# Dairy Economics and Policy: Focus on Asia

## A scoping paper under the auspices of Dairy Asia

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**Dairy Asia: Towards Sustainability**
**Muak Lek, Saraburi**
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# Outline

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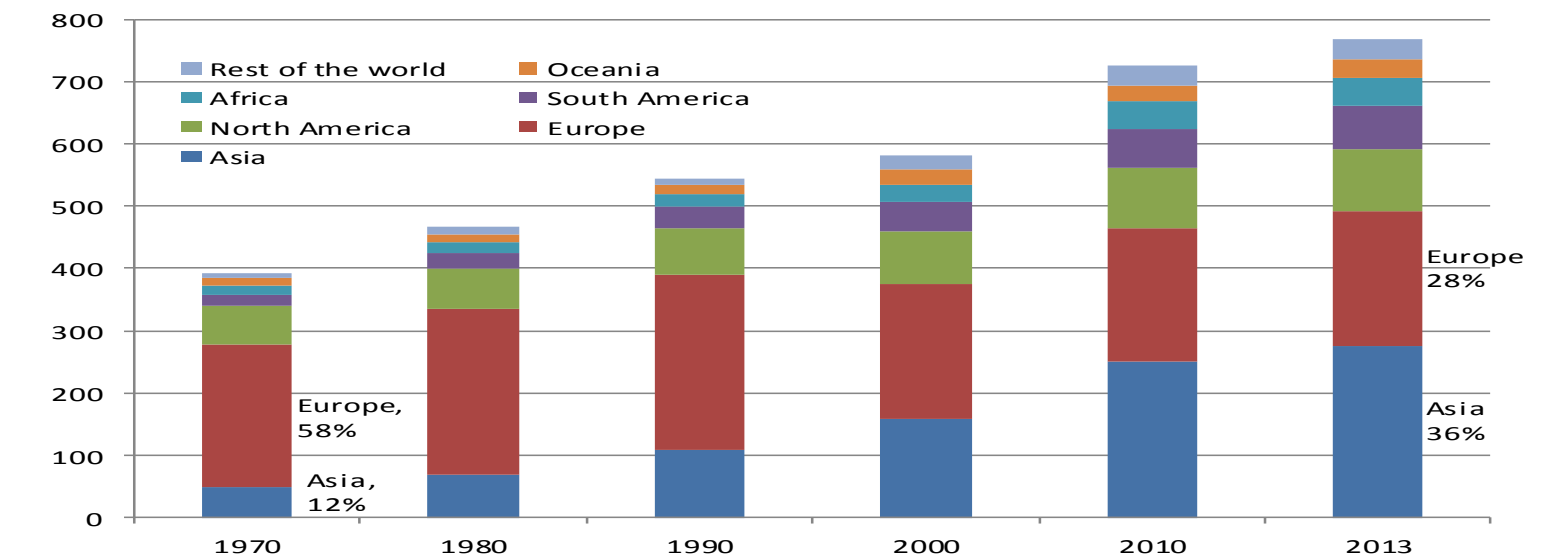
# Background

- Growth in the production and consumption of milk and milk products in Asia has consistently outpaced the growth in other regions.

- Asia has now overtaken Europe as the world's largest milk producing region




Source: FAOSTAT

- India is currently the largest producer of milk accounting for 19 percent of global production.

# Background Cont…..

- Traditionally, much of the dairy sector in the region, particularly in South Asia, has been characterised by smallholder integrated production systems with most producers maintaining between two and five cows.
- In the next decade：
  - Global production of milk would increase by more than 125 million tonnes
  - more than 65 percent of this increase will come from the Asia Pacific region (with India alone accounting for 45 percent of this growth).
- Dairying in the region is a source of employment to many.
- One daily glass of milk to the children in Asia can contribute tremendously to improving the nutritional levels in the region.

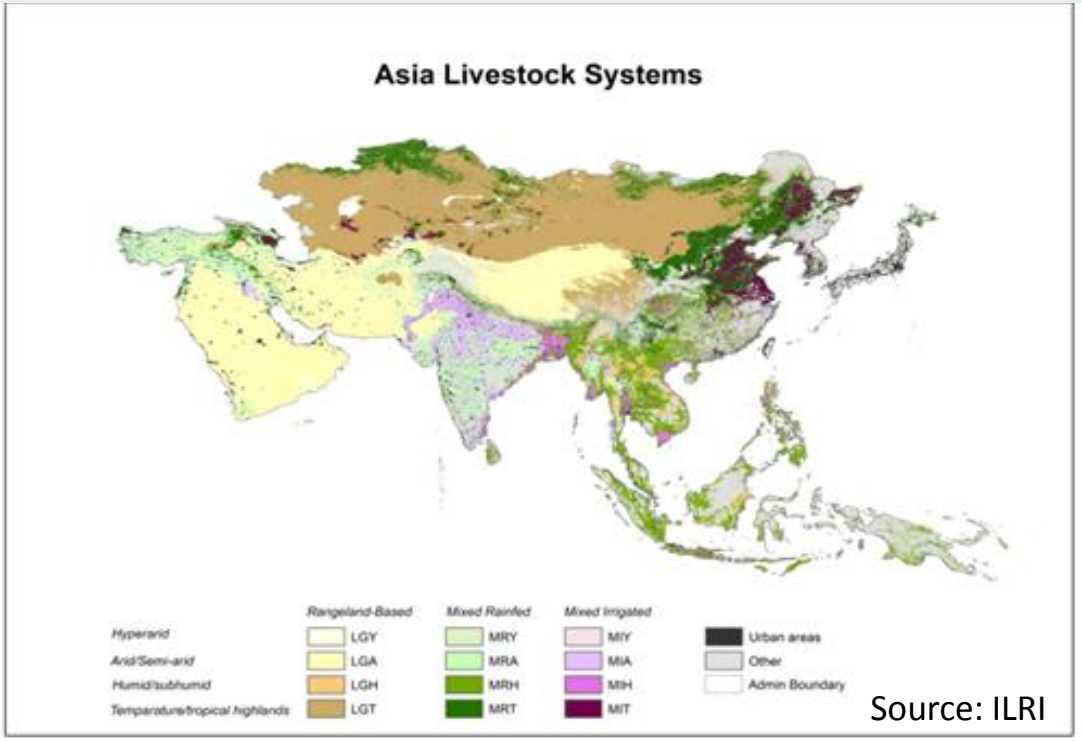
# Background Cont…..

