

National State-of-the-Art Report

1. Name of the country

SRI LANKA

2. Name, address and contact details of the focal Ministry/institution on biotechnology

1. MINISTRY OF TECHNOLOGY, RESEARCH & ATOMIC ENERGY
408, GALLE ROAD
COLOMBO 03

TEL: 94-11-2372274, 2372281, 2374700
FAX: 94-11-2374765
EMAIL: secretary@trmin.gov.lk

2. NATIONAL SCIENCE FOUNDATION
47/5, MAITLAND PLACE,
COLOMBO 07

TEL: 94-11-2696771-3
FAX: 94-11-2694754
EMAIL: info@nsf.ac.lk

3. Name, address and major activities of the key R & D organizations/academic institutions involved in biotechnology activities

NAME	TYPE OF ORGANIZATION	ADDRESS	MAJOR BIOTECH ACTIVITIES
National Science Foundation (NSF)	Funding and S&T Academic & Research	47/5 Maitland Place, Colombo 07.	Research Funding Overseas training – pre/post doctoral Fellowships, short term training Convenes and supports the National Biotechnology Committee and implement its decisions Focal point for the ICGEB, Federation of Asian Biotechnology Associations, SAARC Biotechnology Working Group activities
Institute of Biochemistry, Molecular Biology and	Academic & Research	90, Cumarathunga Munidasa Mawatha, Colombo 03	Research activities in Biomedical Sciences,

University of Colombo.			molecular sciences, Cancer Genetics, Bioinformatics Conduct Postgraduate Degree programmes
Fac. of Science Univ. of Colombo	Academic	Cumarathunga Munidasa Mawatha, Colombo 03	Research, undergraduate & postgraduate degree programmes
The Agricultural Biotechnology Centre University of Peradeniya	Academic & Research	The Agricultural Biotechnology Centre, Faculty of Agriculture, University of Peradeniya	Research and Development, and undergraduate and postgraduate teaching/training in Biotechnology
Fac. of Medicine Univ. of Colombo	Academic	Fac. of Medicine, Univ. of Colombo, Kynsey road, Col 08	Research, Postgraduate degree programmes
Fac. of Medicine Univ. of Kelaniya	Academic	Fac. of Medicine, Univ. of Kelaniya, Ragama	Research, Postgraduate degree programmes
Fac. of Science Univ. of Kelaniya	Academic	Fac. of Science, Univ. of Kelaniya, Kelaniya	Research, Postgraduate degree programmes, microbial culture collection centre
Fac. of Science & Fac. of Medical Sciences Univ. of Sri Jayewardenepura	Academic	Faculty of Science/Fac. of Medical Sciences, Univ. of Sri Jayewardenepura Gangodawila, Nugegoda	Research, Postgraduate degree programmes
Fac. of Science & Fac. of Agriculture, University of Peradeniya	Academic	Faculty of Science/Fac. of Agriculture, University of Peradeniya, Peradeniya	Research, Conduct Degree programmes
Faculty of Science & Fac. of Agriculture, University of Ruhuna	Academic	Faculty of Science, University of Ruhuna, Wellamadama, Matara Fac. of Agriculture, Univ. of Ruhuna, Kampurupitiya, Matara	Postgraduate degree in Molecular Biology & Biotechnology Research
Fac. of Science & Fac. of Medicine, Univ. of Jaffna	Academic	Thirunelvely, Jaffna	Research & Postgraduate degree
Dept. of Biotechnology, Wayamba University	Academic	Dept. of Biotechnology, Wayamba University, Kuliyapitiya	Undergraduate Degree, Research
Fac. of Agriculture, Rajarata University	Academic	Rajarata University of Sri Lanka, Mihintale	Postgraduate degree, Research
Fac. of Applied science, South Eastern University	Academic	South Eastern University, Sammanthurai	Undergraduate and postgraduate programmes
Rice Research & Development Institute (RRDI)	R&D	Batalagoda, Ibbagamuwa.	Research and training
Coconut Research	R&D	Bandirippuwa Estate,	Research and training

Institute of Sri Lanka (CRI)		Lunuwila	
Tea Research Institute	R&D	Talawakelle.	Research and training
Rubber Research Institute	R&D	Agalawatte	Research and training
Sugar cane Research Institute	R&D	Udawalawe.	Research and training
Institute of Fundamental Studies (IFS)	R&D	Hantana Road, Kandy.	Research
Institute of Postharvest technology	R&D	114, Wijerama Mawatha, Colombo 07.	Research
Industrial Technology Institute	R&D	363, Baudhaloka Mawatha, Colombo 07.	Research
Medical Research Institute	R&D	Baseline Road, Colombo 08.	Research
National Aquatic Resources Development & Research Agency (NARA)	R&D	Crow Island, Mattakkuliya, Colombo 15.	Research and training
Plant Genetic Resources Centre	R&D	Gannoruwa, Peradeniya.	Research and training
Horticultural Crop Research & Development Institute	R&D	Gannoruwa, Peradeniya.	Research and training
Veterinary Research Institute (VRI)	R&D	Gannoruwa, Peradeniya.	Research
Bandaranaike Memorial Ayurveda Research Institute	R & D	Nawinna, Maharagama	Research
Institute of Indigenous Medicine	R & D	Nawala, Rajagiriya	Research, degree programmes
Council for Agricultural Research Policy (CARP)	S&T	114/9, Wijerama Mawatha, Colombo 07	Funding research in Agriculture and allied fields
National Research Council (NRC)	S & T	380/71 Baudhaloka Mawatha, Colombo 7	Funding research
Genetech	Private	54, Kittulwatte road, Colombo 08	Research, Molecular Diagnostics, Paternity testing & Forensics
CIC Agri Business	Private	205, D.R. Wijewardana Mw, Colombo 10.	Mass propagation of plants, Marketing and Production of high quality seed, paddy & vegetable seeds Weedicides, Insecticides and Fungicides of international quality.

environment. There is still a greater apprehension regarding safety of genetically modified foods, which needs to be addressed by the scientists.

