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Managing modern bio-technology for agri-business development

The main objective of this article is to make the public aware about the forthcoming national training workshop on "Management of Agricultural bio-technology in Sri Lanka: Development, Transfer and Adoption" which is being organised by University of Ruhuna and Council for Agricultural Research Policy (CARP) in collaboration with International Services for National Agricultural Research (ISNAR).

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Modern agricultural bio-technology are being used to develop new plant varieties with beneficial genetic traits, new plant and animal diagnostic products, animal vaccines, biological pesticides, herbicides, and fertilizers, and modifications in organisms used for food production. In Sri Lanka, many universities, public and private sector institutes etc., are conducting basic and commodity-oriented bio-technology research based on crop production, livestock production, forestry and food science to promote the agri-business.

They contribute some innovations to the agriculture science by performing individual, and international collaborative research programs. Evidently, some bio-technology promotion programs have immense impact on improving infrastructure, promoting skilled manpower and providing current information of the research findings to end users. However, the scientists are still not performing effective bio-technological research sufficiently with the aim of promoting agri-business sector through mutually exchanging their ideas, knowledge, skills and materials. It is believed that the poor communication, commodity orientation and geographical dispersion are key impediments for co-operation and co-ordination.

Free dissemination of agricultural innovations is the common technology transfer mechanism in Sri Lanka. Because the Government or the international donor agency mainly fund the bio-technological research, the researchers are obliged to serve the agricultural community without entering into commercialization. On the other hand, the Government has to bear a significant amount of expenses also to disseminate the knowledge and transfer the technology to the clients particularly to the small subsistence farmers, besides the heavy expenses for bio-technological research. Generally, commodity oriented research is conducted and transfer the technology through the extension networks of the individual research institutes. Existing extension and communication networks within the commodity-oriented research institutes, and among the other research institutes, universities, private sector organisations are yet to be established and managed efficiently to transfer bio-technology up to the end-users. Poor co-ordination and cooperation between research,

extension and end-users for efficient management of the interface has become a severe bottleneck.

It could be recognised that the research programs have to be modified with the view of exploring commercial channels such as marketing and licensing of intellectual properties in order to promote agriculture as national and international enterprise. Transferring technology not only from public to public sector but also from public to private sector and private to private sector, licensing, and licence terms are very important new aspects under commercialisation of agriculture.

Private sector involvement in agricultural bio-technology could be an important catalyst not only for research funding, but also for product delivery and human resource development that strengthens direct linkages between the scientific community and productive sector. Hence, the intervention of government, international donors, NGOs etc., by providing financial assistance to subsidize the expenses of bio-technology which are to be transferred to the small farmers has become an important strategy.

Organising scientists and farming communities as end-users of bio-technology make more impacts on the agri-business development. Scientists could exchange the knowledge, skills and technology through their organisations or interest groups with mutual understanding. Their co-operation may minimise the repetition of and expenses for bio-technology research development, and encourage further advancement of innovations.

The farming communities such as small farmers, commercial farmers, private sector agro-based companies demand, adopt and adapt bio-technology differently from each other. In fact, the agricultural research activities involved in producing technology are to be based on information from and about end-users. The demand for agricultural research can hardly be expected to originate from small farmers. Therefore, transfer of technology programs often fail because change agents are more innovative minded than they are clients oriented. Each target group is composed of farmers operating the same system in fairly homogeneous local circumstances. The identification of these target categories of the end-users before the transfer of technology facilitates greater adoption and impacts.



Farming where bio-technology could be relevant

Incentives should be provided to private sector for undertaking bio-technology research targeted at the production problems of poor farmers who can not afford high cost technology. The Government in addition to allocate national budget may request international donors to finance the public and private bio-technology programs oriented towards poor farmers.

There are multiple technology transfer routes into and within research institutes with the participation of different stakeholders in many countries. The main stakeholders in agricultural bio-technology includes international and national research centres; universities; private/commercial sector; policy and planning sectors in national organisations; farming communities; non-governmental and farmer representatives.

It is suggested to establish a centre for co-ordination/contact centre having strong relations with research, extension, policy institutes, end-users and other stakeholders for the development and transfer of bio-technology in the agri-business sector. With the collaboration of other related institutes, the centre should mainly focus on the transfer of technology to the end users through well-established inter-institutional linkages using advanced communication channels.

