



Himachal Pradesh Agriculture Development Society
GOVERNMENT OF HIMACHAL PRADESH

KITCHEN GARDENING MANUAL



HIMACHAL PRADESH
CROP DIVERSIFICATION PROMOTION PROJECT-II, JICA-ODA
Project HQ: Agriculture Complex, Hamirpur-177001





FORWARD

The Himachal Pradesh Crop Diversification Promotion Project-II, JICA-ODA is a transformative initiative aimed at enhancing agricultural sustainability and ensuring food security. The project focuses on promoting crop diversification, sustainable farming practices, and efficient resource utilization to improve the livelihood of farmers across the Himachal Pradesh. The project emphasizes the importance of kitchen gardening as an integral part of achieving self-reliance in vegetable production, thereby reducing dependency on external sources and encouraging a healthier lifestyle. It is my privilege to introduce the Kitchen Gardening Manual, a comprehensive guide developed under the aegis of HPCDP (Phase II), JICA-ODA. This manual is not merely a collection of techniques but a roadmap towards a healthier, sustainable, and self-sufficient way of life. The adoption of Kitchen gardening has become a beacon of hope for over 25,500 families of the Project areas in Himachal Pradesh. This practice would bring about 400 hectares under vegetable cultivation, expecting at least 60% of the farming families adopting Kitchen gardening in 250 square meters area and benefitting nearly 60,000 individuals. By transforming the vacant household



space into productive garden, families will find an innovative way to access fresh and chemical-free vegetables throughout the year by contributing towards environmental conservation also. By growing three crops in a year, this area would be expanded to 1,200 hectares, showcasing the scalability and sustainability of this model. With an average yield of 20 metric tons per hectare, kitchen gardens have the potential to produce 24,000 metric tons of vegetables from 1,200 hectares in three seasons. On an average market price of Rs.10/kg, this translates to a remarkable revenue/savings of Rs.24 crore annually for participating families. In addition, it will provide families with fresh, nutritious, healthy and pesticide-free vegetables, thereby reducing health risks associated with chemically grown vegetables. As a project director, I envision every family in Himachal Pradesh embracing kitchen gardening as a way of life. This manual will serve as a reliable companion for anyone aspiring to embark on this journey, from beginners to experienced gardeners. Let us work together to ensure that kitchen gardening continues to flourish, paving the way for healthier communities and a greener planet.

Dr. Sunil Chauhan
Project Director



ACKNOWLEDGEMENTS

Vegetables are considered the most essential part of human diet as they are consumed either raw or cooked and provide some of the most valuable and essential nutritional components, vitamins, minerals, fibers, anti-oxidants and other micro nutrients. A Kitchen Garden offers an excellent opportunity to grow fresh, pesticide-free vegetables. It is a sustainable approach to fulfilling household nutritional needs, promoting food security, and encouraging a healthier lifestyle.

This manual has been meticulously crafted to provide valuable guidance to farmers and enthusiasts in adopting sustainable and productive kitchen gardening practices throughout the year.

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DD Sharma
Deputy Project Director





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Chapter 1: Introduction

According to ICMR (Indian Council of Medical Research), each person should consume at least 375 grams of vegetables (except potatoes) per day. However, the actual consumption of per capita vegetables in India is much lower than this recommended intake, causing nutritional deficiencies and health problems.

Vegetables are essential part of a balanced diet as they are rich in vitamins, minerals, fiber and antioxidants, which help prevent chronic diseases such as cancer, heart disease, obesity and diabetes. Fresh, regular intake of pesticide-free vegetables can increase immunity, improve digestion and maintain overall health. In today's scenario, commercially available vegetables are often grown using chemical fertilizers, synthetic pesticides, and artificial cooking agents, which cause serious health risk due to the accumulation of toxic residues.

A kitchen garden provides an effective solution to these problems, which enables families to grow their fresh, pesticides-free and nutrient-rich vegetables at home, which fulfills the daily requirement of the person's vegetables.