Technology is available for:

- Callus and cell cultures of medicinal plants (i.e. Binkohomba, Ekaweriya, and Komarika) all of which have a very high local demand. Research in cell culture of medicinal plants is being conducted at the BMARI (Bandaranayake Memorial Ayurvedha Research Institute) at Navinna, Maharagama. The laboratory is now in the process of mass-producing medicinal plants for bio farming and extraction of medicinal compounds for purification and quality control.
- Plant multiplication through shoot tip culture (micro propagation) – banana, orchids, bell pepper, ornamental plants
- Embryo culture of rice
- DNA finger printing of plants
- GM testing through PCR based technology
- Disease diagnostics through molecular techniques
- Crop improvement using traditional and modern breeding technologies
- Plant cell culture technique using bioreactors

The Weligatta Agro – Technology and Community Service Centre of the University of Colombo has a production unit for micro propagation of plants. Located in a rural setting, it employs young men and women from the area with a science background to produce tissue cultured plants, especially banana, for cultivation by the local farming community. The centre has created opportunities for self employment by encouraging the farmers in the area to take up fruit production, especially banana, for both the local market and for export.

Some private companies are involved in tissue culture of ornamental plants for export.

4.2 Animal biotechnology

Biotechnology has the potential to play a significant role in animal productivity. Enhancing nutritional quality of animal products, animal welfare and disease diagnostics can be addressed through advances in biotechnology. Thus, most agree that investments in this area should be made alongside assessment of environmental risks, identifying research priorities and determining cost effectiveness.

Activities related to Animal biotechnology are mostly at teaching and research levels. In recent times, special high milk producing cows were produced using an embryo transfer program. However, there are a number of other areas in the livestock industry that is being pursued. Eg. Genotyping of animals, artificial insemination, vaccine production, identification of meat types, starter cultures and probiotics, and the use of exogenous enzymes in animal feed.

In Sri Lanka, dairy biotechnology is confined to cottage industries, small and medium scale industries and large-scale multinational industries.

There are a large number of alcohol based industries which are mainly run by private companies. Beer, vinegar and arrack/spirits industries are fairly well established, but the Sri Lankan contribution varies, due to imports. The other industries rely on local materials such as sugarcane molasses, coconut toddy etc. There is no wide scale wine industry in Sri Lanka, it is mainly a cottage industry, which uses coconut water and fruit juices as raw materials. It is estimated that the local industries produce only about 70% of the alcohol needs of the country and that there is room for further improvement. Currently sugar industry produces excess of molasses, which is the main source for production of alcohol. Expansion of sugar industry, increasing facilities for molasses storage and new technology for improved fermentation will assist the industry, to achieve self-sufficiency in alcohol, and further development of industries based on alcohol.

Local strain of Bt is available for mosquito control in different commercial preparations

Biofuel is an emerging area with a number of investments and many scientists are working in this field as a solution to the high fuel costs in the country.

4.5 Environmental biotechnology

In Sri Lanka, government authorities emphasize effective and efficient waste management. Legislation exists to regulate waste management by industries. However, most of the municipal wastes are dumped into low value lands without proper management. Separation of non-degradable and biodegradable waste is not effective. There are a few commercial establishments and industries who act as consultants in the design of waste water treatment.

Few private sector companies are engaged in biofertilizer and biopesticides development. As an efficient method of managing the solid waste composting is being used.

Environmental biotechnology - water and waste water treatment industries, solid waste management industries (re-cycling waste) are slowly developing with encouragement from the government. Biogas fermenters have been increasingly used to capture and use methane released from bio-waste. A number of hospitals are using biogas generators to generate gas for cooking in the hospital kitchens.

4.6 Food Biotechnology

Although Food technology based industry is now gaining ground better methods for assessment of quality of food, molecular methods are required. Since the market is flooded with various food imports testing for genetically modified (GM) food is available as required by current law.

7 Areas of expertise available for cooperation

Tissue culture, Molecular Markers for disease indexing, DNA finger printing for plants and animals, Molecular diagnostic testing for communicable diseases

8 Recent biotechnology products/processes developed/ready for transfer

Sri Lankan strain of Bt developed by Industrial Technology Institute

9 Issues and challenges

- Laboratories should be upgraded to meet the future challenges in biotechnology
- Bio industry and bio-entrepreneurship to be developed
- Need a National Research Policy
- Procurement systems of the institute should be up graded
- Poor access to information from international networks and data bases
- Need for high capital investment
- No central facility in the country has relevant international data or can provide access to the necessary software to potential researchers.
- Poor University-industry linkage
- Poor motivation of the private sector