# DAIRY ASIA: TOWARDS SUSTAINABILITY

Proceedings of an international consultation held in Bangkok, Thailand 21–23 May 2014

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## Our Partners

GLOBAL AGENDA FOR SUSTAINABLE LIVESTOCK

# ABBREVIATIONS

| | |
|---|---|
| ADN | Asia Dairy Network |
| AGA | Animal Production and Health Division of FAO |
| APAF-N | Asia Pacific Animal Feed Network |
| APHCA | Animal Production and Health Commission of Asia and the Pacific |
| APMEA | Asia-Pacific, Middle East and Africa |
| APRACA | Asia Pacific Rural and Agriculture Credit Association |
| ASEAN | Association of Southeast Asian Nations |
| BAAC | Bank for Agriculture and Agricultural Cooperatives |
| BLRI | Bangladesh Livestock Research Institute |
| DLS | Dept. of Livestock services |
| BMPCUL | Bangladesh milk Producers' Co-operative Union Ltd. |
| CFC | Common Fund for Commodities |
| CGIAR | Consultative Group on International Agricultural Research |
| CWU | Consumptive Water Use |
| DALY | Disability Adjusted Life Year |
| DANIDA | Danish International Development Agency |
| DPO | Dairy Farming Promotion Organization of Thailand |
| EADD | East Africa Dairy Development |
| EC | European Community |
| FAO | Food and Agriculture Organization of the United Nations |
| FAO-RAP | FAO Regional Office for Asia and the Pacific |
| GASL | Global Agenda for Sustainable Livestock |
| GDA | Global Dairy Agenda for Action |
| GHG | Greenhouse gases |
| HCM | Ho Chi Minh City |
| HF | Holstein Friesian |
| ICAR | International Centre for Agriculture Research |
| ICARD | Indonesian Centre for Animal Research and Development |
| ICARDA | International Centre for Agricultural Research in Dry Areas |
| ICRISAT | International Crop Research Institute for Semi-Arid Tropics |
| IDF | International Dairy Federation |
| IDP | International Dairy Products |
| IFAD | International Fund for Agricultural Development |
| ILRI | International Livestock Research Institute |
| IPSARD | Institute of Policy & Strategy for Agriculture & Rural Development |
| IWMI | International Water Management Institute |
| LEAP | Livestock environmental assessment and performance |
| LMDP | Livestock and Market Development Project |
| MDA | Myanmar Dairy Association |
| MERIS | Medium Resolution Imaging Spectrometer |
| MLF | Myanmar Livestock Federation |
| MODIS | Moderate Resolution Imaging Spectroradiometer |

| | |
|---|---|
| MRL | Maximum Residue Levels |
| NASA | National Aeronautics and Space Administration |
| NDDB | National Dairy Development Board, India |
| NDP-I | National Dairy Plan of India |
| NIANP | National Institute of Animal Nutrition and Physiology |
| OECD | Organisation for Economic Co-operation and Development |
| PUU | Pasture User's Unions |
| RDCD | Rural Development and Cooperatives Division Resources |
| SPOT | Satellite Pour l'Observation de la Terre, lit (French) Satellite for observation of Earth (English) |
| StAnD | Sustainable Animal Diets |
| TDIA | Thai Dairy Industry Association |
| UHT | Ultra-High Temperature |
| VIIRS | Visible Infrared Imaging Radiometer Suite |
| WSPA | World Society for the Protection of Animals |

# CONTENTS

# BACKGROUND AND SUMMARY

The Asia region has emerged as a major player in global dairy production and consumption. Aggregate consumption gains in dairy products in Asia over the past decade have exceeded twice the annual global average. Recent OECD-FAO Agricultural Outlook estimates that the demand for milk and milk products in the region will touch almost 320 million tonnes by the year 2021 (OECD-FAO, 2012). This means the region will need to increase milk availability by another 40 million tonnes within this decade. While dairy prices in 2008 had declined in line with other agricultural commodities, many of the factors prompting higher prices will likely underpin market fundamentals in the dairy sector over the medium term. These market conditions provide an attractive opportunity for developing Asian nations to further consolidate the gains by investing in measures to enhance productivity, quality and market access.

This growth in demand is happening at a time when concerns about resource scarcity, growing pressure on feed resources, climate change and the need for more equitable development are becoming more and more important. Farmers worldwide face the challenge of producing more food with fewer resources while also addressing climate change and impacts on ecosystems. The agriculture sector in general is under pressure to increase the efficiency of natural resource use to meet society's growing food and environmental needs. For the dairy sub-sector, this means that the economic agents along the entire dairy value chain must adopt technologies and management practices that facilitate integration of environmental health, economic profitability and social and economic equity goals.