- While Asia is the largest producer of milk, two thirds of the world's 800 million undernourished people live in the Asia-Pacific Region.

- However, the region faces many challenges in dairy development such as:
  - Improving productivity and profitability along the cow-to-consumer dairy food chain and at farm level.
  - Improving the organisation of smallholder milk producers to improve their bargaining power and reduce risks
  - Improving dairy food quality and safety
  - Encouraging public and private sector investment in dairy value chain

# Production systems, and cost structures

- Milk production systems across Asia are varied in terms of structure of production, scale and level of intensification, all of which is reflected in the economics of production.




Source: ILRI

- However there are commonalities across the region such as: relatively low yields, small production units compared to other regions, and also low costs of production.

# Large role of smallholder producers

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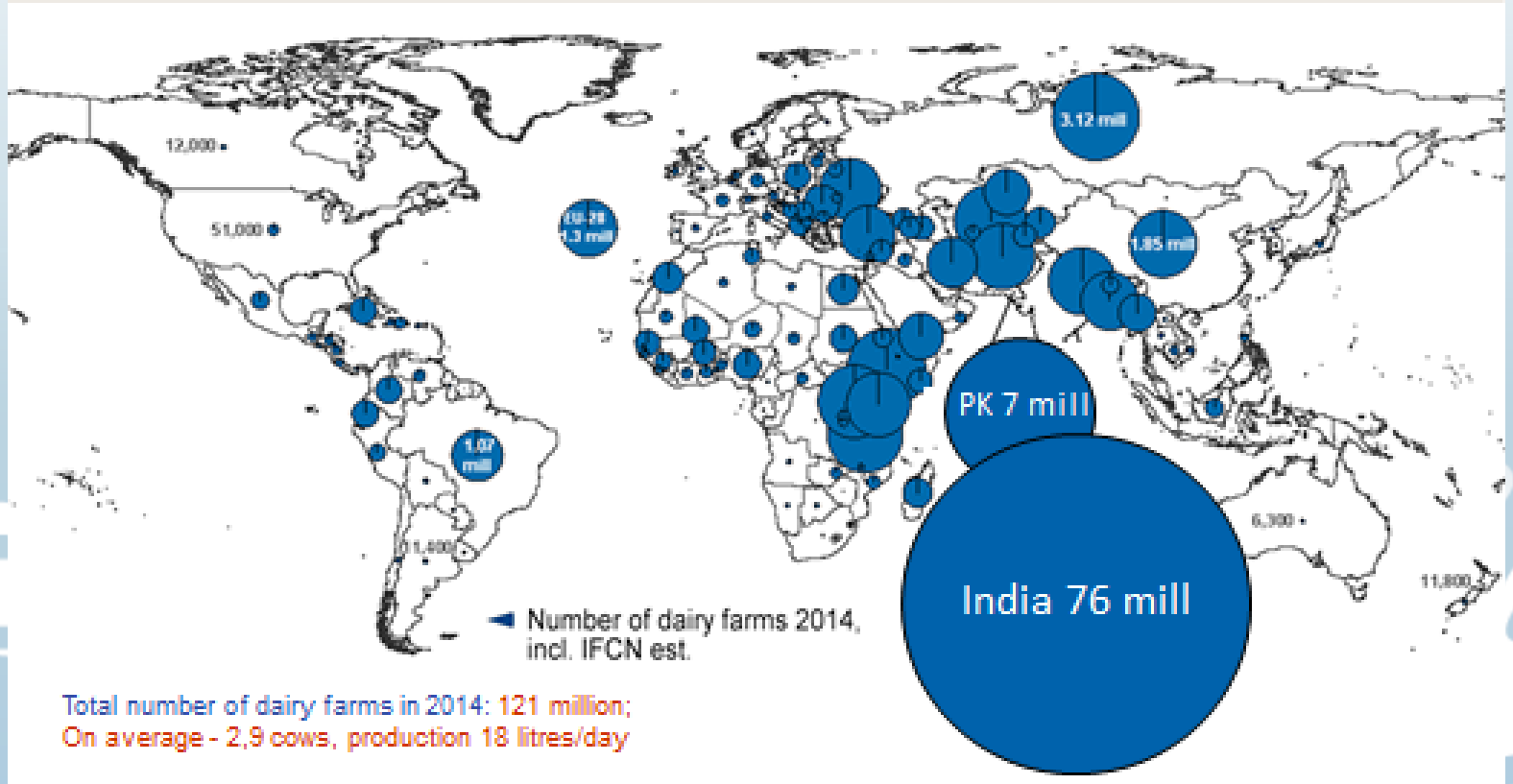
## Number of dairy farms 2014, incl. estimates