1.1 Concept of Kitchen Gardening :

Kitchen gardening involves growing vegetables, fruits, herbs, and medicinal plants in household's spaces such as backyards, balconies, terraces, or open plots. It ensures the availability of fresh, pesticide-free, and nutritious produce while promoting sustainable and eco-friendly practices.



375 grams of vegetable (fresh)



375 grams of vegetable (fresh)



375 grams of vegetable (cooked)



1.2 Need for Kitchen Gardening :

- a) **Access to Fresh vegetables and Fruits:** Ensures a regular supply of fresh, chemical free vegetables, fruits and herbs.
- b) **Health and Safety:** Reduces risks associated with consuming pesticide-laden market produce.
- c) **Economic Savings:** Lowers expenses on purchasing vegetables & fruits.
- d) **Environmental Conservation:** Promotes eco-friendly practices like composting kitchen waste and reducing carbon emissions.
- e) **Efficient Space Utilization:** Makes productive use of small spaces such as backyard, rooftops, and balconies.
- f) **Food security:** Provides a reliable food source during emergencies, market disruption, or price hikes.
- g) **Therapeutic Benefits:** Offers relaxation, stress relief, and mental well-being through gardening activities.
- h) **Educational Opportunities:** Help families, especially children, learn about sustainable agriculture and nutrition.
- i) **Biodiversity Conservation:** Encourages the cultivation of local and indigenous vegetable varieties.

1.3 Objectives of Kitchen Gardening :

- a) **Promote Self-Sufficiency:** Reduce dependency on market-purchased vegetables by growing them at home.
- b) **Ensure Nutritional Security:** Provide access to fresh and diverse vegetables to meet household dietary needs.
- c) **Encourage Organic Practices:** Minimize chemical use by adopting organic fertilizers and natural pest control.
- d) **Utilize Space Effectively:** Cultivate crops in small, available areas, ensuring efficient resource use.
- e) **Preserve Local Varieties:** Grow traditional and indigenous vegetable crops for conservation and diversity.
- f) **Support Sustainable Living:** Reduce waste through composting and adopt eco-friendly gardening techniques.
- g) **Engage Families in Gardening:** Foster family bonding and a sense of responsibility among household members.

1.4 Impacts of Pesticides on Health :

Pesticide residues on vegetables are a significant health concern in India, including Himachal Pradesh. The excessive use of chemical pesticides in conventional farming leads to the accumulation of harmful residues on vegetables and fruits. Regular consumption of these contaminated foods has been linked to several chronic and life-threatening diseases.

- a) **Cancer :**
 - Pesticides such as organophosphates, carbamates, and chlorinated pesticides are classified as carcinogens.
 - Long term exposure can cause cancers like leukemia, non-Hodgkin lymphoma, breast, and prostate cancer.
 - Studies have shown that farmers and consumers in regions with high pesticide use have a higher incidence of cancer, as in State of Punjab which is also known as the “Cancer Belt”.
- b) **Heart Diseases :**
 - Pesticides disrupt normal hormonal functions, leading to increased blood pressure, cholesterol levels, and inflammation.
 - Chemicals like atrazine and glyphosate have been linked to heart rhythm disorders and heart attacks.
- c) **Neurological Disorders :**
 - Prolonged exposure to pesticides can lead to cognitive disorders, Parkinson’s disease among farmers.
- d) **Endocrine Disruption :**
 - Pesticides can interfere with hormone function, leading to thyroid issues, obesity, diabetes, and infertility.
- e) **Kidney and Liver Damage :**
 - The liver and kidneys, responsible for detoxification, can be severely damaged by constant exposure to toxic chemicals in food.





क्या है कीटनाशक ? जहर



कीड़े मरेंगे ! और आप ?

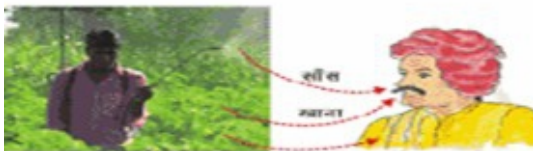
The Pesticides: Killing Pests, Harming Humans?

जहर का असर



The Effects of Poison

जहर ! खेत से आप तक



Is this the Future you want?

आने वाला कल !



