
| Kind of Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm |
| No. of cows / dairy animals | 2 | 6 | 1 | 9 | 2 | 4 |
| Type of animals * | B | B | B | 3B + 6C | | |
| **Farm description** | | | | | | |
| Total agricultural land [1] (ha) | 2.0 | 1.0 | - | 6.4 | 0.8 | 1.6 |
| Land used for dairy enterprise [2] | 8% | 7% | - | 1% | 100% | 25% |
| Stocking rate [3] on total ha | 1.00 | landless | landless | 1.41 | 2.50 | 2.50 |
| Total labour input [4] (labour unit) | 2.1 | 2.0 | 1.0 | 4.7 | 1.8 | 6.1 |
| Family labour input (% of total labour) | 88% | 88% | 100% | 70% | 85% | 61% |
| Other enterprises [5] | Draught animal rearing, dairy animal marketing | Dairy animal marketing | Cowdung | Cowdung as fuel and manure | Sericulture | Commercial poultry, provisional store - retailing |
| **Dairy specific data** | | | | | | |
| Milk yield (kg ECM [6] / cow) | 452 | 1,298 | 1,185 | 2,908 | 3,265 | 3,857 |
| Milk production (t ECM [6]) | 1 | 8 | 1 | 26 | 7 | 15 |
| Replacement rate (%) | 15% | 35% | 20% | 17% | 20% | 20% |
| Age of first calving (months) | 48 | 32 | 46 | 37 | 27 | 19 |
| Data from calendar year | 2004 | 2004 | 2005 | 2005 | 2004 | 2004 |
| Exchange rate from calendar year | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 |
| Exchange rate to US$ | 44.11538 | 44.11538 | 44.11538 | 44.11538 | 44.11538 | 44.11538 |
| Inflation rate | 4% | 4% | 4% | 4% | 4% | 4% |
| | CPI | CPI | CPI | CPI | CP | CPI |

| Typical farm | PK-1 | PK-10 | BD-2 | BD-10 | TH-14 | TH-106 | VN-2 | VN-4 |
|---|---|---|---|---|---|---|---|---|
| Region | South Punjab, Layyah | South Punjab, Layyah | Sirajganj | Sirajganj | Chiang Mai | Chiang Mai | Donganh, Hanoi | Donganh, Hanoi |
| Kind of Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm |
| No. of cows / dairy animals | 1 | 10 | 2 | 10 | 14 | 106 | 2 | 4 |
| Type of animals * | B | 8B + 2C | | | | | | # |
| **Farm description** | | | | | | | | |
| Total agricultural land [1] (ha) | - | 6.0 | 0.4 | 1.5 | 2.1 | 3.0 | 0.5 | 0.2 |
| Land used for dairy enterprise [2] | - | 23% | 63% | 39% | 100% | 100% | 100% | 100% |
| Stocking rate [3] on total ha | landless | 1.67 | 5.00 | 6.67 | 6.67 | landless | 3.97 | landless |
| Total labour input [4] (labour unit) | 1.0 | 3.7 | 2.1 | 5.5 | 2.3 | 11.7 | 1.8 | 1.8 |
| Family labour input (% of total labour) | 100% | 63% | 100% | 83% | 100% | 11% | 100% | 94% |
| Other enterprises [5] | Beef, goat, chicken, manure | Beef calves, goats, hens, making butter oil, manure | Manure use, goats, poultry | Manure use, fish farming, vegetables | Mango fruit production, poultry | Manure sold | | |
| **Dairy specific data** | | | | | | | | |
| Milk yield (kg ECM [6] / cow) | 1,309 | 2,431 | 955 | 1,334 | 3,845 | 4,355 | 4,085 | 4,028 |
| Milk production (t ECM [6]) | 1 | 24 | 2 | 13 | 54 | 462 | 8 | 16 |
| Replacement rate (%) | 32% | 22% | 20% | 15% | 23% | 20% | 25% | 25% |
| Age of first calving (months) | 42 | 33 | 36 | 36 | 26 | 27 | 29 | 27 |
| Data from calendar year | 2005 | 2005 | 2005 | 2005 | 2004 | 2004 | 2004 | 2004 |
| Exchange rate from calendar year | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 |
| Exchange rate to US$ | 59.73501 | 59.73501 | 64.64828 | 64.64828 | 40.30894 | 40.30894 | 15967.54 | 15967.54 |
| Inflation rate | 9% | 9% | 7% | 7% | 2% | 2% | 4% | 4% |
| | CPI | CPI | CPI | CPI | CPI | CPI | CPI | CPI |