IFCN
Dairy Data · Knowledge · Inspiration

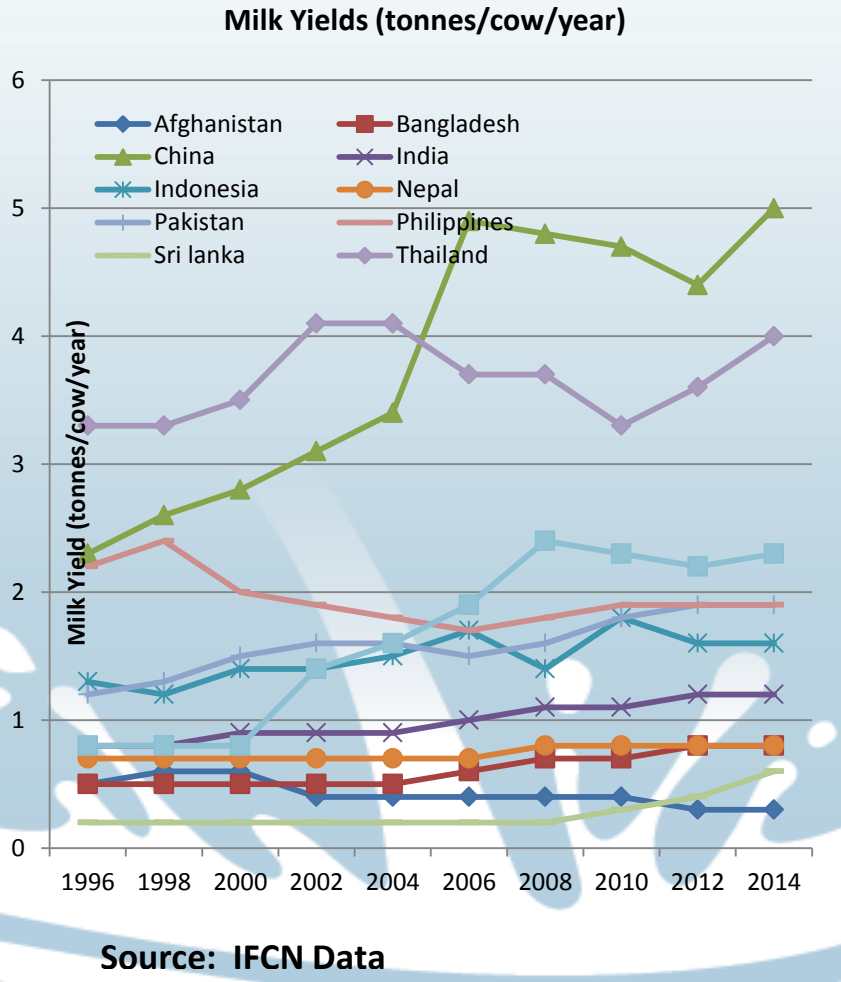



Total number of dairy farms in 2014: 121 million;
On average - 2,9 cows, production 18 litres/day

