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South-South Cooperation Policy as a Tool for Agricultural Technical Change

Since the world food crisis in 2008 and soaring food prices in early 2011, the issue of agriculture has moved to the forefront of the development agenda and is much in the headlines. It is widely accepted that agriculture in many low-income countries has a potential to serve as an engine of development and poverty reduction. Moreover, raising their agricultural production is critical to global food security in the coming decades.

There is ample evidence to show that yields can be dramatically increased in Africa when farmers have access to improved technologies and inputs, as demonstrated, for example, by the hybrid maize revolution in Eastern and Southern Africa. But exploiting this potential on a large scale would require a significant increase in public investment in agricultural research and rural infrastructure, and that African governments provide more supportive policies for agriculture. The transfer of experience and technology through South-South cooperation (SSC) can be particularly important for building supportive international environment.

The Concept of South-South Science and Technology (S&T) Cooperation

The history of South-South cooperation dates back to 1955 conference in Bandung when some African and Asian nations agreed to promote economic and cultural cooperation. It provided impetus for the development of various South-South organisations in the 1960s and 1970s, with Non-Aligned Movement (1961) and Group of 77 (1964) the most important among them.

While South-South technical cooperation was discussed in some of these initiatives, there was no strategic framework for such collaboration until 1978 when the Buenos Aires Plan of Action (BAPA) was adopted at the United Nations (UN) Conference on Technical Cooperation among Developing Countries (TCDC). The Plan described the TCDC approach as a *"vital force for initiating, designing, organising and promoting co-operation among developing countries so that they can create, acquire, adapt, transfer and pool knowledge and experience for their mutual benefit and for achieving national and collective self-reliance, which are essential for their social and economic development*".

Since the adoption of BAPA, the UN has played a crucial role in supporting South-South Cooperation. To coordinate its work in this area, it has set up a Special Unit for SSC managed by the United Nations Development Programme (UNDP). In commemoration of the 30th anniversary of BAPA, the UN convened in December 2009 a High-Level Conference on SSC in Nairobi where the need to strengthen South-South cooperation as an additional mechanism for enhancing growth and addressing the challenges facing developing countries was reiterated.

More than 30 years have passed since the adoption of BAPA, but SSC only recently emerged on a significant scale, as in the past cooperation between developing countries focused more on political issues. Since 2000, one of the main directions of SSC became a growing S&T collaboration among developing countries. There are several reasons for this trend:

- The Internet and other information and communication technologies (ICT) facilitate the implementation of South-South cooperation, allowing the sharing of knowledge in the widest possible extent with minimal costs.
- The growing technological prowess of some countries, enabling them to take the initiative in collaborative research (including through the provision of financial support) and to transfer developed technologies.
- The continuing shift of research activities in developed countries from the public to the private sector. Private companies in developed countries are reluctant to share technology with public institutions in developing countries, preferring instead to preserve their technological advantage. This has shifted the orientation of some developing countries in S&T cooperation from North towards the South.
- Improving economic circumstances in certain developing countries have brought greater research and development (R&D) spending, which itself creates opportunities and an impetus for greater collaboration.

Regarding the latter point, however, in Africa science for development has been a mixed story. Although the African Union in 2007 aimed to solidify political support for science and included a commitment to increase spending on R&D to 1% of each country's gross national product (GNP), and some countries have steadily increased their science spending, the average R&D spend remains just 0.4% of GNP on the continent. This is the consequence of previous assumption that the South could rely primarily on scientific results obtained in the developed world. According to this attitude, developing countries did not train an adequate number of qualified scientists to whom they could turn for

advice on the scientific problems that arise when scientific knowledge is applied in practice. In particular, far too little attention was given to applying science to improve agriculture, livestock, forestry, fishing, and food processing. As a result, farmers in Africa are trapped into using inefficient technologies, and their average cereal yields have barely increased in 40 years.

But there are also some success stories, mostly in Asia. Asian governments spent 10-15% of their total budget on agriculture each year (compared to 5-6% in Africa), investing heavily in agricultural research, irrigation, rural roads and power, subsidising vital inputs like fertilisers and high-yielding seeds. The green revolution in those countries led to regional food surpluses within 25 years. It created huge amounts of productive employment in agriculture and allied industries, lowered food prices, lifted many people out of poverty, and upheld savings and domestic demand to help grow many nascent industries. The experience that should be shared with other developing countries.