***Legends:***
*[1] without forest und other land*
*[2] % of total agr. land, incl. setaside*
*[3] No. of cows / total agricultural land*
*[4] Hired and family labour input for the whole farm (1 unit = 2100 hours)*
*[5] Other than crop and dairy*
*[6] ECM = Energy corrected milk (4% fat, 3.3 % protein)*
** Type of animals: B = Buffalo, C = Cow. If not mentioned the farms have only cows.*

| Typical farm | CN-3 | CN-12 | UG-3 | UG-13 | CM-10 | CM-35 | MA-4 | MA-12 |
|---|---|---|---|---|---|---|---|---|
| Region | North China, Hebei | North China, Hebei | Kayunga District | Kayunga District | Western Highlands | Western Highlands | Doukkala, Benihlel | Doukkala, Benihlel |
| Kind of Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm |
| No. of cows / dairy animals | 3 | 12 | 3 | 13 | 10 | 35 | 4 | 12 |
| Type of animals * | | | | | | | | |
| **Farm description** | | | | | | | | |
| Total agricultural land [1] (ha) | landless | landless | 22.3 | 41.5 | 30.0 | 43.0 | 2.0 | 13.0 |
| Land used for dairy enterprise [2] | landless | landless | 91% | 98% | 33% | 68% | 27% | 37% |
| Stocking rate [3] on total ha | landless | landless | 0.13 | 0.31 | 0.33 | 0.81 | 2.00 | 0.92 |
| Total labour input [4] (labour unit) | 0.9 | 2.7 | 2.0 | 3.6 | 1.7 | 2.3 | 1.4 | 2.9 |
| Family labour input (% of total labour) | 100% | 89% | 39% | 49% | 5% | 48% | 100% | 54% |
| Other enterprises [5] | - | - | Pig, poultry | Goats, pigs | - | Steers | Steers | - |
| **Dairy specific data** | | | | | | | | |
| Milk yield (kg ECM [6] / cow) | 2,583 | 4,399 | 460 | 395 | 1,157 | 488 | 2,214 | 2,211 |
| Milk production (t ECM [6]) | 8 | 53 | 1 | 5 | 12 | 17 | 9 | 27 |
| Replacement rate (%) | 34% | 9% | 35% | 25% | 15% | 24% | 26% | 21% |
| Age of first calving (months) | 27 | 26 | 39 | 39 | 35 | 35 | 30 | 28 |
| Data from calendar year | 2006 | 2006 | 2006 | 2006 | 2006 | 2006 | 2006 | 2006 |
| Exchange rate from calendar year | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 |
| Exchange rate to US$ | 8.2 | 8.2 | 1777.28 | 1777.28 | 532.75 | 532.75 | 8.96 | 8.96 |
| Inflation rate | 2% | 2% | 7% | 7% | 5% | 5% | 3% | 3% |
| | CPI | CPI | CPI | CPI | CPI | CPI | CPI | CPI |

