Annex - B

A MODEL STRUCTURE FOR DEVELOPING MONOGRAPHS ON GAP FOR INDIVIDUAL SPECIES OF MEDICINAL PLANTS

1. **Name of medicinal plant**

   a) Scientific name : Long pepper
   b) Pharmacopoeial name of the medicinal plant: Piper longum L.
   c) Local name (specify language): Pippali

2. **Part to be employed as the medicinal plant material**
   (Description of the part of the plant used for medicinal purposes)

   Spike.

3. **Characteristics of the medicinal plant**
   (Describe the agro-morphological characters including the key character following standard descriptors and descriptor state.)

- Long pepper is the fruit of Piper longum which is a slender, much branched, ascending herb and needs support for its proper growth.
- The leaves are 5-9 cm long and 5 cm wide; lower leaves are broadly ovate, deeply cordate with big lobes at the base, sub acute, entire and glabrous; upper leaves are dark green and cordate with short petiole or nearly sessile.
- The young shoots are drooping type.

Major production areas of the medicinal plant material should be mentioned: Amravati,

Akola, Buldhana districts of Vidarbha region of Maharashtra State, India.

5. **Characteristics of strain(s) for cultivation**

(1) Taxonomical identity : Long pepper (Piper longum), or pippali, is a flowering vine in the family Piperaceae, cultivated for its fruit, which is usually dried and used as a Medicine and spice.

(2) Ecological characteristics: Long pepper naturally grows in Himalayan foothills form Uttarakhand to East Indian States loves subtropical climate.

(3) Major chemical compound responsible for drug value along with chemical profile: Piperine, Piplartine, Piperolactum A and B, Piperodioine alkaloids, and Tricontec, 22 -23 Hydrostimagasterai steroids

(4) Preferred growing conditions: Silt loam to vertisols having normal pH, well drained with abundant organic Corban, Subtropical climate is preferred growing conditions.

a) Climatic conditions: Annual Rainfall – 600 to 1000 mm wells spread in rainy season. Ambient and humid temperature from 10^0 to 40^0 C. long daylight in summer months and short daylight in winter preferred by the crop.
(Rain fall, Temperature and Daylight length)

b) Soil conditions
Soil type: Silt loam to vertisols having normal pH, well drained with abundant Organic Corban, well water holding capacity.

c) Shade requirements, if any. 25% natural shade.

2. Cultivation methods

(1) Propagation methods: By stem cuttings

(2) Cultivation

a) Suitable cultivation conditions: Soil and Climate

b) Propagation: Propagated by stem cutting of pencil size having 3-4 healthy nodes from the local stock.

c) Sowing:

Cuttings of the best Long pepper vine used for planting having three to four nodes. They are planted 3 to 5 such cuttings at one place. They have maintain 30 cms plant to plant distance whereas 75 - 90 cms between row to row. Around 50000 such cuttings covers the one acre area. Planting is directly done in seedbed rather than nursery of planting material. Planting is done in second fortnight ol December to first fortnight of February month. ln these months the temperature of nights are cooled and the day temperature is congenial for Sprouting.

d) Planting/nursery: Nil

e) Manures & fertilizers including microbial fertilizers:

Farmers add 6 - 8 ton FYM along with 8 qtl of Neem cake per acre before planting. They used NPK 40.20:20 per acre in three split dosages one after sprouting and then remaining two dosages in the month of July and August. Many farmers found skipping the first major dose, because of economic reason. Few farmers also used non*descriptive agro-tonics for the plants,

f) Crop management

Farmers are planted various crops such as ,Pappaya (Carica papaya), Banana (Musa spp.) which gives support along with 20-25 percent shade intensity. Whereas, Birds Eye Chilies (Capsicum annuum), Turmeric (Curcuma Longa) and Sawari (sesbania sesban) used as wind break and managing the temperature in the orchard. Farmers are also grown Coriander as a vegetable crop just after the complete planting of these plants, which harvested in two months.

