



INITIATIVE ON
Fragility to Resilience in
Central and West Asia



Minimum Dataset Required to Collect from Agronomic Field Experimentation



Implementing strategic field experimentation not only provide opportunities to solve the research questions but also provide a useful way to address a number of important issues in crop, soil, water, environmental and resource economics using different analytical tools. As implementing field experimentation is resource intensive (cost, time and energy), it is important to plan for collecting/generating standard data set (both quality and minimum number). Below is the list of minimum datasets need to collect from field experimentation for scientific analysis as well as simulation modelling.

| Parameters | Details |
|----------------------|---|
| Weather data | <ul style="list-style-type: none"> • Latitude and longitude of the weather station • Daily solar radiation (MJ/m²/day) • Daily minimum and maximum temperature (°C) • Daily rainfall (mm); Relative humidity (%) • Daily wind speed at 2 m height (m/s) • Reference evapotranspiration (ET₀; mm/day) |
| Field history | <ul style="list-style-type: none"> • Production environment: Rainfed, Irrigated, Highland etc. • Cropping system • Name of the previous crop • Field orientation and slope (%) • Amount of crop residue/mulch retained (kg/ha) |
| Soil data with depth | <ul style="list-style-type: none"> • Soil texture (Sand, Silt, Clay percentage) • Soil salinity (dS/m) and soil pH • Soil water content at saturation • Field capacity (%) • Permanent wilting point (%) • Initial soil fertility: Total N, Available P, Exch. K, Organic carbon, and Mineral N content (NH₄ and NO₃) • Soil micro-nutrient [optional] • Soil nutrient content after harvest [optional] |
| Groundwater table | <ul style="list-style-type: none"> • Depth of the groundwater table (m) • Groundwater salinity (EC; dS/m) |
| Experimental detail | <ul style="list-style-type: none"> • Latitude and longitude • Name of the experiment • Experimentation year • Experimental design • Number of replications • Number of treatments • Treatment details • Plot size (m²)– Length x Width) |

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| Parameters | Details |
|--------------------------|---|
| Crop establishment | <ul style="list-style-type: none"> • Soil moisture at seeding and at crharvest with depth • Variety name • Type of seed (certified/breeder seed, etc.) • Planting (sowing)/ transplanting date (dd/mm/yy) • Planting (sowing) method/system (row to row distance) • Planting (sowing) depth (m) • Age of seedling (if transplanted) • Plant density (no. of seed/m2) or seed rate (kg seed/ha) |
| Phenological observation | <ul style="list-style-type: none"> • Date to start of germination (dd/mm/yyy) • Date to 75% seedling emergence (Days after planting; DAP) • Date to 50% spike initiation (dd/mm/yy) • Days to 50% flowering (DAP) • Days to 50% physiological maturity (DAP) • Maximum canopy cover or LAI (dd/mm/yy) • Biomass accumulation (g/m2) • LAI, and NDVI at major growth stages [optional] • Harvesting date (dd/mm/yy) |
| Fertilizer management | <ul style="list-style-type: none"> • Rate of fertilizer application (kg elemental nutrient/ha) • Application time (basal, top dressing) • Fertilizer application date (dd/mm/yy) • Fertilizer type/Name (Urea, DAP, Zinc, etc) • Elemental nutrient content in fertilizer (% N, P, K) • Fertilizer application method (broadcast, band, foliar) • Depth of fertilizer application (cm) |
| Irrigation management | <ul style="list-style-type: none"> • Amount/depth of irrigation applied (mm) • Date of irrigation (dd/mm/yr) • Source of irrigation • Time required to irrigate particular area (minute/unit area) • Irrigation method (flood, furrow, sprinkler, drip, etc.) • Irrigation water quality (EC and pH) |

Minimum Dataset Required to Collect from Agronomic Field Experimentation

| Parameters | Details |
|--|---|
| Insect, pest, and disease infestation | <ul style="list-style-type: none"> • Name of disease/insect pest • Score of infestation (1 to 9 scale) • Name of insecticide or fungicide applied • Date of application • Application rate • Method of pesticide application |
| Harvesting: Yield, biomass and yield attributes | <ul style="list-style-type: none"> • Date of harvesting • Method of harvesting (manual, plot harvester) • Area harvested (L x B m²), • Number of rows harvested (in line seeding) • Grain yield (at specified moisture level) (kg/ha) • Biomass/straw yield (both fresh and oven dry) (kg/ha) • Total aboveground biomass weight (oven dry) (kg/ha) • Grain and straw moisture content (%) • Yield attributes: Number of plants per m² at harvest, • Number of grains per spike or cob • Oven dry 1000 grain weight) (g) • Method used for measuring yield attributes |
| Grain quality | <ul style="list-style-type: none"> • Grain Protein, Iron and Zinc content etc. • Grain and straw N, P, K content (%; optional) • Analytical methods used |
| Economics (on-farm and large size on-station experiment) | <ul style="list-style-type: none"> • Labor used: No. of man days each operation (seeding to harvest) • Equipment used: Hours of operation per unit area; Cost per hour • Input cost: Seed, Fertilizer, Water (if applicable), Chemicals • Output price: Grain, Straw and other if applicable) <p>Note: All cost should be from the experimental year based on the local market in local currency per unit cost</p> |

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