| Typical farm | PE-6 | PE-15 | DE-30S | DE-80N | US-80WI | US-350WI | NZ-282 | NZ-1042 |
|---|---|---|---|---|---|---|---|---|
| Region | Cajamarca, Polloc | Cajamarca, Campiña | Baden-Württemberg; Schwäb. Wald | Schleswig-Holstein, Geestrücken | Wisconsin | Wisconsin | Waikato | Central South Island |
| Kind of Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm | Family Farm, equity partnership |
| No. of cows / dairy animals | 6 | 15 | 30 | 80 | 80 | 350 | 282 | 1042 |
| Type of animals * | | | | | | | | |
| **Farm description** | | | | | | | | |
| Total agricultural land [1] (ha) | 7.6 | 7.3 | 50.0 | 80.0 | 93.1 | 275.2 | 96.0 | 299.0 |
| Land used for dairy enterprise [2] | 83% | 100% | 93% | 87% | 100% | 100% | 100% | 100% |
| Stocking rate [3] on total ha | 0.79 | 2.05 | 0.60 | 1.00 | 0.86 | 1.27 | 2.94 | 3.48 |
| Total labour input [4] (labour unit) | 1.9 | 3.7 | 1.5 | 2.3 | 2.6 | 8.5 | 2.3 | 7.9 |
| Family labour input (% of total labour) | 100% | 29% | 100% | 96% | 54% | 23% | 50% | 19% |
| Other enterprises [5] | Sheep | - | Direct sales distillery, contract labour, forestry | Steers | Custom work | - | - | - |
| **Dairy specific data** | | | | | | | | |
| Milk yield (kg ECM [6] / cow) | 2,153 | 4,459 | 6,813 | 7,926 | 8,703 | 10,445 | 4,299 | 5,114 |
| Milk production (t ECM [6]) | 13 | 67 | 204 | 634 | 696 | 3,656 | 1,212 | 5,329 |
| Replacement rate (%) | 22% | 19% | 34% | 38% | 40% | 40% | 20% | 22% |
| Age of first calving (months) | 32 | 27 | 30 | 30 | 27 | 27 | 24 | 24 |
| Data from calendar year | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 |
| Exchange rate from calendar year | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 | 2005 |
| Exchange rate to US$ | 3.30838 | 3.30838 | 0.80453 | 0.80453 | 1 | 1 | 1.42065 | 1.42065 |
| Inflation rate | 2% | 2% | 1% | 1% | 3% | 3% | 2% | 2% |
| | CPI | CPI | GDP Deflator | GDP Deflator | GDP Deflator | GDP Deflator | GDP Deflator | GDP Deflator |

# A.6 Description of data collection for typical dairy farms

**Classification of typical farms by data collection procedure**

1. **Panel approach:** A panel (farmer, advisor and scientist) discussed the data and agreed on the results of the typical farm.
2. **Statistical approach only:** The data were taken mainly from accounting statistics and were discussed among dairy experts to create a typical farm.
3. **Single farm approach only:** The data were taken mainly from a single farm and were discussed among dairy experts to create a typical farm.
4. **Single farm case:** The data were taken from a single farm. The data represent this single case rather than a type of dairy farm in the region.


| Farm | Data collection | Year analysed |
|---|---|---|
| IN-2OR-B | 1/3 | 2004 |
| IN-6OR | 1/3 | 2004 |
| IN-1PU | 1/3 | 2005 |
| IN-9PU | 1/3 | 2005 |
| IN-2KA | 1/3 | 2004 |
| IN-4KA | 1/3 | 2004 |
| PK-1 | 2/3 | 2005 |
| PK-10 | 2/3 | 2005 |
| BD-2 | 2/3 | 2005 |
| BD-10 | 2/3 | 2005 |
| TH-14 | 1/3 | 2004 |
| TH-106 | 1/3 | 2004 |
| VN-2 | 1/3 | 2004 |
| VN-4 | 1/3 | 2004 |
| CN-3 | 3 | 2006 |
| CN-12 | 3 | 2006 |
| UG-3 | 3/1 | 2006 |
| UG-13 | 3/1 | 2006 |
| CM-10 | 3 | 2006 |
| CM-35 | 3 | 2006 |
| MA-4 | 3/1 | 2006 |
| MA-12 | 3/1 | 2006 |
| PE-6 | 1/3 | 2005 |
| PE-15 | 1/3 | 2005 |
| DE-30S | 1/2 | 2005 |
| DE-80N | 1/2 | 2005 |
| US-80WI | 2 | 2005 |
| US-350WI | 2 | 2005 |
| NZ-282 | 2 | 2005 |
| NZ-1042 | 2 | 2005 |

