# Experimental site

The field experiment will be conducted in the research field of Matayari, Dhangadi-6, Kailali. The field is located at 28˚ 43' 48'' N latitude and 80˚ 35' 57'' longitude at the altitude of 188 masl. The experimental site has tropical to sub-tropical climate with hot dry summer and cold winter. Selected site is expected to beneficial due to its rich soil depth and cultivation friendly profile. Although, maize crop is said to perform well on a wide range of climatic conditions, its suitability to the study site is further corroborated with the following soil textural and composition attributes – neutral to acidic pH (5-6), loamy clay soil texture and moderate to high organic matter content.

# Field preparation and sowing

For field preparation prior to planting, land will be made free of volunteer plants. Selected land will be deep ploughed twice followed by harrowing. Finally, prior to sowing rotary harrow or seed drill will be used to obtain a fine tilled bed.

# Design and layout

An alpha lattice design (k=4) alloting 2 blocks per replication and 13 treatment genotypes within a block will be replicated twice thus forming a total of 52 plots. Seed will be sowed at the last week of May on each plot manually by placing in measured spots forming following planting geometry:

* 1 m distance between blocks
* 0.5 m distance within blocks
* Row-Row spacing: 0.6m
* Plant-Plant spacing: 0.25
* Net plot area: 2.5 x 4 (10 m2)
* Line sowing method: Continuous

# Field management and intercultural operations

For obtaining desirable yield 180:60:40 kg NPK/ha (as recommended by MoAD) will be applied with 2 split doses of nitrogen, first being top dressed and the second broadcast application to be done after first weeding (35-40 days after sowing). Supplemental weeding will be done if necessary apart from pre-emergence weedicide (Atrazine 1.0-1.5 kg a.i. ha-1) application. Irrigation will be scheduled at the minimum of two times based on soil moisture rating.

# Observation and data recording

Data collection procedures will follow guidelines provided by CIMMYT in their standard maize field trials which includes following crop attributes:

1. Days to Male Flowering: Number of days from seed sowing to date pollen shed by tassel in 50% of plants in plot.
2. Days to Female Flowering: Number of days from seed sowing to date of appearance of silk in 50% of plants in plot.
3. Anthesis Silking interval (ASI): It is the difference of days from female flowering to the male flowering.
4. Plant height: It is the height of plant from base of the plant to the base of lower tassel branch. It should be collected form minimum 5 representative plants from plot.
5. Ear height: Height from base of the plant to the base of top most cob.
6. Field weight: Total weight of the dehusked cob during harvesting at field.
7. Number of plant and cob: Count the number of plants in whole plot during harvesting and total number of cobs from whole plot. It will help to find the prolifically and barren plants in plot.
8. Cob length: It is the length of cob from base to the tip of the cob.
9. Cob circumference: It is the girth of the average sampled 5 cobs from middle part of cob. Cob diameter will be measured by using vernier caliper from middle portion of cob.
10. Number of rows per cob: It is the number of rows presented in average sampled cob.
11. Number of grain per row: It is average number of grains presented in rows from sampled cobs.
12. Lodging: Number of plants fallen in ground should be counted. Plants fall from stem below cob are considered as stem lodging and if plants fall from ground (root) are counted as rood lodging.
13. Moisture: Several sampled cobs were selected and grain from middle portion of cob was taken at the time of harvesting when field weight is taken. Moisture was converted into 12.5% for final data analysis.
14. Plant aspect: Complete visual score given by breeder to the overall plant performance of a variety. It incorporates major attributes such as:

* Ear position
* Plant architecture
* Tassel characteristics
* Disease prevalence

It is recorded prior to the onset of crop senescence. It is scored in the scale of 1 to 5; 1 representing excellent plant type, good yield potential, crop uniformity, lower ear position, vigorous, good stalk strength and 5 representing poor plant type, low yield, lodging, diseased, discoloured leaves and poor tassel exertion.

1. Ear aspect: Ear aspect id the composite visual score given by breeders to the overall yield performance of the variety. It include key traits such as:

* Yield
* Ear rot
* Texture
* Ear uniformity
* Grain filling
* Cob covering
* Ear symmetry

It is recorded just after cob harvesting and scored as 1 to 5: 1 representing excellent ear type, flint texture, disease free, large straight uniform rows while 5 representing poor ear type, small, rotten, non-uniform rows.

1. Texture: Grain texture is recorded at harvest from all entry of trials. Maize grains can be differentiated into 4 texture group on the basis of their appearance:

* 1: flint,
* 2: semi flint,
* 3: semi dent
* 4: dent

# Statistical analysis and reporting

Field observation data will be recorded in a field book for standing crop, soil parameters and post-harvest crop attributes. The field book will be transcribed to a database sheet, possibly using MSExcel software. Exploratory as well as inferential analysis will be carried out using open source applications R (Ihaka and Gentleman, 1996) and META-R (Alvarado et al., 2020).

Data modeling strategies will include linear regression using categorical and numeric independent variables as a function of yield response. Post-hoc comparisons will be done using Duncan's Multiple Range Test (DMRT) using 5% threshold for declaration of significance.