विद्युतगमन में 2-4-D का असर

क्या आप अपने बच्चों को
इसी तरह देखना चाहेंगे?

The Journey of Poison: From Farm to Table

गन्ने के खेत हुए खतरनाक



सोचो इन्सान का क्या होगा ?

The Poisons in our Fields

क्या कीटनाशक से लाभ बढ़ता है ?

पहले साल कीड़ा मरता है, फसल बढ़ती है।



दूसरे साल से कीड़ा बढ़ता है, और खर्चा भी बढ़ता है।

Pesticides: Short Term Gain, Long Term Loss

किसको किससे फायदा ?



कीटनाशक कंपनियाँ



समझदार किसान

Who Profits from Pesticides?

क्या है इसका समाधान ?

कीड़ों को मारने के और भी तरीके हैं।



नीम एक अच्छा समाधान है।



Neem: A solution for sustainable Agriculture



1.5 Statistics from India and Himachal Pradesh:

- ♦ **Cancer Rates:** While specific data linking pesticide exposure to cancer rates in Himachal Pradesh is limited, the state has reported cancer incidences. The National Family Health Survey (NFHS-5) provides health data for the region, though it doesn't directly attribute cases to pesticides exposure. (National Health Mission).
- ♦ **Cardiovascular Diseases:** India has witnessed a rise in CVD death rates, from 155.7 to 209.1 per 100,000 between 1990 and 2016. States like Punjab have higher burdens, potentially due to factors including pesticide exposure.

1.6 Real- Life cases Linking Pesticides to Diseases:

- ♦ **Punjab's Cancer Train:** High pesticide usage in Punjab led to increased cancer rates. Thousands of patients travel to Bikaner (Rajasthan) for treatment, highlighting the severity of pesticide-related health issue.



The Business of Death: Punjab's Cancer Train





Your Field Making You Sick?

◆ Endosulfan Tragedy in Kerela:

The use of endosulfan pesticide in cashew plantations caused widespread cancers, congenital disabilities, and neurological disorders among local populations.

◆ Health impacts on Farmers of Himachal Pradesh:

A study focusing on fruit and vegetable growers in the Kullu and Shimla districts of Himachal Pradesh found that 80% of respondents reported health issues related to pesticide use. Common symptoms included headache, dizziness, skin irritation, and respiratory problems.

1.7 Groups of people who are most vulnerable to the harmful effects of Pesticide Residues:

1. Children

- **Developmental Sensitivity:** Children are more susceptible to pesticide toxicity because their bodies are still developing, and their immune and nervous systems are not fully developed.
- **Health Risks:** Chronic exposure can lead to developmental delays, learning disabilities, behavioral disorders, and long-term cognitive effects.

- **Increased Vulnerability:** Children's smaller body size means that pesticide residues can accumulate to higher concentrations in their systems than in adults.
- **Studies:** Research has shown a correlation between pesticide exposure and increased risk of attention deficit hyperactivity disorder (ADHD) in children.



2. Pregnant women and Children:

- **Risk to Fetal Development:** Pregnant women who consume pesticide-contaminated vegetable risk exposing their unborn children to harmful chemicals, which can interfere with fetal development.
- **Heath risks:** Pesticides can cause birth defects, developmental delays, and low birth weight. Some pesticide act as endocrine disruptors, affecting hormonal balance and increasing the risk of preterm birth or miscarriage.

3. Elderly Individuals

- **Weakened Immune System:** Older adults have a weaker immune system, which makes them more vulnerable to the toxic effects of pesticide residues.
- **Chronic Conditions:** Pesticide can exacerbate pre-existing health conditions such as cardiovascular diseases, diabetes, and arthritis.
- **Long term health risks:** Prolonged exposure increases the risk of neurodegenerative diseases like Parkinson's disease and Alzheimer's.

4. People with Compromised Immune Systems:

- **Chronic Illnesses:** Individuals with weakened immune systems, such as cancer patients or those with autoimmune diseases, are more susceptible to the harmful effect of pesticide residues.
- **Health Complications:** Pesticides can further suppress the immune system, making it harder for the body to fight off infections and diseases.
- **Examples:** People undergoing chemotherapy or treatment for HIV/AIDS are at higher risk of serious health effects from pesticide exposure.