# A.7 Exchange rates 1996–2007

| Country | | Currency | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albania | AL | ALL | 101.56 | 147.71 | 152.44 | 138.64 | 144.82 | 145.87 | 145.44 | 126.34 | 106.80 | 102.93 | 102.91 | 92.57 |
| Argentina | AR | ARS | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 3.11 | 2.99 | 2.96 | 2.93 | 3.09 | 3.13 |
| Armenia | AM | ADM | 79,874 | 90,026 | 159.02 | 388.63 | 438.23 | 454.14 | 488.36 | 477.53 | 448.31 | 440.16 | 422.99 | 339.50 |
| Australia | AU | AUD | 1.28 | 1.35 | 1.59 | 1.55 | 1.73 | 1.93 | 1.84 | 1.54 | 1.36 | 1.31 | 1.33 | 1.19 |
| Bangladesh | BD | BDT | 41.90 | 44.01 | 47.05 | 49.19 | 52.34 | 56.77 | 59.63 | 60.06 | 60.88 | 64.65 | 70.29 | 70.33 |
| Belarus | BY | BYR | 13,608 | 25,039 | 43,569 | 276,661 | 800 | 1,420 | 1,804 | 2,051 | 2,160 | 2,150 | 2,152 | 2,152 |
| Brazil | BR | BRL | 1.00 | 1.08 | 1.16 | 1.82 | 1.83 | 2.38 | 2.97 | 3.12 | 2.93 | 2.43 | 2.18 | 1.93 |
| Bulgaria | BG | BGL | 179.45 | 1,645.66 | 1,753.92 | 1,849.30 | 875.97 | 2.18 | 2.07 | 1.73 | 1.58 | 1.57 | 1.57 | 1.43 |
| Cameroon | CM | XAF | 512.49 | 584.26 | 590.21 | 616.02 | 713.46 | 741.47 | 724.61 | 590.97 | 549.16 | 532.75 | 553.41 | 489.78 |
| Canada | CA | CAD | 1.36 | 1.38 | 1.48 | 1.49 | 1.49 | 1.55 | 1.57 | 1.40 | 1.30 | 1.21 | 1.13 | 1.07 |
| Chile | CL | CLP | 412.37 | 419.51 | 460.67 | 509.19 | 539.67 | 642.62 | 703.77 | 702.97 | 621.67 | 561.81 | 539.39 | 520.69 |
| China | CN | CNY | 8.31 | 8.29 | 8.28 | 8.28 | 8.28 | 8.28 | 8.29 | 8.29 | 8.29 | 8.20 | 7.98 | 7.60 |
| Colombia | CO | COP | 1,036 | 1,143 | 1,428 | 1,762 | 2,093 | 2,324 | 2,580 | 2,938 | 2,676 | 2,332 | 2,424 | 2,104 |
| Czech Republic | CZ | CSK | 27.14 | 31.75 | 32.27 | 34.63 | 38.64 | 38.04 | 32.81 | 28.23 | 25.73 | 23.99 | 22.63 | 20.23 |
| Denmark | DK | DKK | 5.80 | 6.60 | 6.70 | 6.98 | 8.09 | 8.32 | 7.88 | 6.58 | 5.99 | 6.00 | 5.94 | 5.42 |
| Ecuador | EC | ECS | 3,251 | 4,066 | 5,654 | 13,096 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,652 |
| Egypt | EG | EGP | 3.41 | 3.40 | 3.42 | 3.42 | 3.55 | 4.06 | 4.66 | 5.91 | 6.24 | 5.83 | 5.82 | 5.71 |
| Estonia | EE | EEK | 11.90 | 13.87 | 14.08 | 14.69 | 17.01 | 17.47 | 16.60 | 13.86 | 12.60 | 12.59 | 12.47 | 11.40 |
| Euro | | EUR | 0.77 | 0.89 | 0.90 | 0.94 | 1.09 | 1.12 | 1.06 | 0.89 | 0.81 | 0.80 | 0.80 | 0.73 |
| Ethiopia | ET | ETB | 5.84 | 6.50 | 6.99 | 7.81 | 8.08 | 8.42 | 8.79 | 8.79 | 8.89 | 8.83 | 9.02 | 9.22 |
| Hungary | HU | HUF | 149.45 | 186.85 | 214.49 | 237.40 | 282.89 | 286.59 | 258.08 | 224.50 | 202.93 | 199.94 | 210.83 | 182.95 |
