Vivan Sharan

Agricultural cooperation

Agricultural growth in BRICS countries and cooperation within member states to achieve that collective goal is of vital importance. This is so largely because employment in agriculture remains large in the BRICS countries (Table 1).

Table 1: Role of agriculture in the economy (as a % of total)

Country	Employment	GDP	Exports[1]
India	56	18	11
China	40	10	3
Brazil	10	5.7	34
South Africa	10	2.3	10
US	< 2	1.4	10
Euro Area	7	1	10

Source: OECD

Indian agriculture suffers from both productivity shortages and aggregation issues. Table 2 shows BRICS member states' agricultural productivity in the global context. The need for extension services by way of training and advisories is of importance, given lack of productivity in part due to outdated farming techniques adopted by uninformed peasants.

Over the years, India has made progress in productivity by way of System of Rice Intensification (SRI) method in certain rice-growing parts like Bihar, Odisha, Andhra Pradesh, Tamil Nadu, Karnataka and West Bengal. SRI in India has been carried out by government, civil society, extension programs, research institutes and the like. It does not have any single scientific method, but centres on better management of soil, water and seeds. SRI has been practiced across the developing world for many years now.

[1] Food exports as a share of total merchandise exports.

There is potential for India to feed dynamic information such as this into the Basic Agricultural Information Exchange System (BAIES) as envisaged under the BRICS Agricultural Action Plan 2012-16. Prospective areas of information sharing include agricultural management systems and latest developments in agricultural science and technology. Since a large proportion of farm holdings in BRICS countries are small, the BRICS can intensify cooperation in technologies for small-holder farming, as the joint declaration of the 4th meeting of the BRICS agriculture ministers envisions.

Extension services is a potentially large area for private sector intervention given the traditional information shortages faced by small farmers across the developing world. Unifying platforms like producers' groups will also help capacity development, besides serving their traditional role of aggregating produce from small farmers.

Table 2: Productivity in rice and wheat | Unit: yield (tonnes) per hectare

Country	Rice (t/ha)	Wheat (t/ha)
China	4.67	4.97
Brazil	3.64	2.73
India	2.4	3.15
South Africa	2.0	3.41
Russia	3.25	2.30
EU	3.89	5.59
OECD	5.15	3.75

Source: OECD-FAO Agricultural Outlook 2014

Digital economy

There are many aspects of development which can greatly benefit from the use of technology, particularly in BRICS countries where the growth in digital infrastructure is impressive. One of the most important among these is credit access or financial inclusion.

The degree of financial exclusion in India is high and its nature very skewed. While on the one hand 13 per cent of all bank loans in the country is cornered by ten business groups[2], 73 per cent of all farming households in India have zero access to formal credit.[3] Similarly, only about a third of all MSMEs have access to organized channels of finance at best.[4] At the same time, the limitations to the brick and mortal model are obvious, both in India and across BRICS countries, but more severely in India (Table 3). This provides fertile ground for the leverage of technology in providing access to credit at the bottom of the pyramid. Recent policies in India reflect such priorities, be it through the distribution of RuPay debit cards or through Aadhar linked bank accounts.

Table 3: State of formal credit access in BRICS

Country	**ATMs per 100,000 people**	**% of rural population (>15 years) with an account with a financial institution**
Brazil	13.27	63.02
China	46.94	74.33
India	61.88	49.78
Russian Federation	130.74	61.22
South Africa	155.55	68.59

Source: World Bank

However, the 950 million mobile phones in the hands of as many ordinary Indians provides an opportunity to enhance digital finance in the country. The same goes for other BRICS countries where the number of mobile phones per person is very high and constantly growing (Table 4). Additionally, BRICS countries make up the top four markets for smartphones. Some policy thinking in the abovementioned direction is already evinced in India, with the government proposing utilising the JAM (Jan Dhan Yojana-Aadhar-Mobile

[2] https://doc.research-and-analytics.csfb.com/docView?language=ENG&source=ulg&format=PDF&document_id=991849241&serialid=d7XXSoeHZ5lPnONkfrTSRhbDjI77DBsiqV1bjoXfsx4%3d

[3] NSSO data (quoted in RBI paper at this link: http://www.rbi.org.in/scripts/BS_SpeechesView.aspx?Id=862)

[4] "Indian Banking – The Engine for Sustaining India's Growth Agenda", KPMG/Indian Chamber of Commerce (2013)

Phone) trinity to provide credit, insurance and other financial services to the underserved.

Table 4: Mobile phone penetration in BRICS

Country	Number of mobile phones	Cell phones per person
India	950 million	0.7
China	1.2 billion	0.9
Russia	243.1 million	1.8
Brazil	278 million	1.2

Interestingly, the above telecom infrastructure can also be utilised to provide agricultural extension services to farmers in India and other BRICS countries. The same can also be said of urban services by way of better e-governance. But that would be better served by higher internet penetration in the respective countries. Internet penetration is fairly limited in India (Table 5). The Indian Government plans to expand its internet coverage under its Digital India and National Optical Fibre Network schemes. The Government also aims setting up 7 lakh kilometres of fibre optic networks in villages to connect all 'panchayats' with broadband by 2016. The Digital India framework involves establishing broadband highways, e-governance and e-Kranti which entails electronic delivery of sundry services in urban and rural areas.