5. Consumers of Non-Organic Vegetables:

- **General Public:** Consumers who regularly purchase and consume conventionally grown vegetables from markets are at risk of ingesting pesticides residues.
- **Heath Risks:** Prolonged consumption of pesticide-laden vegetables has been linked to an increased risk of cancers, hormonal disruption, neurological disorders, and reproductive issues.
- **Studies in India:** Research indicates that pesticide residues in commonly consumed vegetables like tomatoes, spinach, and cauliflower exceed permissible limits, which poses a potential health risk to consumers.

1.8 Benefits of Vegetable kitchen Garden:

Kitchen Gardening offers a sustainable solution to minimize the intake of pesticide- laden vegetables, especially in a country like India where pesticide use is widespread. Here are some key advantages:

a) Health benefits:

- Provides pesticide- free and nutrient- rich produce.
- Reduces risks of chronic diseases like cancer and heart ailments caused by contaminated vegetables.
- Improves overall family health with a variety of fresh vegetables.

b) Economic Benefits:

- Reduces household expenses and increases food security, especially during economic downturns.

c) Environmental Benefits:

- Promotes waste recycling through composting.
- Reduces dependence on commercially transported vegetables, lowering carbon emissions.
- Enhances local biodiversity by supporting pollinators like bees and butterflies.

d) Social and Psychological Benefits:

- Acts as a therapeutic hobby, reducing stress and anxiety.
- Fosters family collaboration and a sense of achievement
- Encourages community bonding through shared gardening knowledge and produce.





1.9 Nutritional Value of Vegetables (per 100g edible portion)

Sr. No.	Name of Vegetable	Energy (Calories)	Water Content (%)	Carbohydrates (%)	Protein (%)	Fat (%)	Vitamin A (I.U)	Vitamin B (mg)		Vitamin C (mg)	Calcium (mg)	Iron (mg)
								Biotin	Riboflavin			
1.	Tomato	20	94	3.6	0.9	2.2	900	0.12	0.00	18	10	0.6
2.	Capsicum	24	92.7	4.3	1.3	0.35	500	0.08	0.07	14.4	8	0.6
3.	Chilli	29	85.7	3.0	2.9	0.6	292	0.19	0.39	11.1	30	4.4
4.	Brinjal	24	92.7	4.0	1.4	0.3	30	0.04	0.11	12	-	0.9
5.	French Bean	26	91.4	4.5	1.7	0.1	221	0.08	0.06	21	50	17
6.	Okra	35	89	6.4	1.9	0.2	610	0.07	0.10	13	66	15
7.	Ginger	-	6.90	66.50	8.60	6.40	175	0.05	0.13	12	0.001	0.0011
8.	Turmeric	-	5.8	63.50	8.6	8.9	175	0.09	0.19	49.8	0.2	0.05
9.	Colocasia	97	73.1	21.1	3.1	0.1	24	0.09	0.03	0	40	17
10.	Cucumber	12	96.2	2.5	0.4	0.1	0	0.02	0	7	10	15
11.	Bottle gourd	12	96.1	2.5	0.2	0.1	0	0.03	0.01	0	20	0.7
12.	Bitter melon	25	92.4	4.2	1.6	0.2	380	0.07	0.09	85	20	18
13.	Pumpkin	25	92.6	4.6	1.4	0.1	1600	0.06	0.04	2	10	0.7
14.	Pea	93	72.1	15.9	7.2	0.1	405	0.25	0.01	9	20	15
15.	Cauliflower	30	90.6	4	2.6	0.4	750	0.04	0.10	56	33	15
16.	Cabbage	27	91.9	4.6	1.8	0.1	150	0.06	0.09	124	39	0.8
17.	Radish	17	94.4	3.4	0.7	0.1	9	0.06	0.07	15	35	0.04
18.	Carrot	46	66.1	10.6	0.9	0.2	1890	0.04	0.02	3	60	2.2
19.	Turnip	29	91.6	6.2	0.5	0.2	20	0.04	0.04	43	30	0.4
20.	Beetroot	46	87.7	10.6	1.7	0.1	0	0.04	0.09	10	18	10
21.	Onion	50	86	11.1	1.2	0.1	0	0.08	0.01	11	47	0.7
22.	Garlic	30	62	29.8	6.3	0.1	0	0.06	0.02	13	30	13
23.	Spinach	46	86.4	6.5	3.4	0.8	9770	0.26	0.56	70	380	16.2
24.	Methi	49	86.1	6	4.4	0.9	6450	0.04	0.31	52	395	16.5
25.	Broad Bean	46	-	7.2	4.5	0.1	350	0.08	0	12	50	14
26.	Broccoli	32	65.4	5.7	3.6	0.35	3150	0.10	0.23	113	103	11
27.	Asparagus	12	93	3.9	2.2	0.2	0	0	0	0	0	0
28.	Potato	77	79.2	17.5	2	0.1	7	0.20	0.08	17	10	0.8
29.	Fenugreek Leaves	49	86.1	6	4.4	0.9	3660	1.10	0.09	52	395	1.9