Yet it is also clear that green revolution technologies cannot simply be transferred from one region to another. In some countries they have created problems. Increases in output have become dependent on the continual release of new varieties of seed as earlier high-yielding ones lose their resistance to diseases and pests. The wide-spread use of a few varieties accentuated the problems of crop disease as biological diversity is reduced. The improper use of fertilizers and chemicals contributed to the pollution of drinking water. The new technologies have increased farmer dependence on agricultural research centres and, in some cases, on Northern transnational companies. To effectively serve the needs of farmers, research has to be more localised and sensitive to farmers' conditions and requirements in different areas. Africa, in particular, needs a strong system of agricultural research taking into account its conditions of fragile soil, scarcity of irrigation water, diversity of crops, and climate features. Most of the countries of the region cannot afford such a system on their own, and this fact therefore requires much greater cooperation among them.

The idea of SSC allows developing countries to find sustainable and low-cost solutions to their problems and possibilities for development in the experiences of other Southern nations. An important rationale for SSC in agriculture is the similarity of soil, climatic and ecological conditions among some groups of developing countries. Also it helps to fill the gap in research and technology that is relevant to the poorest. In particular, much private and public R&D in the world is spent on corn, wheat, maize, rice, while very little is devoted to cassava, millet and sorghum. Although they suffer from severe funding

constraints, the public agricultural research institutions in Africa are jointly undertaking some research for small farms and have had some big successes (e.g. disease resistant varieties of cassava and sweet potatoes).

The cooperation between countries with more similar agro-ecological systems, supported by great number of actors, creates a unique potential for improving coordination, sharing experiences and avoiding replication of techniques that did not produce results in other countries.

The Variety of Cooperation Forms

One of the driving forces of South-South Cooperation in S&T, as was mentioned above, became the growing technological advance of countries like China, India, Brazil, South Africa, Malaysia, Turkey, the Republic of Korea, Indonesia, Egypt and some others. In general, official statements regarding SSC by these countries suggest that their relationship with Africa is based on the need and desire to pursue mutually beneficial cooperation for common development. But it is clear that Southern partners need natural resources, markets and support on global issues, areas in which Africa has a lot to offer. On the other hand, Africa needs technology and technical expertise from other developing countries to address its development needs. Therefore, in most cases SSC in S&T takes the form of projects, where pivotal countries collaborate with one or several beneficiary countries. However, there is a strong call among Southern nations not to consider this type of development cooperation as based on donor-recipient basis, but as standing on equal partnership.

In agricultural sector this type of partnership is being increasingly motivated by the concept of outsourcing. There is a growing concern regarding food security in some countries that previously have achieved agricultural self-sufficiency. In India, where farmers have drilled some 20 million irrigation wells, water tables are falling and the wells are starting to go dry. It is estimated that 175 million Indians are being fed with grain produced by overpumping. In China, overpumping is concentrated in the North China Plain, which produces half of China's wheat and a third of its corn. In Saudi Arabia wheat production is collapsing because the non-replenishable aquifer the country uses for irrigation is largely depleted. At the same time, there is a great potential for boosting productivity in agriculture in Africa. So these countries should be interested in cost-effective transfer of appropriate and advanced clean technologies to Africa to help initiate

another green revolution in this region. It is also important to note that in a sense of SSC agriculture outsourcing does not mean acquiring land for production of food for own use (land grabbing), but 'win-win situation' when high productivity of African agriculture is to be achieved and surplus of food to be shared with partners.

On the most significant scale SSC in agriculture with Africa is being maintained by China, involving over 40 countries and over 200 cooperation projects. China has sent more than 10 000 agro-technicians to Africa to train local farmers and provide technical support. The focus has been made on land management, breeding technologies, food security, agricultural machinery, and the processing of agricultural and sideline products. On the latest Forum on China-Africa Cooperation (FOCAC) held in 2009 China made the commitments to increase the number of its agricultural technology demonstration centres in Africa to 20, send 50 agricultural technology teams to Africa and train 2 000 agricultural technology personnel for Africa, in order to help boost the continent's food security.

Another good example of SSC, among many others, is the support for Africa's agricultural development by the Arab countries and Arab funds, especially in the field of irrigation and water management, where they have accumulated knowledge and expertise. E.g., SSC agreement between Egypt and Tanzania. Most of the land under cultivation in Tanzania is rain-fed, leaving farmers dependent on weather conditions. Egyptian experts and technicians have been working with local farmers on irrigation, plant nutrition and soil fertility, seed production, agricultural engineering etc.