Table 5: Internet penetration

Country	% of households with internet access
Brazil	42.4
China	43.9
India	13
Russia	67
South Africa	39.4

Source: ITU, 2014

Regional Value Chains and Services standards Cooperation

Standards imposed by regulators on goods are primarily aimed at protecting the end consumer. Since the contribution of the services sector to the national GDP is much higher in India than goods, it is an imperative to start formulating services standards. The process should be stakeholder driven and obviously take into account the existing capacities within indigenous firms to follow through on such stipulations. Globally, the Agreement on Trade in Services, is the overarching framework for governing standards of trade in services, although the global discourse on quality and standards is disproportionately focused on goods. While many of the upcoming mega-FTAs, also referred to as the 21st century trade deals, are increasingly taking into the emergent need for services standards, the BRICS countries are out of the TPP and the TTIP. The BRICS must ensure that they don't end up as passive rule-takers, as opposed to setting the agenda – one of the grouping's implicit mandates.

There is potential here for the BRICS countries to collaborate on this measure, including for example by way of harmonisation of standards (like it is envisioned in the case of goods in SAARC, and exists in the European Union). Since intra-BRICS trade have also grown in the last few years arising from both trade complementarities as well as from their being in a somewhat similar stage of economic development, there is a fairly strong case for the same.

Technical regulations in certain BRICS states exist, but their reach across the services value chain is limited. For instance, in Brazil standards are applicable to health. Some of the BRICS economies also have MOUs on standards, conformity assessment and accreditation procedures with each other along with being co-signatories in a number of mutual recognition agreements.

Clean Energy Cooperation

BP's Energy Outlook 2030 estimates that the BRICS will account for 42 per cent of world energy consumption, up from 23 per cent in 1990. China and

India account for 50 per cent of the world's incremental energy demand. Energy consumption growth in BRICS grew 5.6 per cent between 2000 and 2011, 4.4 per cent in 2012 and 3.5 per cent in 2013[5]. During this time, coal met 40 per cent of the rising demand for energy, thus propelling CO2 emissions further, at a rate of 1.8 per cent in 2013. BRICS, due to their high growth / industrialisation stage, inevitably contributes in a big way to the global emissions (40 per cent of global greenhouse emissions in 2010, with China contributing 22 per cent alone)[6].

Given the high dependence on coal for energy needs, the way forward involves adoption of cleaner technologies. That makes the discussion on clean coal highly relevant. Following is a look at the advanced clean coal technologies, which might be adopted in BRICS countries and funding mechanisms developed therein. Moreover one of the focus areas for the New Development Bank would be clean energy.

Table 6: Coal technologies

Carbon Capture and Storage (CCS)	CCS is a technology which would allow capturing and storing up to 90% of the CO2 emitted by the large fossil fuel power plants. CCS will potentially play in ushering in a decarbonised economy. CCS is advancing slowly, due to high costs and lack of political and financial commitment. The energy penalty of CCS is generally put at 20-30% of electrical output. The US and Canada are at the forefront of CCS technology. Ih 2014, the number of CCS schemes rose to 22 (of which 13 were operational).
Super-critical and ultra-supercritical technology	Supercritical (SC) and ultra-supercritical (USC) power plants operate at temperatures and pressures higher than the critical point of water, i.e. above the temperature and pressure at which the liquid and gas phases of water coexist in equilibrium, at which point

[5] http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/world-energy-consumption-china-and-brics-slow-while-usa-restart_29687.html

[6] http://edgar.jrc.ec.europa.eu/overview.php?v=GHGts1990-2012&sort=des7

	there is no difference between water gas and liquid water. This results in efficiencies of above 45%, higher than what would otherwise be achieved (32%).As a result, SC and USC power plants require less coal per megawatt-hour, leading to lower emissions. India is in the process of building several SC power plants, and Emerson automated India's first in Andhra Pradesh recently.
Fluidized bed technology	Fluidized beds suspend solid fuels on upward-blowing jets of air during the combustion process. The result is a turbulent mixing of gas and solids. The tumbling action, much like a bubbling fluid, provides more effective chemical reactions and heat transfer. The popularity of fluidized bed combustion is due largely to the technology's fuel flexibility - almost any combustible material, from coal to municipal waste, can be burned. The technology reduces sulphur and nitrogen oxide emissions and is slowly being adopted worldwide, including in developing countries like Philippines.

The funding and policy enablers for such technology warrants cooperation and BRICS members are already working in that direction. A joint BRICS platform for exchanging best practices and environmentally clean technology and know-how is now being mooted.

Urbanisation and Service Delivery