| Iceland | IS | ISK | 66.80 | 71.10 | 71.20 | 72.40 | 78.90 | 97.69 | 91.67 | 76.78 | 70.26 | 62.92 | 70.10 | 63.66 |
| India | IN | INR | 35.44 | 36.34 | 41.29 | 43.06 | 44.95 | 47.23 | 48.68 | 46.66 | 45.34 | 44.12 | 45.32 | 41.08 |
| Indonesia | ID | IDR | 2,328 | 2,904 | 10,285 | 7,877 | 8,416 | 10,294 | 9,350 | 8,593 | 8,946 | 9,722 | 9,184 | 9,145 |
| Iran | IR | IRR | 1,585 | 2,399 | 3,297 | 4,195 | 5,094 | 5,992 | 6,890 | 7,900 | 7,900 | 8,283 | 9,492 | 9,524 |
| Israel | IL | ILS | 3.19 | 3.45 | 3.81 | 4.15 | 4.09 | 4.21 | 4.74 | 4.55 | 4.49 | 4.50 | 4.47 | 4.10 |
| Japan | JP | JPY | 108.83 | 121.04 | 130.88 | 113.81 | 107.86 | 121.56 | 125.30 | 115.98 | 108.17 | 110.12 | 116.34 | 117.58 |
| Jordan | JO | JOD | 0.71 | 0.71 | 0.71 | 0.71 | 0.71 | 0.72 | 0.71 | 0.71 | 0.71 | 0.71 | 0.71 | 0.71 |
| Kazakhstan | KZ | KZT | 67.87 | 75.63 | 78.64 | 119.83 | 142.31 | 147.55 | 150.77 | 151.91 | 140.81 | 134.17 | 130.59 | 125.41 |
| Kenya | KE | KES | 57.17 | 58.92 | 60.54 | 70.42 | 76.28 | 78.75 | 79.15 | 76.32 | 79.55 | 75.75 | 72.62 | 67.82 |
| Korea, Republic of | KR | KRW | 805 | 954 | 1,402 | 1,190 | 1,131 | 1,291 | 1,250 | 1,195 | 1,151 | 1,028 | 970 | 934 |
| Latvia | LV | LVL | 0.55 | 0.58 | 0.59 | 0.59 | 0.61 | 0.63 | 0.62 | 0.57 | 0.54 | 0.56 | 0.56 | 0.51 |
| Lithuania | LT | LTL | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.66 | 3.06 | 2.78 | 2.78 | 2.75 | 2.52 |
| Macedonia | MK | MKD | 49.84 | 57.41 | 58.27 | 60.83 | 70.27 | 72.35 | 68.72 | 57.35 | 52.14 | 52.11 | 50.31 | 45.52 |
| Mexico | MX | MXN | 7.60 | 7.93 | 9.15 | 9.56 | 9.47 | 9.35 | 9.68 | 10.81 | 11.31 | 10.90 | 10.92 | 10.94 |
| Morocco | MA | MAD | 8.71 | 9.53 | 9.62 | 9.81 | 10.64 | 11.32 | 11.07 | 9.69 | 8.97 | 8.96 | 8.91 | 8.22 |
| New Zealand | NZ | NZD | 1.46 | 1.51 | 1.87 | 1.89 | 2.20 | 2.38 | 2.16 | 1.72 | 1.51 | 1.42 | 1.54 | 1.35 |
| Nigeria | NG | NGN | 81.86 | 82.19 | 86.46 | 96.00 | 105.14 | 116.95 | 126.40 | 133.07 | 133.56 | 132.10 | 132.44 | 128.22 |
| Norway | NO | NOK | 6.46 | 7.08 | 7.55 | 7.80 | 8.80 | 8.99 | 7.98 | 7.08 | 6.74 | 6.44 | 6.42 | 5.82 |
| Pakistan | PK | PKR | 36.00 | 41.08 | 48.73 | 51.40 | 53.94 | 62.63 | 62.26 | 59.89 | 60.01 | 59.74 | 60.25 | 60.78 |
| Panama | PA | PAB | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.04 | 1.02 |
| Paraguay | PY | PYG | 2,038 | 2,165 | 2,690 | 3,112 | 3,485 | 4,054 | 5,561 | 6,367 | 5,861 | 6,246 | 5,843 | 5,148 |
| Peru | PE | PEN | 2.45 | 2.66 | 2.93 | 3.38 | 3.49 | 3.55 | 3.66 | 3.60 | 3.51 | 3.31 | 3.36 | 3.19 |
| Philippines | PH | PHP | 26.23 | 29.63 | 41.00 | 39.15 | 44.34 | 51.17 | 51.73 | 54.31 | 56.19 | 55.14 | 51.41 | 45.95 |