While the above cases involve South-South cooperation from the countries with more advanced levels of S&T development, the next case gives an example of SSC between countries at a similar level of development (Benin and Zambia). Comparative advantage does not necessarily mean advanced level of experience, as Southern countries can learn a lot from other countries at a similar level of development. The project idea was inspired by a tour involving Zambian stakeholders to the Songhai Centre for Sustainable Development in Cotonou, Benin. The Songhai Centre has over the years researched and promoted the concept of zero entropy; the agricultural production process where nothing is wasted and everything gets transformed (for example, into compost).

In Zambia through the cooperation with Songhai Centre a teaching farm to train youth to become community agricultural extension workers was established. The objective was to replicate the adaptable components of the Songhai Centre in Benin into the Zambian environment. The Golden Valley Agricultural Research Trust (GART) of Zambia was

selected to be the focal point for replicating the adaptable components of the Songhai model on the basis of its own experience in promoting a similar approach in the country. The training programs have helped the Zambian farmers to develop new low-cost technology of agriculture (particularly in the cultivation of mushrooms), new food technologies and standards for quality control, have changed in a positive way the attitude of the youth towards farming.

The partnership of African countries with the South is complementary rather than a substitute for relations with traditional partners. Moreover, many SSC projects are supported by Northern donors, and this leads to triangular cooperation. Japan, for example, states its policy to support SSC in its Official Development Assistance (ODA) Charter, and incorporates promotion of triangular cooperation in its cooperation programmes with major pivotal countries (e.g., Japan partners with Brazil to transfer agricultural technology to Africa and other developing countries). The New Rice for Africa (NERICA) project resulted from the cooperation between several African countries and research centres, backed by donors (Japan, FAO and the African Development Bank) and led to the creation of new drought-resistant and high-yield rice for Africa.

The Netherlands supports an interesting Programme for South-South Cooperation that unites Benin, Bhutan and Costa Rica. Among other joint projects these countries have successfully cooperated in the development of sustainable and competitive organic supply chains by means of knowledge and experience-sharing with an emphasis on the commercial capacities of farmer organizations: quality control, building productive capacities etc.

Food and Agriculture Organization (FAO) of the UN organizes special SSC agreements, so that technicians and experts from emerging developing countries can work directly with farmers in host countries, sharing their knowledge and skills. Up to April 2010, 40 agreements have been signed (the most recent in March 2010, between Chad and Vietnam) and over 1 400 experts and technicians had worked in the field. In contrast to North-South technical assistance, these are people who live out in the villages, working directly with locals, not caught up in endless meetings in the capital city or writing reports. The very presence of outsiders in rural communities not used to seeing foreigners is an important stimulus for change. The skills they bring are passed on to the communities in which they work and a multiplier effect is achieved through the training of local farmers and technicians who can spread the word to others after the foreigners have gone back home.

The Case of India-Brazil-South Africa (IBSA) Dialogue Forum

Established in June 2003, IBSA is a coordinating mechanism amongst three emerging countries, which are determined to deepen their ties in various areas and put a strong emphasis on promoting South-South cooperation. IBSA keeps an open and flexible structure. It does not have a headquarter nor a permanent executive secretariat. The highest level is the Summits of Heads of State and Government held every year. To deepen mutual knowledge and explore common points of interest on sectoral areas 17 working groups (WG) were established, including agriculture, S&T, climate change, and energy. IBSA also opens itself to concrete projects of cooperation and partnership with less developed countries.

In accordance with the commitment to promote SSC, the three countries established, within the framework of UNDP, the IBSA Trust Fund for Poverty and Hunger Alleviation. Members contribute $1 million per year each to initiate and finance poverty reduction projects in other developing countries. One of the projects was finished in Guinea-Bissau, where IBSA partnered with the Ministry of Agriculture to improve yields and food self-sufficiency. 4 500 Guinea-Bissau peasants (60% of them women) were trained in agricultural techniques to enhance rice cultivation and citrus fruits and mango production. IBSA partners assisted the introduction of new seeds species that improve yield and allow agricultural production even during Guinea-Bissau's rainy season. They also provided training on water management and control.

Each of IBSA member states is deeply involved in SSC in agriculture with Africa. India, through the Africa-India Forum Summit launched in 2008, aims to reinforce cooperation, especially with the transfer of agricultural technologies that meet the real needs of small-scale farmers in Africa. India is one of the lead actors in tropical technology, not only in high-tech packages but particularly in low technology, which is important for meeting farmers' needs. The Indian experience is being shared through National Research Development Corporation (NRDC), Central Food Technological Research Institute (CFTRI), Council of Scientific and Industrial Research (CSIR) and Indian Council of Agricultural Research (ICAR).