Source: IFCN database

# Milk yields across Asia

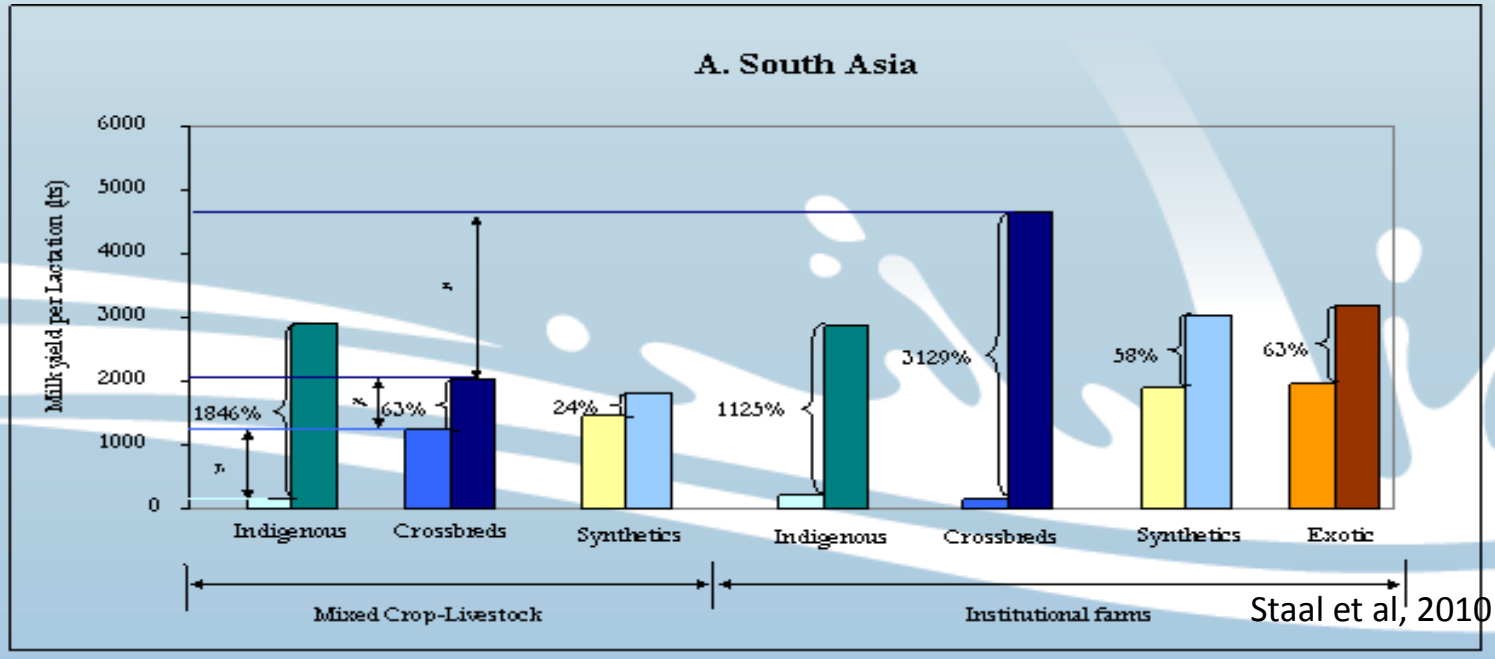
- Milk yields across the region are generally low.
- Only China and Thailand exhibit the highest yields at 3-5 MT/cow/year due to greater use of improved technology and concentrate feed.
- Elsewhere yields remain relatively low, under 2 MT/cow/yr, and in India, yields are 1 MT or lower.
- Likely to reflect low input, low output production strategies
- Little evidence yields are improving so growth is through herd growth




**Source: IFCN Data**

# Milk Yield Gaps

- We observe wide variability in yields even of similar breeds in the same general production systems.
- Analysis compares yields from similar breeds in similar production settings in S Asia
- Yield gaps of over 100% are observed among indigenous breeds, and from 63% to over 300% among crossbreds.