g) Diseases and pests management

Farmers avoided the same piece of land for frequent cultivation of Long pepper. They also avoided ill drained and acidic soils to grow this crop" During planting they used Copper Oxychloride for sapling treatment against Leaf Blight disease. Whereas, they are also used root initiating hormone such as IAA at the same time. Soil application of Trichoderma viride to manage the soil borne diseases- Whereas, few farmers planted marigold for nematode management which one of the major causal organism for wilt in long pepper, which is dreaded disease in Long pepper. Farmers are also used Bavistin (Carbendazin 50o/o WP) and Nuvan to reduce wilt disease and the insect’s incidences

h) Harvesting stage, time & procedures:

Spikes of the Long pepper is main produce received from the creeper, while roots are secondary produce received from the plant after uprooting it in the last. Roots are harvested seldomly because many time they got rootting within a soil. Harvesting of spikes is done three to five times manually during the months of October to December. The spikes are ready for harvest 2 months after their formation on the plants. Spikes are hand-picked when they are blackish green the harvested spikes are dried in the sun for 4 to 5

days until they are perfectly dry. The green to dry spikes ratio is around 10:1.5 Average per acre yield of dried Long pepper spikes is 445 kg., 641 kg. And 264 kg. Respectively in 1st, 2nd and 3d year. Whereas, the average production cost comes to Rs.462 /kg .The local agricultural university approves Rs. 95287/ acre as cost of production, whereas Rs. 20673 / acre as a profit. The dried spikes are then stored in gunny bags. Beside the spike, the lower part of stems and roots which have a medicinal value also be harvested at the end of orchard. For the stems, they cut close to ground, while the roots are dug up, cleaned and heaped in shade for a day, after which they are cut into 2.5 to 5 cm long pices" The average yield of dried roots and stem is 100 kg per acre.

i) Post harvest handling & processing

It is high value low volume crop. Farmer sale it as per their needs and the market rate" The shelf life of Long papper dried spike is one to two years at normal condition, whereas, it is more in cold storage. The shelf life depends on input use, drying and storing condition. Weevil is single-most storage pest affects the short life of dried spikes drastically"

j) Expected yield with desired quality

The green to dry spikes ratio is around 10:1.5 Average per acre yield of dried Long pepper spikes is 445 kg., 641 kg. And 264 kg. Respectively in 1st, 2nd and 3d year. Whereas, the average production cost comes to Rs.462 /kg

7. Quality evaluation of the medicinal plant material

(1) *National quality standard of the medicinal plant material*
(Defined as the quality and quantity standard)
(2) *Name of major chemical/ chemicals constituents and its percentage*
(3) *Chemical structure of selected major constituents*
(4) Chemical profile, if known

8. Comparative summary table of the characteristics of different cultivated strains, if any

Morphological characteristics of each strain chemo type, morph type etc. being cultivated, including height, growth, morphology/shape of root, stem, leaf, flower, fruit and 'seed, resistance/tolerance to diseases/pests, and composition and quantitative indications of major chemical constituents of the medicinal plant.

9. Cultivation calendar

A tabulated schedule of cultivation practices whichever to be followed indicating the type of care and management work/ actions and their timing during the entire growing period.

10. Background data and other information

(1) *Source of seed, propagation material, etc*
Local (stem cutting of previous year crop)

To assess the appropriateness/suitability of cultivation and characteristics of seed/ propagation material. Cultivation should be carried out according to the recommended cultivation practices.

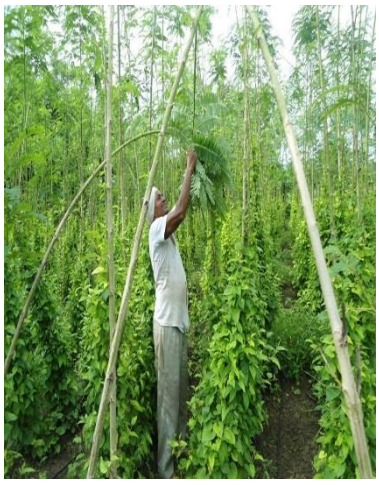
(2) *Photographs (3-5)*

Plant and plant part material; also showing working methods/ equipment as appropriate.