| Poland | PL | PLN | 2.70 | 3.28 | 3.49 | 3.97 | 4.35 | 4.10 | 4.07 | 3.89 | 3.65 | 3.24 | 3.11 | 2.75 |
| Romania | RO | RON | 0.31 | 0.72 | 0.89 | 1.54 | 2.17 | 2.93 | 3.41 | 3.41 | 3.34 | 2.94 | 2.82 | 2.43 |
| Russian Federation | RU | RUB | 5,134 | 5,787 | 10.22 | 24.98 | 28.17 | 29.19 | 31.39 | 30.70 | 28.82 | 28.29 | 27.19 | 25.49 |
| Saudi Arabia | SA | SAR | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 |
| Serbia | RS | RSD | 4.92 | 5.00 | 8.99 | 10.92 | 11.61 | 48.31 | 63.53 | 57.68 | 58.96 | 67.07 | 69.36 | 59.50 |
| Slovakia | SK | SKK | 30.68 | 33.65 | 35.31 | 41.46 | 46.39 | 48.38 | 45.31 | 36.77 | 32.29 | 31.09 | 29.71 | 24.55 |
| Slovenia | SI | SIT | 135.57 | 160.27 | 166.63 | 183.14 | 225.16 | 244.59 | 243.59 | 210.39 | 195.50 | 193.33 | 191.09 | EUR |
| South Africa | ZA | ZAR | 4.30 | 4.61 | 5.55 | 6.12 | 6.94 | 8.62 | 10.53 | 7.57 | 6.46 | 6.38 | 6.79 | 7.06 |
| Sri Lanka | LK | LKR | 55.31 | 58.98 | 64.91 | 70.77 | 76.92 | 89.61 | 95.78 | 96.55 | 101.24 | 100.59 | 104.29 | 111.19 |
| Sweden | SE | SEK | 6.71 | 7.64 | 7.95 | 8.27 | 9.17 | 10.33 | 9.72 | 8.08 | 7.35 | 7.47 | 7.38 | 6.74 |
| Switzerland | CH | CHF | 1.24 | 1.45 | 1.45 | 1.50 | 1.69 | 1.69 | 1.56 | 1.35 | 1.24 | 1.25 | 1.25 | 1.20 |
| Syria | SY | SYP | 41.95 | 41.89 | 41.85 | 42.29 | 63.93 | 55.21 | 52.29 | 48.51 | 52.18 | 52.98 | 54.21 | 53.13 |
| Taiwan | TW | TWD | | | | 32.31 | 31.26 | 33.98 | 34.58 | 34.48 | 33.47 | 32.19 | 32.55 | 32.89 |
| Tanzania | TZ | TZS | 614 | 619 | 660 | 749 | 804 | 887 | 994 | 1,063 | 1,113 | 1,150 | 1,286 | 1,265 |
| Thailand | TH | THB | 25.36 | 31.18 | 41.35 | 37.88 | 40.20 | 44.54 | 43.07 | 41.60 | 40.31 | 40.31 | 37.99 | 32.26 |
| Turkey | TR | TRL | 81,806 | 152,752 | 262,205 | 420,649 | 624,754 | 1,240,942 | 1,542,022 | 1,528,854 | 1,448,899 | 1.35 | 1.44 | 1.30 |
| Uganda | UG | UGX | 1,051 | 1,088 | 1,247 | 1,472 | 1,655 | 1,788 | 1,738 | 1,845 | 1,807 | 1,777 | 1,847 | 1,736 |
| Ukraine | UA | UAH | 1.52 | 1.87 | 2.61 | 4.35 | 5.50 | 5.38 | 5.49 | 5.51 | 5.47 | 5.16 | 5.22 | 5.17 |
| United Kingdom | GB | GBP | 0.64 | 0.61 | 0.60 | 0.62 | 0.66 | 0.69 | 0.67 | 0.61 | 0.55 | 0.55 | 0.54 | 0.50 |
| Uruguay | UY | UYP | 8.03 | 9.50 | 10.53 | 11.26 | 11.40 | 12.84 | 21.32 | 28.24 | 28.69 | 24.46 | 24.93 | 23.98 |
| USA | US | USD | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uzbekistan | UZ | UZS | | | 94.79 | 124.64 | 237.20 | 941.65 | 1,012.60 | 1,095.90 | 1,028.84 | 1,010.14 | 970.73 | 910.20 |
| Vietnam | VN | VND | 11,036 | 11,705 | 13,267 | 13,945 | 14,177 | 15,031 | 15,934 | 16,068 | 16,175 | 15,968 | 16,436 | 16,412 |