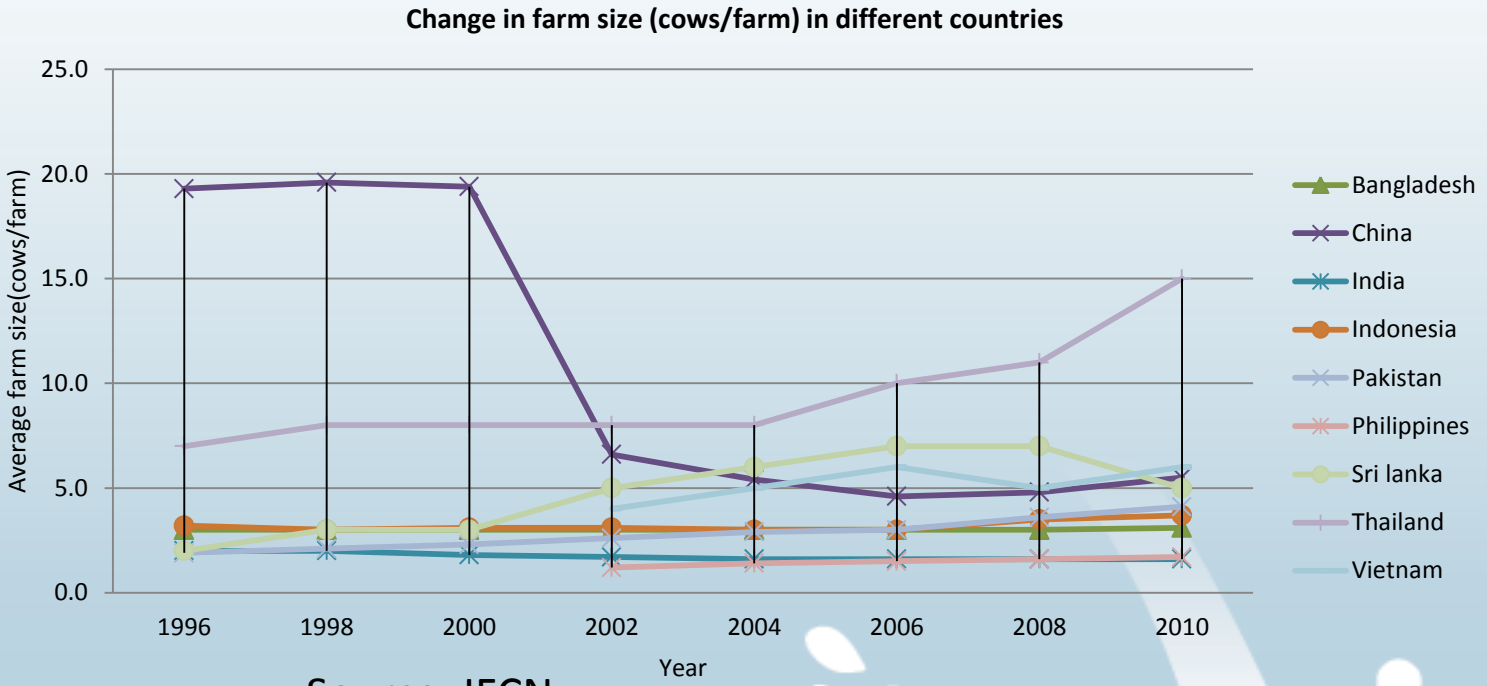



Staal et al, 2010

# Milk Yield Gaps continued…

- Differences can be attributed mainly to production strategies and environment, including climatic and disease challenge.
- Yield gaps do have implications for returns from milk production, but are unlikely to translate directly into differences in costs, since low yields are likely associated with low input and low cost systems.
- These variations create opportunities for improved competitiveness and suggests that some producers may be significantly underperforming their potential
- This underperformance should be a priority target for research and development, while controlling costs

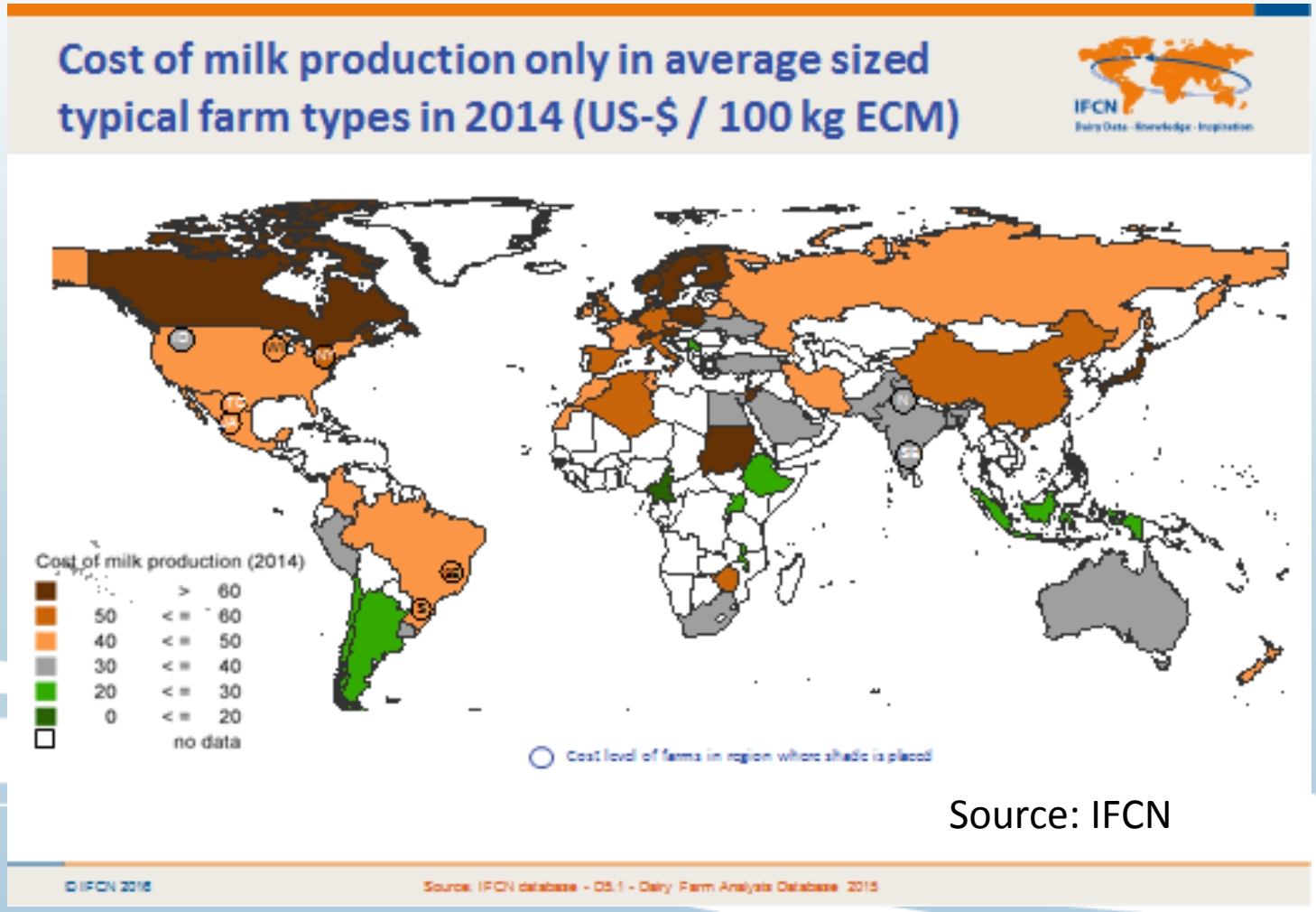
# Dairy farm size




Source: IFCN

- Dairy farms sizes (cows/farm) in key Asian countries are mostly less than 10, and in the major producing countries of South Asia, farms generally have fewer than 5 cows.
- Some evidence that farm sizes are increasing over time
- Studies show little economies of scale when opportunity costs of labor are low

# Costs of production




Source: IFCN

Costs of production in most Asian countries are relatively low, under $40/100 kg milk

# Costs of production cont…..

- Wide differences in yields, or farm size, may not necessarily translate into large differences in costs and particularly returns.
- Cost of milk production is generally low in much of Asia and farm scale is unlikely to be a critical determinant, particularly when labor costs are low
- Multiple studies have shown smallholders to be competitive, and found little correlation between farm size and costs of production (Hemme et al, Sharma et al)
- Relative costs of land, labor and feed generally determine which scale of production is relatively most efficient in a given system at a given time.

