Training Course on Climate-Resistant Crop Variety Selection and Breeding

Professional Development Training Course Outline

Category	Agriculture	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

As climate change accelerates and extreme weather events become more frequent, the need for climate-resilient agriculture is more urgent than ever. Training Course on Climate-Resistant Crop Variety Selection and Breeding equips agricultural professionals, researchers, and policy-makers with cutting-edge knowledge and hands-on techniques to combat the adverse effects of climate variability. Focused on the latest advancements in crop genetics, biotechnology, and sustainable breeding strategies, the course emphasizes how to enhance productivity, ensure food security, and preserve agrobiodiversity in the face of environmental stressors such as drought, salinity, heat, and pest pressures.

Using data-driven approaches and real-world case studies, this SEO-optimized training empowers learners to make informed decisions regarding variety development, selection, and deployment. Participants will gain insights into participatory breeding, precision phenotyping, gene editing tools (such as CRISPR), and climate modeling for agro-ecological zoning. By fostering climate-smart agriculture, this program supports long-term adaptation strategies aligned with global development goals like SDG 2 (Zero Hunger) and SDG 13 (Climate Action).

Programme Curriculum

Training Course on Climate-Resistant Crop Variety Selection and Breeding

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Learning Objectives

1. Understand climate change impacts on crop genetics and agricultural systems.
2. Identify key traits for climate-resilient crop varieties (e.g., drought, heat, salinity tolerance).
3. Apply genomic-assisted breeding tools including marker-assisted selection (MAS).
4. Integrate precision agriculture and smart farming in variety evaluation.
5. Analyze genetic diversity and its role in crop adaptation.
6. Employ participatory varietal selection (PVS) for community-driven breeding.
7. Utilize CRISPR/Cas9 and gene editing in breeding for climate-smart traits.
8. Apply crop simulation models for evaluating varietal performance.
9. Develop breeding strategies for pest- and disease-resistant varieties.
10. Promote biodiversity conservation through local and traditional varieties.
11. Assess agronomic performance using multi-environment trials.
12. Design seed dissemination strategies for climate-resilient varieties.
13. Develop policy recommendations for climate-resilient breeding systems.

Target Audiences

1. Agricultural Researchers
2. Plant Breeders
3. Extension Officers
4. Agro-policy Makers
5. Seed Companies and Agribusiness Professionals
6. University Faculty and Students (Agriculture/Biotechnology)
7. Development Agencies and NGOs
8. Climate Change and Food Security Experts

Course Duration: 5 days

Course Modules

Module 1: Introduction to Climate-Resilient Agriculture

- Overview of climate risks in agriculture
- Vulnerabilities of major crops to climate change
- Climate-smart agriculture principles
- Role of crop breeding in adaptation
- Global trends in crop loss and food insecurity
- **Case Study:** FAO-supported climate-resilient rice in Bangladesh

Module 2: Identifying Traits for Resilience

- Key adaptive traits (drought, salinity, heat, flood)
- Trait-environment interactions
- Phenotypic screening protocols
- High-throughput phenotyping tools
- Trait prioritization for target environments
- **Case Study:** Drought-tolerant maize under the Water Efficient Maize for Africa (WEMA) project

Module 3: Genetic Resources and Diversity

- Crop genetic resources and gene banks
- Importance of landraces and wild relatives
- Pre-breeding for stress resilience
- DNA markers and genotyping tools
- Germplasm evaluation under stress conditions
- **Case Study:** ICRISAT's use of sorghum landraces in India

Module 4: Genomic and Molecular Breeding Tools

- Marker-assisted selection (MAS)
- Genomic selection (GS) principles
- Transcriptomics and metabolomics applications
- Bioinformatics in crop breeding
- Emerging technologies (e.g., SNP arrays, NGS)
- **Case Study:** Genomic-assisted wheat breeding in CIMMYT programs

Module 5: Participatory Breeding and Stakeholder Engagement

- Farmer-centered breeding approaches
- Gender-inclusive breeding design
- On-farm varietal trials and evaluation
- Bridging scientific and indigenous knowledge
- Policy frameworks supporting farmer participation
- **Case Study:** Participatory varietal selection in East African beans

Module 6: Gene Editing and Advanced Biotech Approaches

- CRISPR/Cas9 in crop improvement
- Regulatory frameworks and biosafety
- Ethical and social considerations
- Tissue culture and transformation techniques
- Product development and commercialization pipelines
- **Case Study:** Genome-edited rice for submergence tolerance in Southeast Asia

Module 7: Climate Modeling and Variety Targeting

- Crop modeling platforms (e.g., DSSAT, APSIM)
- Climate data integration in breeding
- Agroecological zoning and adaptation mapping
- Risk and vulnerability assessment
- Forecasting varietal performance under climate scenarios
- **Case Study:** Climate-resilient wheat zone modeling in Ethiopia

Module 8: Scaling and Policy Integration

- Seed system development for resilient varieties
- Intellectual property and plant variety protection (PVP)
- Market linkages and agribusiness models
- Extension strategies for adoption
- National and global policy alignment (e.g., SDGs, CAADP)
- **Case Study:** Policy-driven millet revival in Kenya and Senegal

Training Methodology

- Interactive lectures with expert facilitators

- Hands-on lab and field simulations
- Case study analysis and group discussions
- Role-playing for participatory breeding activities
- Use of digital tools: modeling software, genetic databases
- Action plan development and feedback sessions

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
21 Sep 2026	25 Sep 2026	Online	$1,000
21 Sep 2026	25 Sep 2026	Physical	$1,500
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0

Start Date	End Date	Location	Price
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21 Sep 2026	25 Sep 2026	Physical	$0

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