Current Status of Agricultural Biotechnology in Pakistan

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- Since the establishment of two biotechnology Institutes namely CEMB and NIBGE in 1987, we have seen a consistent increase in Biotech Institutes and Biotech departments in virtually all universities. It has been due to liberal support by the Government during the last two decades.
- There are **53 institutes/departments currently working around the country** in this field. This gives an idea of the extent of infrastructure and expertise developed in this area.
- There are four major funding agencies in the country that has been supporting the research in agricultural biotechnology through different projects and awards.

On Going Research Projects and Funding Details

Funding Agency	No. of Projects	Total Funding
Agricultural Linkages Program (ALP) of Pakistan Agricultural Research Council	15	58.4 million rupees
National Research Programme for Universities (NRPU)of HEC	46	153 Million Rupees
Natural Sciences Linkages Program (NSLP) of PSF	14	33 Million Rupees
Punjab Agricultural Research Board (PARB)	14	302 million rupees

Key Institutes

- National Institute for Biotechnology and Genetic Engineering (NIBGE)
- Institute of Biochemistry and Genetic Engineering (IBGE)
- Dr. A.Q. Khan Institute of Biotechnology and Genetic Engineering (KIBGE)
- Department of Bioinformatics and Biotechnology (GCUF)
- Pakistan Council of Scientific and Industrial Research (PSCIR)
- Plant Biotechnology Unit and Sino Pak Hybrid Rice Research Center (HEJ)
- Center of Excellence in Molecular Biology (CEMB)
- School of Biological Sciences (SBS)
- The Institute of Agricultural Sciences (IAGS)PU
- National Institute for Genomics and Advanced Biotechnology (NIGAB)
- Center of Agricultural Biochemistry and Biotechnology (CABB)
- Institute of Industrial Biotechnology (IIB-GCUL)
- COMSATS University Islamabad, Abbottabad Campus (CUI)
- Agricultural Biotechnology Research Institute (ABRI), AARI
- KAM - School of Life Sciences (FCCU)

Research is going on in the country on

Crop	Trait
Cotton	Insect resistance Cotton leaf curl Virus resistance, Biotic and abiotic stress tolerance Drought stress tolerance, Reduction of toxic Gossypol production Bio-pesticides to control Cotton Bollworms, Glyphosate resistance
Sugarcane	Enhanced anti-pathogenic activity, Resistance against sugarcane white leaf disease, Abiotic stress tolerance
Wheat	Improved water use efficiency, Yield enhancement Double haploid system development, Drought tolerance Enhanced fertilizer use efficiency, Low water requirement Sulfate transporters gene expression, Glutathion Production under drought, Weed suppression, Stress tolerance, Enhanced Salinity tolerance, Glyphosate Resistance, Vitamin B6 enriched Variety, Disease resistance, Insect resistance Phosphorus use efficiency, Low phytate for increased bioavailability of Iron and Zinc
Chickpea	Blight and drought stress resistance Wilt resistance Improved growth and yield

Rice	Salinity Tolerance Identification of Allele specific polymorphism in fragrance gene Bacterial blight resistance Abiotic stress tolerance Salt tolerance Improved sucrose content
Maize	Drought tolerance Improved yield
Sunflower	Drought tolerance
Mustard (Brassica Oil Seed)	Genetic improvement
Tomato	Enhanced salt tolerance Biofortified with precursor of Vitamin A Hybrid production High yield Disease resistance
Potato	Integration of anti sweetening gene
Lentil	Genetic transformation protocol

Wild Mushrooms	Nutritional and chemical profiling
Cereals	Enhanced water use
Legumes	Effect of pesticide on Nitrogen fixing Bacteria
Rapeseed	Enhanced disease resistance

*Research is also been going on the production of bio-fertilizers, biogas, biodiesel, biofuel.

PRIVATE SECTOR RESEARCH AND DEVELOPMENT

- FB Genetics, Four Brothers Group: Plant Biotechnology Research and Development
- Auriga Group of Companies
- Bayer Pakistan - Crop Science Division
- Corteva Agri sciences

REGULATORY PROCESS FOR COMMERCIALIZATION

- National Biosafety Centre is on now under the regular strength of Pak-EPA. Recruitment of permanent staff of NBC is in progress.
- Several National Biosafety Committee (NBC) and Technical Advisory Committee (TAC) meetings have been held by National biosafety Centre (NBC) since February, 2017.
- Bt- Cotton has been the only crop which has been commercialized.
- There is an urgent need for re-visiting the Biosafety Guidelines in the country.
- If over regulation can be avoided, GM technology have the potential to increase productivity as well as the nutritional value of crops.

- 224 cases of GMOs are under review at NBC

1.	Laboratory Genetic Manipulation Work	48
2.	Field Trials	121
3.	Import and Transport cases	21
4.	Commercialization cases	27
5.	Renewal of Biosafety licenses	07
	Total	**224**