- An approach that recognizes the limiting factor in each setting is key in targeting investments – no one model fits all settings

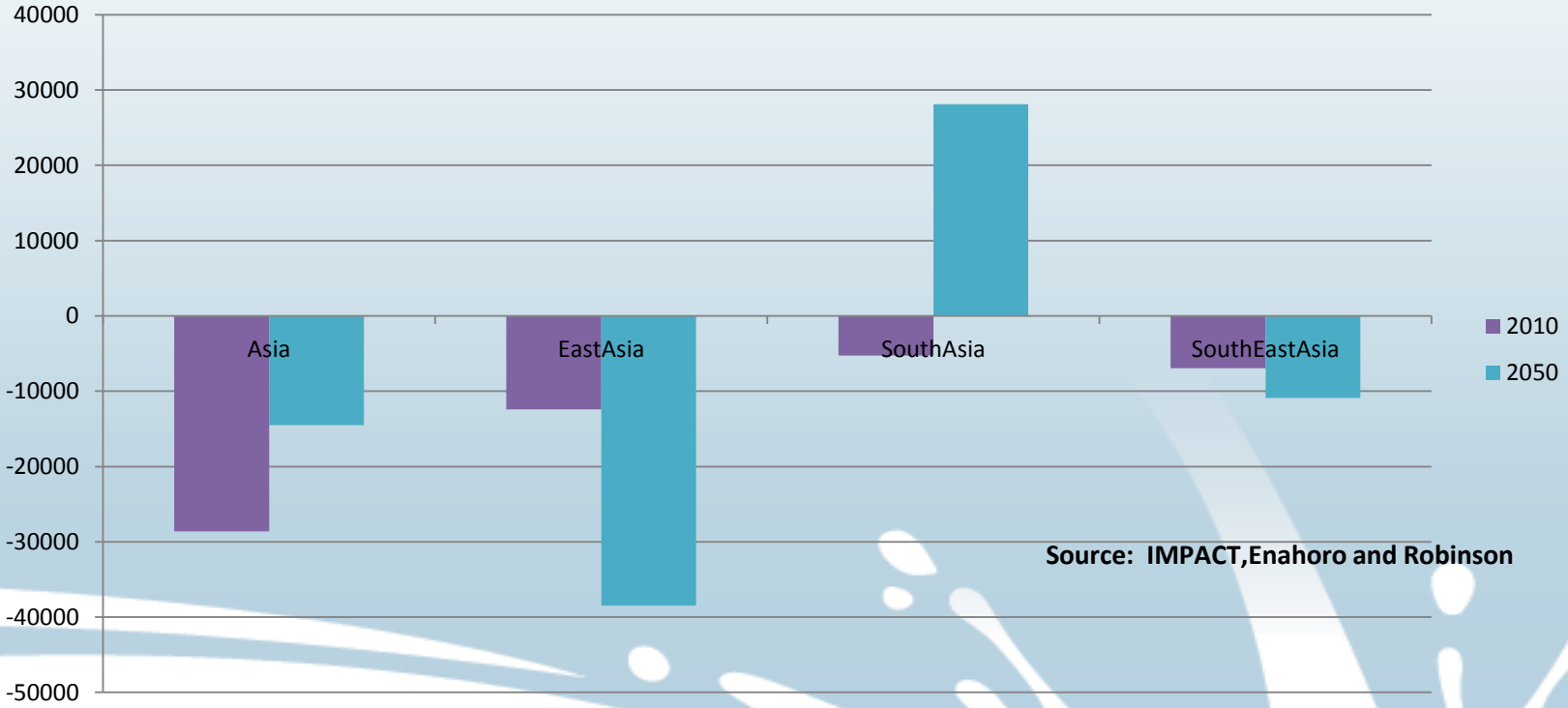
# Markets, prices and trade policies

- Asia exhibits a wide variety of dairy market and value-chain arrangements
  - rural village markets and direct sales
  - informal or traditional vendors selling fresh milk or traditional products
  - highly sophisticated and integrated processor and supermarkets networks.