*1 US-$ = ... national currency, Source: www.oanda.com*
*Euro: In Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain since 2002 the currency is the EURO.*
*The years before the exchange rates have been quite similar. In the table the exchange rate of the German currency are shown converted into EUR.*

# A.8 Assumptions for the calculations – farm economic indicators

### Cost calculation

The cost calculations are based on dairy enterprises that consist of the following elements:

- milk production
- raising of replacement heifers
- forage production.

The analysis results in a comparison of returns and total costs per kilogram of milk. Total costs consist of expenses from the profit and loss account (cash costs, depreciation, etc.), and opportunity costs for farm-owned factors of production (family labour, own land, own capital). The estimation of these opportunity costs must be considered carefully because the potential income of farm owned factors of production in alternative uses is difficult to determine. In the short run, the use of own production factors on a family farm can provide flexibility in the case of low returns when the family can chose to forgo income. However, in the long run opportunity costs must be considered because the potential successors of the farmer will, in most cases, make a decision on the alternative use of own production factors, in particular their own labour input, before taking over the farm. To indicate the effects of opportunity costs we have separated them from the other costs in most of the figures.

For the estimations and calculations the following assumptions were made:

### Labour costs

For hired labour, cash labour costs currently incurred were used. For unpaid family labour, the wage rate per hour for a qualified full-time worker in the region multiplied with the working time of a skilled worker was used. For India and Pakistan we used the approach of individual opportunity wage levels for family members multiplied with their working time in the farm.

### Land costs

For rented land, rents currently paid by the farmers were used. Regional rent prices provided by the farmers were used for owned land. In those countries with limited rental markets (like NZ), the land market value was capitalised at 4.5 % annual interest to obtain a theoretical rent price.

### Capital costs

Own capital is defined as assets, without land and quota (calculation: assets for buildings, machinery, livestock and other), plus circulating capital (10 % of all dairy related variable expenses). For borrowed funds, a real interest rate of 6 % was used in all countries; for owner's capital, the real interest rate was assumed to be 3 %.

### Quota costs

Rent values were used for rented or leased quota. Opportunity costs for own quota are calculated based on the quota value * 3 % interest rate. Depreciation of quota based on national depreciation scheme is deducted to calculate farm income.

### Depreciation

Machinery and buildings were depreciated using a straight line schedule on purchase prices with a residual value of zero.

### Adjustment of VAT

All cost components and returns are stated without value added tax (VAT).