Brazil's projects in Africa were initially focused on Lusophone countries of Angola, Mozambique and Guinea-Bissau. However, with the opening of Embrapa (Brazilian agricultural research and training institution established in 1973, which has been a driving force for agricultural development at the national and international levels) office in Accra

in 2006, a number of other countries, including Ghana, Benin, Guinea, Kenya and Ethiopia, have signed technical cooperation agreements. Brazil is looking towards a broad partnership with all members of African Union (AU) in technological transfer and agricultural capacity-building projects. Embrapa Africa began working on everything from growing and processing tropical fruit and vegetables to producing meat and managing forests, also Brazil offers for Africa controversial biofuels programme.

South Africa is a leader on the continent in agricultural technology and is a key player in joint R&D projects of African Union. One of the endless examples is the development of low-cost and low-risk plant biotechnology techniques, which may be an appropriate technology within reach of rural and disadvantaged farmers to obtain increased and sustainable crop yields. In Kenya, for example, tissue culture of disease-free banana plantlets, obtained as a result of cooperation between the Kenya Agricultural Research Institute and the South African Institute of Tropical and Sub-Tropical Crops, has helped former coffee-growing farmers to use biotechnology for development, and to make the transition in earning new income.

As IBSA countries have developed substantial capabilities in agricultural sector, there are significant synergies between these countries for agricultural cooperation. The main body for coordinating efforts in this sector is the Joint Working Group on Agriculture. At the 4th Summit of Heads of State/Government in Brasilia in April 2010 the Group adopted "Future of Agriculture Cooperation in IBSA". According to the document the important potential areas for coordination can be indicated as follows:

1. Food Processing;
2. Food Safety Measures;
3. Promoting Joint Agricultural R&D (it is also stated that for smooth flow of agricultural technology between IBSA, the Agricultural Technology Transfer network could be set up, which can pool information on the availability of agricultural technologies in the region);
4. ICTs for agricultural development;
5. Capacity building and exchange of human resources.

The document proposes to conduct the study that can highlight the synergies, complementarities and comparative advantages of each country. The study will include scenario planning analysis which will provide broad futures for agriculture over the next 25 years or so. The attempt to establish long-term agricultural cooperation planning is a unique for South-South initiatives.

Currently, according to the most recent 7th IBSA Trilateral Commission Meeting Ministerial Communique (March 2011, New Delhi), the Joint Working Group on Agriculture is interested in undertaking collaborative activities in the areas of diagnostics and control of trans-boundary diseases of animals, training programmes in viticulture, integrated pest management and soya bean production and value addition.

Some other Working Groups are also involved in agriculture-related cooperation. WG on Energy has signed Memorandum of Understanding (MoU) on biofuels already in 2006. Although biofuels appeared to be a controversial issue, the cooperation in this area is pursued by IBSA countries. They held a Workshop on production and use of biofuels by Brazil in September 2010 as well as a Workshop on Technical specifications and standards for biofuels hosted by South Africa in December 2010.

The IBSA micro satellites project announced by leaders of the grouping on the conclusion of its 4th Summit in Brasilia is aimed to address common challenges in climate studies, agriculture and food security.

The IBSA nanotechnology initiative is a collaborative research and development programme between the Departments of Science and Technology in India, Brazil and South Africa. As part of this initiative, for example in the field of nanofiltration, South Africa's North-West University has built a treatment plant that incorporates ultrafiltration membranes to clean brackish groundwater in a rural village. The plant removes pollutants such as chloride, nitrate, phosphate and sulphate to produce safe drinking water for domestic and community use.

The case of IBSA shows that joint efforts help to promote and scale up South-South cooperation as well as making the cooperation a high profile one.

Conclusion

SSC in agriculture is a win-win situation for all the stakeholders involved. This is true for recipients: with increasing privatisation of agricultural research, for small-scale farmers it becomes more difficult than in the past to get access to global technology; SSC not only neutralizes negative effects of this, but also provides real opportunity for green revolution in Africa through sharing successful experiences and cost-effective technologies. Countries providing these practices and technologies are also gaining, not only because of the direct benefits resulting from the project, but also because of the learning experiences arising from these new types of cooperation.

Therefore, SSC is more likely to intensify in the future. The cases considered in this paper show that South-South initiatives create real benefits and have potential to be one of the driving forces if not a condition for agricultural technical change in Africa.

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