- The emergence of supermarkets and their impact on the production landscape has been a subject of intense policy debate in the region – evidence is mixed
- By some estimates, in some countries nearly 60 to 80 percent of consumers purchase dairy products in informal or traditional markets and only occasionally consume processed or semi-processed products
- The share held by informal markets is much less in East than in South Asia

# Demand and supply projections

Projected net exports dairy products , 2010 and 2050 in Asia

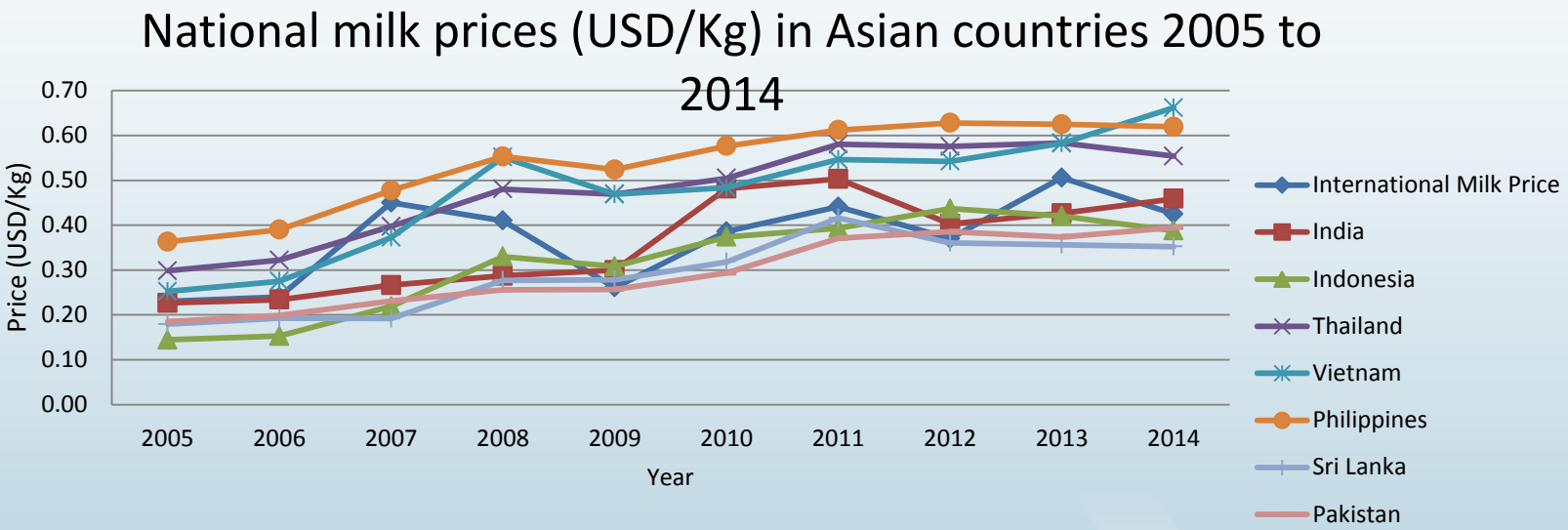



- Asia overall in 2010 was and continues to be a large net importer, over 200 million tons, largely driven by East and Southeast Asia.
- But production in South Asia is expected to grow significantly, leading to exports

# Demand and supply and trade implications

- South Asia, currently a relatively small net importer, is projected to shift dramatically to become a significant exporter by 2050, exporting nearly 30 million MTs.
- Overall outcome will be that Asia will be a smaller net importer overall, but imports will increase enormously in East Asia, and to a smaller extent in Southeast Asia.
- A key question is the extent to which the increased demand in East Asia will be met by exports from South Asia through intra-regional trade, or will still rely on imports from elsewhere.
- But to enable such trade measures should focus on reducing formal and informal trade and business obstacles. Tariffs low in E and SE Asia, higher in S Asia but non tariff barriers are still an obstacle
- Key NTBs to address (1) technical barriers to trade; (2) sanitary and phyto-sanitary standards (SPS); (3) customs related measures; and (4) non-automatic licensing; quantitative restrictions; prohibitions; enterprise-specific restrictions; single channel for imports; and foreign exchange market restrictions.

# National Milk Prices




- Prices vary widely between Asian countries, in addition to differing from international prices due differences in costs of production among those countries.
- Dairy products, esp liquid milk, are only semi-tradable. Only 10% of global milk production is traded across borders.
- Traditional tastes buffer competitions from imports
- Policy makers may instead concentrate more usefully on differences within local markets and along local supply chains.

# National and local dairy markets

- Policy and investment options for growing formal milk markets and modern supply chains are generally well established.
  - Cold chain infrastructure, HACCP,
- However, addressing informal markets is more complex
- Informal markets are driven by gap between formal market prices (and standards) and consumer willingness to pay
- Upgrading informal markets by working directly with informal market actors to increase both their capacity for improved hygiene and food safety
  - Training and certification (Omore et al)
- The concept of “private sector” should include even the smallest actors, and their role addressed and leveraged