Long Pepper Vine

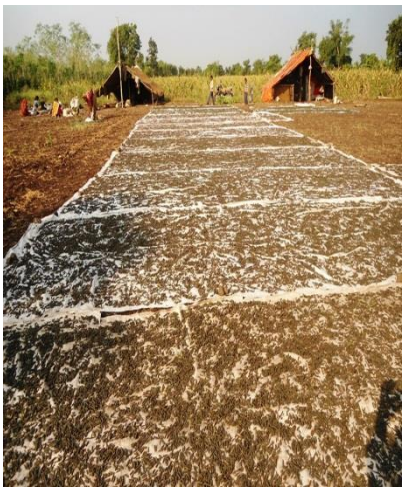
Sowing Method

Plant Transplanting



Working Method

Harvesting (Picking)



Sun drying

Annex- C

SAMPLE RECORD FOR CULTIVATED MEDICINAL PLANTS

1. **Identification of cultivated medicinal plant**

Scientific name: - Long pepper

Pharmacopoeial name:-

Local name (language for):- Pippali

Plant part for medicinal use & harvested: - Spike

Identification of cultivation site: -

Field location: - Pandhari & Khodgaon

State/District/Village:- Maharashtra / Amravati / Anjangoan Surji

2. <u>Identification of cultivator</u>

Name of cultivator :- Mr Gajendra S Yeul

Contact address:- At Khodgaon , Anjangaon Surji, Amravati 444705, Maharashtra State, India

Period of cultivation:- January to February

3. Seeds and propagation materials

Source of the planted material:- stem cutting of previous year crop

Physical description of the planted material:- ----------

Commercially available (circle): No

If yes, name of cultivar---Nil Name of supplier: - Locally available

4. Cultivation

4.1 Method of propagation materials establishment (circle): direct seed sowing/transplants

Date of transplanting: - January-February Percentage emergence: - 70%

Date of replanting: - Nil Percentage stand establishment:- 60%

4.2 Spacing

I. Row x Row (cm):- 105 cm

II. Plant x Plant (cm):- 38 cm Covered area (m^2):- 2000 m^2

Number of plants per unit area: - 21600 / ha

Crop rotation: - Yes

Soil and irrigation water analysis as per the standards methods: Yes

4.3 Fertilizers and chemicals (if used)

Fertilizer applied before planting (circle): organic (composted animal manure)/chemical

Name:- Manure / Chemical Method:- Manual

Time/date (d/m/y) 20/06/2022 Rate:- Rs 2000/-

Fertilizer applied after planting (top dressing): organic (composted animal manure)/chemical

Name:- DAP + 10:26:26 Method: - Manual

Time/date (d/m/y):- June to October Rate: - Rs 3600/-

4.4 Herbicides applied before planting, if any

Name: - Nil Method ----------

Time/date (d/m/y) - - - - - - - - - - - - - - - - - - - Rate ----------

4.5 Herbicides applied after planting, if any

Name:- Nil Method ----------

Time/date (d/m/y) ---------- Rate ----------

4.6 Special operations done, if any

Name:- Binding vine by natural thread (Lahe) Method: - Manually

Time/date (d/m/y):- June to October Rate: - Rs 400/- per labor & 40/- per bunch of lahe

4.7 Plant protection chemicals applied, if any

Name: - Chloropyriphos + Carbandazim Method:- By Sprey

Time/date (d/m/y):- June to September Rate: - Rs 1200/-

5. Harvest/Collection

Date of harvest:- October to December Time of day: - Morning to Evening

Conditions: - When spikes are shiny black Method:- Manually

Yield: - 100 Kg

6. Drying practices

Drying method: - Sun drying

(Sun drying/Shade/Mechanical)

Duration of drying (days): - 4-5 Days

Moisture content (after drying) (%):- 8 to 13 %

7. Unusual circumstances that may influence quality

(Extreme weather conditions, exposure to hazardous substances, pest outbreaks, etc):

Rain during sun drying

Annex D

INFORMATION ON CONTAINER LABEL

The Label of the container of medicinal produce should bear following information

1. Name of the produce		2. Grade, if any	
3. Quantity		4. Date of Cultivation	
5. Lot No.		6. Lot size	
7.Cultivated at		8.Storage Conditions	
Signature of the Store Manager		Date:	