

Dual Disruptive Transformation of African & Asian Food Systems

Tom Reardon, Bart Minten, Saweda
Liverpool-Tasie, David Tschirley, Ricardo
Hernandez, Ben Belton, David
Zilberman

ICABR-WorldBank, Washington DC, June 13, 2018

... food system transformation not gradual
but abrupt, sudden

... image of a tidal wave

1. Rapid Food system transformation driven by meta drivers & CONFLUENCE of 5 trends

1.0. Meta drivers

- income growth
- policy liberalization
- Public infrastructure investment
- Massive private investment (FDI & domestic)
- technology change and transfer (in each segment of supply chains) and cross cutting (e.g. internet)

1.1. PULLED by Downstream demand

a) Rapid urbanization:

... Africa: 24% in 1970, 40% in 2011

... Asia: 24% in 1970, 45% in 2011

**b) Urban share in national food consumption
BIGGER than in population**

... South Asia and ESE: 30/40/50-60%

... SE Asia and West Africa: 40/50/60-70%

→ Rural-urban food volume flow growing fast over past 3 decades:

... 800% in Africa

... 1000% in Southeast Asia

b) diet change

... in urban and rural areas

**... and not just middle class but also among
poor**

b.1) Rise of Purchased food in total rural food expenditures (purchased + own production)

Indonesia and Bangladesh, about 80%

Nepal and Vietnam, 65-72%

ESA, 45% Nigeria, 70%

→ Implies rise of rural-rural & urban-rural supply chains

b.2) Rise of Processed food (purchase)

... share of processed in total rural food expenditure in ESA = 39% (in Nigeria, 65%)

... in urban ESA, 53%

... in rural Asia, 59%

... in urban Asia, 73%

... again Africa & Asia pictures converging...

b.3) rapid diversification beyond grains

... vegetables/fruit, fish, meat, dairy

**... Asia: 65% of food consumption in rural areas,
75% in urban areas**

... Africa: 50% in rural areas & 65% in urban

1.2. “FACILITATED ” by Midstream & Downstream segments development

... with Quiet Revolution and Modern Revolution transformation discussed next

1.3. FED by upstream transformation

c.1. farming intensification, commercialization, diversification

c.2 input value chain development

2. Focus on Value chain transformation: Quiet & Modern Revolutions

2.1. Stages of transformation of food systems

- a) Traditional**
- b) Transitional**
- c) Modern**

2.2. Our focus: Two sets of disruptive transformations

a) From traditional stage to transitional stage: THE QUIET REVOLUTION

... roughly 2/3 of developing country situations)

... advanced in Asia, well along in Africa

b) From transitional to modern stage: THE MODERN REVOLUTION

... roughly 1/3 of developing country situations)

... **well along in Asia, emerging in Africa**

c) Overlaps of stages per country & over countries

_____ traditional (waning)
 _____ transitional (dominant)
 _____ modern (emerging)

3. Traditional to Transitional: Quiet Revolution

3.0. Overall

... Sudden & fast

... based on domestic markets & domestic investments

3.1. Structural changes

- a) Longer supply chains driven by urbanization**
- b) Diversification & value added in supply chains driven by diet change**
- c) Proliferation of 10's of 1000's of SMEs in processing, wholesale, 3PLS (transport, warehouse, cold storage)**

3.2. Conduct change

a) Traditional systems up-ended, examples

... tied output-credit arrangements with traders, are disappearing

... shift from traditional rural brokers to town-based wholesalers & 3PLS

... shift from unpackaged bulk sale to packaged, branded milled grains

b) Widespread, disruptive (relative to traditional) technology changes, for example

... shift from pastures to feed

... from capture to enclosure (chickens, fish)

... to machines for transport, milling, farming, cooling

... to chemicals for farming & post-farm

→ I believe 75% of technology change in developing countries is of this basic transitional type

c) Some examples, all domestic market stories

c.1) Bangladesh fish farming

... grew 15 fold in 25 years

... feed sector tripled in 5 years

... big shift from traditional variety (carps) to fast-growers (tilapia, catfish)

... SMEs in the supply chain tripled in 10 years

c.2) Teff in Ethiopia

**... Shift to vehicular transport in only 10 years,
large investment in private transport**

**... huge jump in urban wholesale, milling,
prepared sales of enjera and milled teff**

**... Farm response with variety change and
intensification**

c.3) India potato cold storages in Uttar Pradesh to Delhi market

... from 1% of farmers using to 99% using over 1 decade

... from little to 2/3 of Delhi potatoes from rural cold storages

... 10% growth of Cold storages per year over 2000s

c.4) Booming Nigeria maize/feed/chickens-eggs complex

... huge growth in chicken farming at SME scale

... intense involvement of women

... marketing to growing towns

... 600% feed sector growth in 10 years

... growth of the long north south supply chain for maize and feed

4. Transitional to Modern: Modern Revolution

4.0. Overall

... also abrupt/sudden/fast

... driven mainly by domestic but also export markets & FDI as well as domestic investments

4.1. organization/structure change

a) Concentration & partial multinationalization

a.1) symbiosis of

...supermarket revolution

... large scale processors, wholesalers, 3PLS

**a.2) economies of scale and scope
outcompeting traditional players**

a.3.) private standards & quality differentiation

a.4.) procurement system modernization (fast tracking supply chain transformation)

a.5) first in processed, then semi-processed, and starting in fresh

4.2. Rapid emergence of internet/digitalization “e-commerce”

- a) This is a return to delivery by retailers**
- b) Driven by similar demand side drivers as supermarket revolution**
- c) Supply side: technology driver: Emerged with internet, started b2b then b2c**

d) Supply side: intense competition and investment and technology transfer (Amazon, Alibaba, others)

e) Morphing into linkage of ecommerce and brick stores and even shops

f) Extends economies of scale and scope

g) Basic impact is acceleration of shift from traditional retail and shopping

... acceleration of transformation

4.3. Rise of Robots in the food system in DEEs

a) Emerging in all segments of value chains

... in farming

... but also in all other segments

**b) Not necessarily driven by wage costs
(happening in areas with abundant labor)**

**c) Potential to accelerate and intensify the
overall transformation**

5. Conclusions

- a) Dual revolution in the food system, driven by CONFLUENCE of trends downstream, midstream, upstream**
- b) Disruptive in its speed: tidal wave, recent abrupt, fast**
- c) Disruptive in its changing of structure, institutions, technologies**

d) Clear gains for consumers from both revolutions

e) Clear gains from Quiet Revolution for jobs and supply side

f) Challenges and opportunities from Modern Revolution

g) Crucial for research to study the whole food system and understand rapid change