(Source: CSKHPKV, Palampur)

1.10 Conclusion:

Kitchen Garden offer a multitude of benefits for individuals, families, and communities. They promote healthier lifestyles by providing access to fresh, nutritious produce, reducing reliance on processed foods, and encouraging physical activity. Kitchen Gardens also enhance food security, especially in rural areas,

by supplementing household food supplies and potentially generating income. Furthermore, they contribute to environmental sustainability by promoting organic farming practices, and fostering biodiversity. By embracing kitchen gardening, we can create a more sustainable and healthier future for ourselves and generations to come.



Chapter 2 : HP Agro Climatic Zones

Himachal Pradesh, located in the north-western region of India, is characterized by diverse agro climatic conditions due to its varied topography and elevation. The state encompasses several agro climatic zones ranging from subtropical to temperate and alpine regions,

providing an ideal environment for a wide variety of vegetable crops. These regions support the cultivation of different types of vegetables suited to specific climatic conditions.

Sr. No.	Agro climatic Zones	Districts Covered	Suitable Vegetable grown in H.P
1.	Sub-tropical Sub Mountain and low Hills Areas (upto 914 mtr. & annual rainfall less than 90 cm)	Una, Bilaspur, Hamirpur, lower Kangra, Sirmaur, Solan	Tomato, Brinjal, Okra, Cucumber, Pumpkin, Radish, Spinach, Chilli, French Bean, Amaranthus, Colocasia, Bottle Gourd, Bitter Gourd, Green Peas, Carrot, Cauliflower, Cabbage, Mustard, Turnip, Beetroot
2.	Mid Hills sub humid Areas (upto 915 -1523 mtr. & annual rainfall 90-100cm)	Kangra, Mandi, Solan, Sirmaur, Kullu	Cabbage, Cauliflower, Peas, Beans, Carrots, Garlic, Onion, Ginger, Turmeric, Coriander, Cucumber, Bottle Gourd, Bitter Gourd, Pumpkin
3.	High Hills Wet Temperate Areas (upto 1524-2742 mtr. & annual rainfall- 100-200 cm)	Shimla, Kullu, Chamba, Kinnaur, Mandi	Potato, Cabbage, Cauliflower, Broccoli, Radish, Turnip, Onion, Garlic, Carrot, Coriander
4.	High Hills Dry Temperate Areas (above 2743 mtr. & annual rainfall-25-40cm).	Lahaul Spiti, parts of Kinnaur, Pangi (Chamba)	Green Peas, Potato, Cabbage, Cauliflower, Turnip





Chapter 3 : Vegetables Groups

Vegetables are broadly classified into different groups and families based on their botanical characteristics. This classification helps in understanding their growth habits, nutritional value, and cultivation requirements. Some common vegetable groups include leafy greens, root vegetables, fruiting vegetables, and legumes. Within these groups, vegetables are further categorized

into various families such as Solanaceae (tomatoes, potatoes, peppers), Brassicaceae (cabbage, broccoli, cauliflower), Cucurbitaceae (Cucumbers, Broccoli, cauliflower). This information is crucial for successful kitchen gardening, as it allows gardeners to select suitable varieties, understand their specific needs, and implement appropriate cultivation practices.