Technology transfer office or public relation officer can play multiple roles such as education and awareness, creation and modification of policy issues, protection of intellectual properties, generation of new revenues, networking, creation of new start up service to the society. The creation of area of experts teams emphasizes creation of the quick response multi-disciplinary professional groups that operate within traditional line responsibilities for research and extension units.

These self directed teams are tightly linked with pub-

lic; more integrative of research, education, delivery and evaluation; dedicated to enhancing their knowledge, skills and capacity; and more empowered with resources.

To facilitate the integration of bio-technology with broader national research priorities and strengthen management of demand driven; user oriented bio-technology programs integration of bio-technology with conventional agricultural research system has become an important approach. Society support many public institutions indirectly through the payment of taxes. Transfer of new bio-technology to farmers through public institutional links may increase food production leading to lower price for food. Moreover, the revenues generated through commercialising technology also can support continued research and development of new technologies. Therefore, incentives should be provided to public and private sectors for undertaking bio-technology research not only for the better-off commercial farmers, but also targeted at poor farmers as poverty alleviation strategy in developing countries.

IPRs have been created to protect the rights of individuals to enjoy their creations and discoveries. Bio-technology inventions are protected under utility patents and control the use of genetic materials of a number of plants and for multiple uses. Absence of sufficient legal protection for agricultural research urged the establishment of IPR policies. It is emphasized the policy needs for IPR in developing countries with the view of changing objective of national research programs; international IPR and trade negotiations; changing attitude towards intellectual property protection of bio-technology which are common and urgent needs.

The scientists are encouraged to conduct research also in explor-

ing; needs of protecting intellectual properties, applicability of IPR protection strategies with international regulations and agreements, implementation of IPR programs, institutional setting and policy enforcement, impact assessment under the prevailing situation of the agri-business development.

Program formulation, execution and delivery of agricultural bio-technology to the identified users are the responsibility of public sector in developing countries. Public sector agricultural research institutes have to develop their own linkages to user groups who have little purchasing power and limited knowledge of bio-technology. With the global attempt of commercialisation of agriculture, national policies also have to be changed to protect IPR and transfer the bio-technology. Free, public distribution of bio-technology is becoming rare because inventors want to recoup some costs associated with the inventions and to gain financially.

Policy issues to establish and manage technology transfer mechanisms through commercial channels such as marketing and licensing of intellectual properties have to be considered. Licensing allows a privilege to use innovation for a fixed duration in a fixed geographical location in exchange for money or other compensation.

Selling of bio-technology faces main problems such as difficulty of putting monetary value and inventor would be prevented from utilising the own research in any future inventions. Moreover, private sector involves with transfer of technology through affiliated or licensed research that does not reach public sector but is retained by proprietary developers.

However, the extension policy incorporate with structural change encouraging link between private-public, private-universities would secure the

transfer of technology to the small farming communities. The Plant Breeders Right (PBR) has to be granted by the Government to exclude others from producing or commercialising materials of a specific new plant variety for a certain period, PBR is essential to provide incentives for private investments in plant breeding.

Provisions for limited unauthorised use of protected matters through Research Exemption, to study subject matter without reproducing or multiplying it for commercial purposes, may leads to the advancement of technology. Breeders' Exemption, which allows free use of material of a protected variety to a certain extent for creating new varieties encourage scientists to continue their efforts to develop varieties suitable for existing environmental, economic and social conditions.

The Government through farmers privilege has to give farmers the freedom to use their own harvested materials of protected variety for next production cycle. Particularly, the poor small farm holders have to be protected from the commercial exploitation. Most farmers in developing countries are poor and cannot afford risks. Therefore effective crop insurance mechanisms are important before they are asked to switch over to new bio-technology.

Although the bio-technology has great promise for human welfare, it poses potential risks to human health and the environment. Information empowerment of the civil society and consumer education are the best insurance against unfavourable risks of adopting bio-technology. Bio-safety regulations and guidelines are important for policy-makers, research managers, producers and consumers to benefit from bio-technology without endangering public health and the environment.