### Adjustment of milk ECM

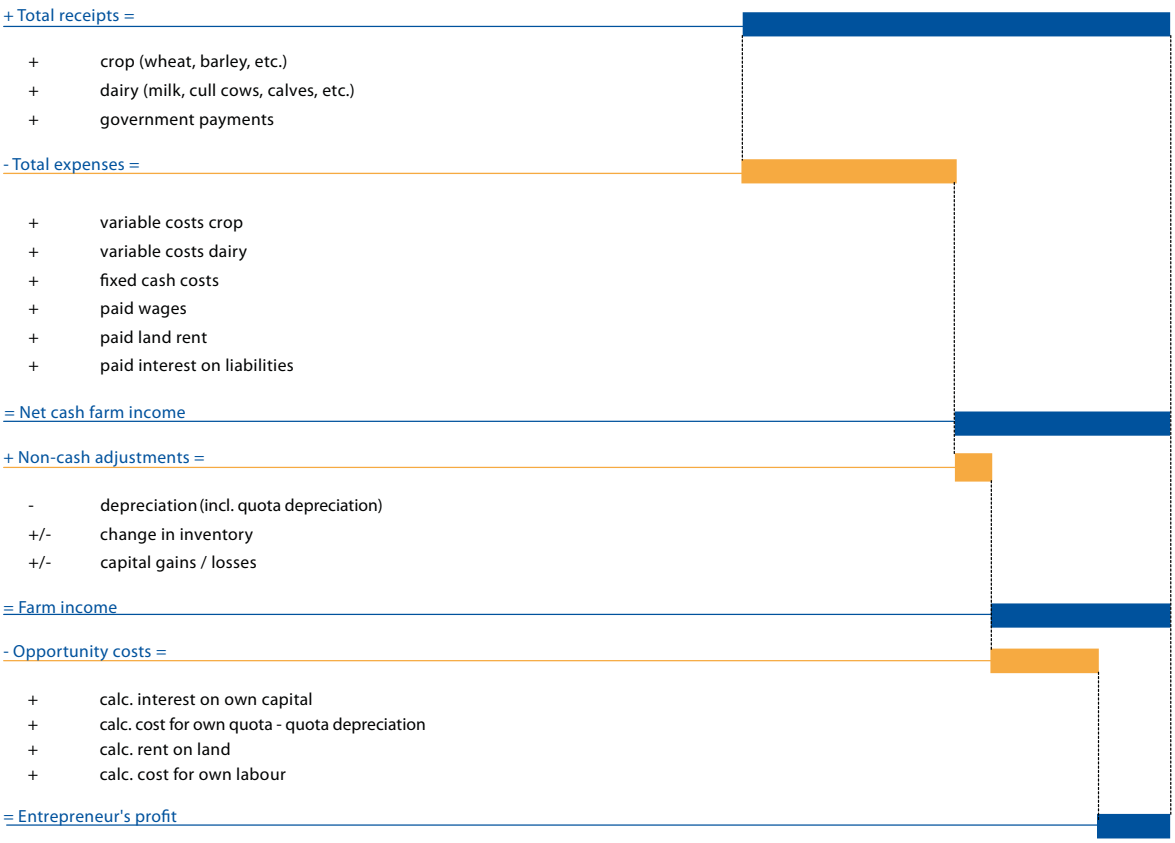
The milk output per farm is adjusted to 4 % fat, 3.3 % protein. Formula: ECM milk = (milk production * ((0.383 * % fat + 0.242 * % protein + 0.7832) / 3.1138). *Source: DLG (2001), unpublished.*





*Moments in 2007*

# A.8 Assumptions for the calculations – farm economic indicators



# Status and Prospects for Smallholder Milk Production
# A Global Perspective

In 2005, some 1.4 billion people lived in absolute poverty and that nearly 1 billion were affected by chronic mal- or undernutrition. An estimated 75 percent of the world's poor live in rural areas, and at least 600 million of these keep livestock that enable them to produce food, generate cash income, manage risks and build up assets. With the valuable contribution that livestock makes to sustaining livelihoods, especially in rural areas, the development of small-scale livestock enterprises could be a key element of efforts to eradicate extreme poverty and hunger.

Milk production is an important livestock-sector activity and it is estimated that nearly 150 million farm households throughout the world are engaged in milk production. Small-scale milk production not only improves food security of milk producing households but also creates significant amounts of employment in the entire dairy chain, which comprises many small-scale rural processors and intermediaries. On the other hand, demand for milk and milk products is steadily growing, particularly in developing countries. If supply is to keep pace with the growth in demand, milk production will need to grow by close to 2 percent per year.

The aim of this book is to provide a holistic picture on the trends and drivers in the dairy sector as well as the implications these may have for the future of dairy farming, in particular among the smaller-scale, rural producers.

Across the countries analysed, small-scale milk producers have very competitive production costs and thus, if organized, have the potential to compete with large-scale, capital-intensive 'high-tech' dairy farming systems in developed and developing countries. Dairy sector development can therefore be a potent tool for poverty reduction. However, gainful participation of smallholder milk producers in the dairy market not only depends on their own competitiveness, but also on the efficiency of the dairy chains of which they are part. Therefore, smallholder dairy development strategies must not exclusively focus on dairy producers but must increase competitiveness in each and every segment of the dairy chain.

ISBN 978-92-5-106545-7

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I1522E/1/04.10/1600