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"India and Nepal share close bioagri ties"

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Tell us about the Nepal Agriculture Research Council (NARC) and its association with Indian agricultural scientists and industry?
NARC is the apex body for the applied agricultural research in Nepal. It is the autonomous institute under Ministry of Agriculture Development in Nepal. It was established on 1991; however, the biotechnology unit was established on 1998.

NARC-Nepal has close ties with agricultural institutions and scientists all over the world directly and indirectly since its establishment. Since Nepal and India are a part of the South Asian Association for Regional Cooperation (SAARC), it has more relationship with Indian scientists, ICAR and IARI through SAARC and APAARI (Asia Pacific Association of Agricultural Research Institutions). Many capacity building works were conducted by Indian scientists for Nepalese scientists.

Nepal Agriculture Research Council helped for the registration of Indian crop varieties developed and marketed by Indian seed companies especially for maize, rice and vegetables. They have the great seed market in Nepal especially for hybrids. Similarly, NARC-Nepal also plays the greater role for the recommendation to Nepalese farmers for the pesticide, fertilizer and machineries produced by Indian companies. Biotechnology Unit alone purchased the biotech chemicals produced by Indian companies (GeiNei, Himedia) costing around $60,000.00 each year.

How have the biotechnology applications helped in the growth of agriculture sector in Nepal? Which are the crops that have benefited?
Nepal is highly dependent on the agriculture for sustainability of its economy and employment. However, commercialization of the agriculture can't be paced up as expected due to resilience on the application of the modern technology in agriculture. Use of biotechnological tools for the development of the crop varieties is most important. Similarly, adaptation of robust crop varieties developed elsewhere will be another aspect of applications of biotechnology in agriculture.

Nepal's physio-geographical situation always favors its main business as agriculture. It lies between two growing economy

(India and China) which needs more food for next years. Similarly, it can catch the recent developments in agriculture from its neighboring countries due to its geographical variability that matches to both countries. Hybrid and open pollinated seeds on vegetable crops, maize and rice is popular in Nepal from Indian seed companies that developed using modern technology (except genetic transformation). Nepal has tremendous scope for the development of agricultural sector using modern biotechnology.

Very few applications of such technology exist in Nepal. Few initial screening of crop germplasm using molecular markers has been started in some food crops especially on rice, wheat, maize, barley, millets and other underutilized crops recently. Molecular Marker Assisted Breeding/Selection (MAB or MAS) is just initiated for some major crops. However, use of tissue culture for development of disease-free vegetable and fruit crops like potato and banana is already established in private and public sector. Similarly, mushroom seed production is another profit business in Nepal.

What kind of funding do you receive from the government? Who are the major contributors and has it been enough?
Nepal Agriculture Research Council receives funds from Nepal government and other donors (public funding agencies like World Bank), however, government funding is the major source of funding (it covers 99 percent of total funding) for research and other activities of the institute. Total budget of NARC-Nepal is around $5,000,000 per year for research and another $5,000,000 per year for administration which is distributed all research stations (76 in number) throughout the country. However, it is very insufficient to conduct the research works in all discipline of agricultural research. For example, $80,000 per year is allocated to conduct research works on biotechnology for whole institute, which is insufficient.

Does agri-biotech companies exist in Nepal? Provide us details about the product development in agriculture?
Yes, some agri-biotech private companies are working in Nepal. Public sector works on research purpose rather than production. Most of private companies (3 in number) are focused on micro-propagation of vegetable, fruit and ornamental plants such as potato, banana, orchid and strawberry. Some have started to work on antibodies and molecular technology for food crops (indigenous fruit, Lapsi and cardamom) (2 in number).

Details of the functions of these companies are tabulated as below.

Company: R-Lab
Location: Sanepa, Lalitpur
Product: Production of antibodies, molecular technology on indigenous fruit (Lapsi)

Company: Deurali Janta
Location: Kathmandu
Product: Molecular technique for virus free cardamom

Company: Tissue culture factory
Location: Lalitpur
Product: Tissue culture on potato and orchids

Company: Nepal Biotech Nursery
Location: Lalitpur
Product: Tissue culture on banana, potato and orchids

Company: Himalayan Florotech
Location: Lalitpur
Product: Tissue culture on banana and strawberry

What is the status on the GM crops? Are there any chance of commercialization any sooner?
There is not any official release and/or registration of genetically modified crops in Nepal to date. The research and release of GMOs in India put the pressure for the adoption of GMOs in Nepal too. Nepalese agriculture sector has a lot of influence from India due to its similar socio-economy context, open boarder and cultural ties. Release of Bt-Brinjal in India develops an alert in Nepalese agriculture because most of the Brinjal seed in Nepal comes from India.

Being the signatory country to Cartagena Protocol on Biosafety and Convention on Biodiversity (CBD), Nepal has to develop many rules, regulations and technical capability before adopting any GMOs. As per National Seed Policy-Nepal (1999) Nepal needs a regulatory and monitoring system for conducting research, varietal development and commercial cultivation of GMOs within country.

The provision of this system was established on National Biosafety Framework (2007), however, implementation of this framework to develop act, rules and regulations is still not active. Similarly, Nepal still can't develop its technical capability to

meet Cartagena Protocol on Biosafety for adoption and/or research on GMOs. Therefore, Nepal doesn't have any chance of adopting genetically modified crops soon owing to its legislation and scientific development aspects.