Vegetable Group	Family	Crop Name
Leafy Vegetables	Amaranthaceae	Spinach, Amaranthus, Beetroot, Swiss Chard
	Brassicaceae	Cabbage, Cauliflower, Knol-khol, Mustard Greens, Kale
	Asteraceae	Lettuce, Globe Artichoke, Endive
	Lamiaceae	Mint, Basil
	Basellaceae	Malabar Spinach
	Apiaceae	Coriander, Celery, Parsley
	Brassicaceae	Mustard
Root Crops	Brassicaceae	Radish, Turnip
	Apiaceae	Carrot
	Araceae	Elephant Foot Yam (Zimikand)
Tuber Crops	Solanaceae	Potato
Fruit Vegetables	Solanaceae	Tomato, Brinjal (Eggplant), Chilli, Capsicum (Bell Pepper)
	Malvaceae	Okra
Crucifers	Cucurbitaceae	Cucumber, Pumpkin, Bottle Gourd, Bitter Gourd, Ridge Gourd, Sponge Gourd, Watermelon, Muskmelon, Squash
Leguminous Vegetables	Fabaceae	French Beans, Green Peas, Broad Beans, Cluster Beans, Cowpea, Soyabean
Bulbous Vegetables	Alliaceae	Garlic, Onion, Leek, Spring Onion
Spices and Condiments	Zingiberaceae	Ginger, Turmeric
	Umbelliferae	Cumin
Other Vegetables	Poaceae	Sweet Corn
	Polygonaceae	Buckwheat (used as a leafy vegetable in high hills)



Chapter 4 : Classification of Crops

The classification of crops given below is according to the agro-climatic zones, family and seasons of cropping. This table provides a valuable resource for farmers in Himachal Pradesh by outlining the optimal cultivation practices for various vegetable crops across the state's diverse agro-climatic zones. It categorizes vegetables based on their

families and their suitability for specific zones. Furthermore, the table identifies the most appropriate cropping seasons (Kharif, Rabi, Zaid) for each vegetable within each zone, enabling farmers to make informed decisions regarding crop selection and timing of cultivation to maximize yields and optimize resource utilization.

Agro climatic Zone	Family	Kharif season	Rabi Season	Zaid Season
Sub-tropical Sub Mountain and low Hills Areas (upto 914 mtr. & annual rainfall less than 90 cm)	Solanaceae	Tomato, Brinjal (Eggplant), Chilli, Capsicum	Potato	Tomato, Brinjal, Capsicum
	Alliaceae		Onion, Garlic	
	Cucurbitaceae	Cucumber, Bottle Gourd, Bitter Gourd, Ridge Gourd, Pumpkin		Cucumber, Bottle Gourd, Bitter Gourd
	Fabaceae	French Beans, Cluster Beans, Cowpea	Green Peas, Broad Beans	
	Apiaceae		Carrot, Coriander	
	Amaranthaceae	Amaranthus (Chaulai), Bathua	Spinach	Spinach
	Araceae	Colocasia/Taro (Arbi) Zimikand		
	Malvaceae	Okra		Okra
	Brassicaceae		Cauliflower, Cabbage, Broccoli, Mustard, Radish, Spinach	Mustard & Radish
	Chenopodaceae		Beetroot	
Mid Hills sub humid Areas (upto 915 -1523 mtr. & annual rainfall 90-100cm)	Solanaceae	Tomato, Brinjal, Chilli, Capsicum	Potato	Tomato, Brinjal, Capsicum
	Alliaceae		Onion, Garlic	
	Cucurbitaceae	Cucumber, Bottle Gourd, Bitter Gourd, Pumpkin		Cucumber, Bottle Gourd, Pumpkin
	Fabaceae	French Beans, Cluster Beans, Cowpea	Green Peas, Board Beans	
	Brassicaceae		Cabbage, Cauliflower, Broccoli, Radish, Turnip	
	Apiaceae		Carrot, Coriander	
High Hills Wet Temperate Areas (upto 1524-2742 mtr. & annual rainfall- 100-200 cm)	Solanaceae	Potato		
	Brassicaceae	Cabbage, Cauliflower, Broccoli, Radish, Turnip		
	Alliaceae	Onion, Garlic		
	Apiaceae	Carrot, Coriander		
High Hills Dry Temperate Areas (above 2743 mtr. & annual rainfall-25-40cm).	Solanaceae	Potato		
	Fabaceae	Green Peas		
	Brassicaceae	Cabbage, Cauliflower, Turnip		