Further, it is imperative that the transition to a more sustainable path considers sustainability in its full complexity encompassing all its pillars—economic, ecological, and social. Partial solutions will not produce the desired results. For example, any efforts towards conservation that ignore the need for economic development, food security and livelihoods are unlikely to succeed. Conversely, socio-economic development will not be sustainable if it does not maintain the ability of the ecosystem and society to adapt to short and long-term changes. This complexity necessitates consideration of sustainability as a societal issue and requires integrated efforts by a wide range of stakeholders to capitalize on the strength of dairy production systems in Asia and to minimize the potential negative impact of rapid growth in demand and supply of dairy products in the region. It is also imperative that such efforts be realistic, equitable, and conscious of region's ecological, socio-economic and cultural dimensions.

To discuss and debate these issues, promote collaboration and knowledge exchange among relevant national and international agencies and to discover the ways of addressing future challenges, FAO, Regional Office for Asia and the Pacific (FAORAP) together with Animal Production and Health Division (AGA) of FAO, the Global Agenda for Sustainable Livestock (GASL), Dairy Farming Promotion Organization of Thailand (DPO), Department of Livestock Development, Royal Thai Government, (DLD) and other partners, organized the Regional meeting 'Dairy Asia—Towards Sustainability" in Bangkok on 21-23 May 2014. The meeting was attended by about 90 participants from over 20 countries comprising stakeholders from governments, national and international research agencies, civil society organizations, multilateral institutions, think tanks, private sector and regional and global networks. The meeting provided a platform to share experiences, debate issues of key concern, and provide guidance for the nature of required response in different countries and growth scenarios. The meeting was structured around three thematic areas—(i) Natural Resources and the Environment, (ii) Growing feed and fodder scarcity and the required response, and (iii) food security, rural livelihoods, public health and human nutrition. The chosen themes reflected the need for a multifaceted response to support sustainable growth of the Asian dairy sector.

# Feed resource assessment in grasslands using satellite imaging

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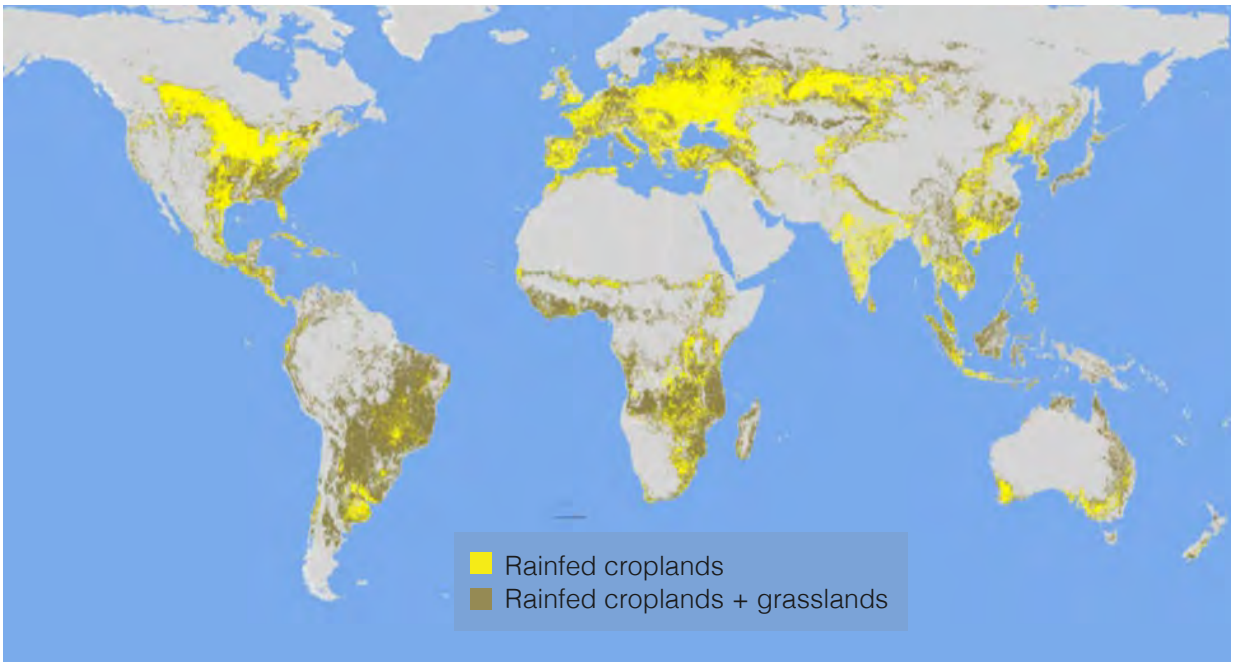
An important implication of the rapid expansion of livestock populations in Asia is the need for improved assessment tools that can inform strategic planners on how best to utilize increasingly scarce resources such as feed and water. Satellite imaging is a powerful assessment tool that can assess and track grasslands and other resources that are necessary inputs to sustainable livestock production systems.