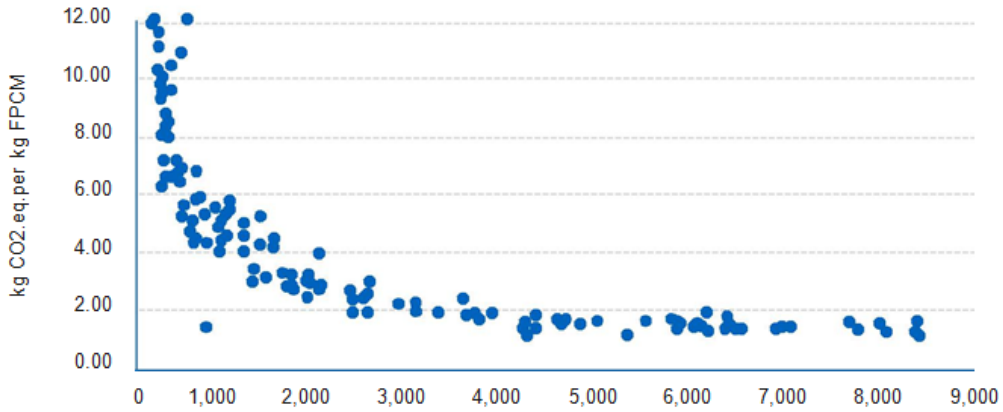
# Market concentration

- Control of market share by a limited number of actors can reduce farm prices, and raise retail prices
- Little evidence that "supermarketization" threatens smallholder supply chains, since consumers source fresh products mostly from local vendors/retailers
- A study in South India found that milk prices paid to farmers were significantly higher in villages with three formal milk buyers compared to those with only two buyers (Joseph et al)
- In growing Chinese market, in spite of a few large players, little evidence of oligopoly behaviour (Dai et al)
- Avoiding market concentration may be one of the key priorities for dairy policy makers, to ensure equitable pricing for farmers that stimulates sustained production.
  - Reduce barriers to market entry
  - Monitor local variations in milk prices to detect market concentration

# Environmental related implications of the dairy sector growth: GHG

- Dairy farms are a source of greenhouse gas (GHG) emissions, mainly from enteric fermentation (methane) and manure management (methane and nitrous oxide).
- Overall contribution of global milk production, processing and transportation to total anthropogenic emissions is estimated at 2.7 percent
- However, per unit milk emissions decline with increased productivity. Simply increasing productivity is thus an important avenue to reduced GHF emissions from dairy. A clear "win-win" opportunity

**Figure 2:** Emission intensity and milk production



# GHG: cont……

- GHG emissions can also be mitigated by
  - enhanced use of local feed resources
  - balancing dairy cow rations for improved digestibility
  - Improved manure management, and anaerobic manure digester technology

- Balancing GHG mitigation with the reality that feeding ruminants human inedible plant material increases overall food supply

- Nutrient Density to Climate Impact (NDCI) measure
  - Soft drinks: <0.1
  - Soy drink: 0.25
  - **Milk: 0.54**
- Higher nutrient contribution from milk per unit climate impact

# Measures of environmental impact: water

- Water use footprints are emerging as an important sustainability indicator in the agriculture and food sectors
- At a global level, on a per unit of nutritional value basis, the water footprint of milk compares favourably with other foods

| | Lts water per Kcal energy | Lts water per g protein |
|---|---|---|
| Vegetables | 1.34 | 26 |
| Fruits | 2.09 | 180 |
| **Milk** | **1.82** | **31** |
| Pulses | 1.19 | 19 |

- Other livestock products generally exhibit higher water footprints
- Importantly: mixed production systems using crop residues generally exhibit lower water footprint than industrial production, due to water use for feed

# Environmental related implications: manure management

- Dairy cow manure is a nutrient-rich fertilizer for crop/fish pond productivity and replacement of chemical fertilizers. Application to land of livestock manure is demonstrated as one of the most appropriate methods of manure utilization
- However, if not managed carefully, it can become a source of soil and water pollution, biodiversity loss and other economic losses
- 40 to 60 percent of farmers at global level do not make adequate use of dung and few of farmers recycled the nutrients in urine
- Reasons
  - Poor awareness, labour scarcity, market failure, lack of investment opportunities
  - Chemical fertilizers often subsidized
  - Manure policy driven by concern for negative externalities, not opportunities

# Summary and conclusions

- Milk yields are generally low in many Asian countries by global standards, reflecting low input strategies and constraints and suggesting opportunities for improved competitiveness
- Farm sizes are small, but growing, and smallholders dominate production
- Costs of production are also relatively low and are not seen to be related to farm size

➢ Strategies to increase competitiveness should not assume one standard farm model, but match local resources and markets, and prioritize smallholders

# Conclusions cont…

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- Demand is growing across the region, but so is production, particularly in South Asia
- Milk prices vary across the region, and are mostly determined locally, with some influence from international prices
- Informal markets still dominate in some countries, while formal markets are growing everywhere
- Intra-regional dairy trade opportunities will grow (esp South to East) but will require comprehensive reduction of trade constraints, including NTB
- Since prices mostly determined locally, attention should be given to market concentration risks, supply chain efficiency, and market information
- While continuing to support modern supply chains, provide policy and capacity support to leverage small and informal actors to upgrade informal chains for quality and employment. Small is also "private sector"

# Conclusions cont….

- Climate change, water scarcity, nutrient loading and increased resource competition pose major additional challenges for the sector in the long run.
- Dairy animals are efficient converters of human inedible plant material into high-quality food, and increased productivity can reduce unit GHG emissions, esp when combined with other climate-smart practices
- Water footprints lower in mixed systems in much of Asia, but manure management often sub-optimal

- Again, there is no "one size fits all." Strategies need to be tailored to specific bio-physical and socio-economic features of the dairy production systems through investment and multisector coordinated governance, including capacity development
- A key policy focus in this context should be on correcting market distortions and policy failures that encourage environmental degradation.

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# THANK YOU