Under the umbrella of the Consultative Group on International Agricultural Research (CGIAR), ICARDA is a global agricultural research centre that works in the world's dry areas. ICARDA's research program aims to assist countries to sustainably raise the productivity of agricultural systems, improve the incomes of smallholder farmers, and strengthen nutrition and food security. ICARDA collaborates in many of the CGIAR research programs, which are far reaching and include: gene banks; climate change; water/land and ecosystems; forest/trees and agro forestry; livestock and fish; dry land and cereals/systems; policies, institutions and markets; and wheat/grain legumes.

Geoinformatics is the science that deals with the structure and character of spatial information, its capture, its classification and qualification, its storage, processing, portrayal and dissemination, including the infrastructure necessary to secure optimal use of this information. Geoinformatics has seen numerous advances in recent years, including increased spatial/spectral/temporal resolution, increased computational speed, and improved image processing techniques, while the cost of hardware, and software and datasets has considerably decreased.

**FIGURE 1**

Global distribution of rain fed agriculture (Source: Biradar et al., 2009)



The applications of geoinformatics are virtually unlimited and are used by ICARDA to support decisions regarding biodiversity and crop improvement, land and water resource management, to assess crop and livestock production and changes over time, and to inform policy and market development.

Production systems, including livestock feedstock, can be mapped with precision using satellite imagery, illustrating varieties and landraces, crops and forage, farmlands and grasslands and agro-ecosystems, among others. Satellite imaging of irrigated/surface water and croplands/vegetation worldwide have been undertaken and Figure 1 illustrates the global distribution of rain fed production systems.

Landscape change over time can also be mapped using satellite imagery. Earth observation systems for agro-ecosystem research, MODIS, VIIRS, MERIS, Landsat, Resourcesat, RapidEye, SPOT, Pleiades, WordlView, GeoEye, etc. , are capable of coarse to very high resolution. The versatile nature of the satellite sensor with interoperable bandwidth can be scaled up or down depending on need. In terms of grassland monitoring, an integrated observation system can be created, which incorporates, weather stations, and space and air borne remote sensors, among others. Figure 2 depicts results of grassland monitoring of the Tibetan plateau from 2003 to 2008.

Unused potential in existing agricultural production systems can also be deduced using satellite imagery. For example, studies show that there are 15 million ha of rice-fallow land in South Asia alone, that could be put to other use.

Finally, an example of increased land use for food and forage production over time, as documented by satellite images, is illustrated in Figure 3.

With the rapid advances in information technology, geoinformatics has become an important tool for sustainable intensification of agriculture, reducing vulnerability, measuring impacts and systems innovation.

**FIGURE 2**

Spatial pattern of annual gross primary productivity (g C m-2 yr -1) (left) and inter-annual variation (from <7% to >25%) of the grasslands of the Tibetan Plateau between 2003 and 2008 (Source: He et al., 2014).

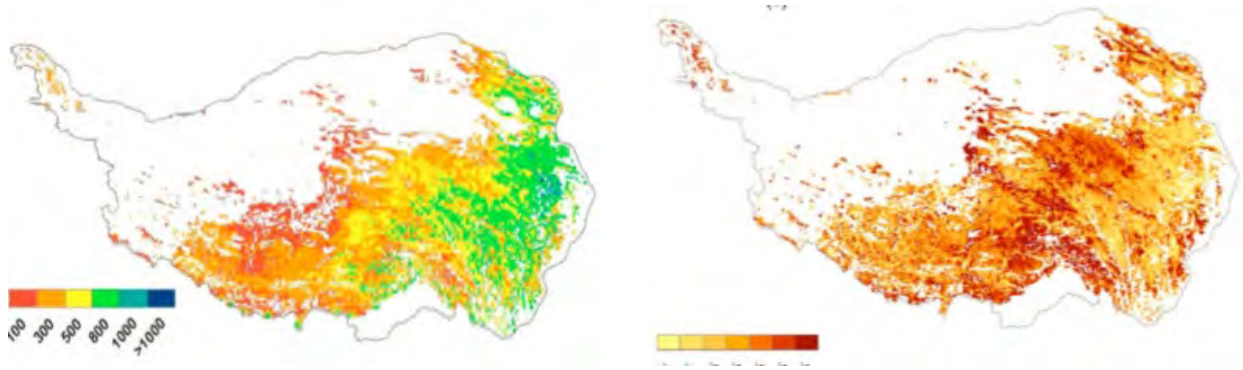



**FIGURE 3**

Changing land use of the Wadi As-Sirhan basin, Saudi Arabia (from left to right: 1987, 1991, 2000, and 2012; source: NASA)