Chapter 5 : Comprehensive Guide to Vegetable Cultivation in Himachal Pradesh (10sqm plot)

Sr. No.	Family	Crop Name	Spacing (cm)		Seed rate requirement (g/10 sq m)	No. of Plants	Planting Time	Prevalent Varieties in Himachal Pradesh
			R to R	P to P				
1.	Solanaceae	Tomato	90	45	0.25	24	July to Sept-October	Palam Pride, Palam Pink, Solan Lalima, Him Pragati
2.	Cucurbitaceae	Brinjal	60	45	0.65	37	February to May-June	Arka Nidhi, Hisar Shyamal
		Capsicum (Bell Pepper)	60	45	0.30	37	March to June-July	California Wonder, Solan Bharpur
		Potato	45	30	2000	74	August to November	Kufri Jyoti
		Cucumber	125-150	50-75	4	11	February- May- June	Him Palam Kheera-1, Him Palam Kheera-2
		Bitter Gourd	90-150	45	5	18	Feb-March to July	Solan Hara, Solan Safed
		Bottle Gourd	125-150	50-100	5	9	Feb-March to July	Pusa Summer Prolific Round, Pusa Manjari, Punjab Round
		Pumpkin	150	100	2	6	June-July to September	Solan Badami
3.	Amaranthaceae	Spinach (Palak)	30	5-10	31	444	November to Jan-February	Pusa Harit
		Amaranthus (Chaulai)	45	10	0.75	222	February to May	Anapurna, Durga, P.R.A-9401
4.	Araceae	Colocasia (Arbi)	60-90	30-45	150-200g of corms	35-40	June to November	Pusa Keshav, Local
		Zimikand	75-90	60-75	150-200 g of corms	15-18	June to November	Palam Zimikand-1, Local



Sr. No.	Family	Crop Name	Spacing (cm)		Seed rate requirement (g/10 sq m)	No. of Plants	Planting Time	Prevalent Varieties in Himachal Pradesh
			R to R	P to P				
5.	Chenopodiaceae	Beetroot	45	10	7.5	222	October to February	Crimson Globe, Detroit Dark Red
6.	Fabaceae	Pea	30	10	125	333	November to Feb- March	Him Palam Matar -1, Him Palam Matar-2, Arkel, Punjab -89
		French Bean (Bush)	45	45	75	49	Feb- March to June	Contender, Pusa Parvati, Solan Naina
		Methi	20	10	10-12	500	Nov- December to February	Palam Saumya, IC- 74
7.	Apiaceae	Carrot	30	8-10	6.25	333	September to January	Solan Rachna, Pusa Yamdagani
		Coriander	20	10	2	500	February to April	Himachal Green, Pant Haritima
8.	Brassicaceae	Cauliflower	45	45	0.75	49	July to October	Pusa Snowball k-1
		Cabbage	45	45	0.75	49	October to February	Pride of India, Golden Acre
		Broccoli	45	45	0.75	49	November to January- February	Palam Samridhi, Palam Kanchan
		Chinese Cabbage	70	55	0.2-0.25	9-11	October to January	Palampur Green
9.	Alliaceae	Onion	15	5-8	10	833	December to May	Palam Lohit, Him Palam Shweta
		Garlic	20	10	500	500	November to April	Solan Selection, G.H.C-1
10.	Malvaceae	Okra	45-60	15	19	127	March to June	Palam Komal, P-8
11.	Zingiberaceae	Ginger	30-40	20-25	200-250	40-50	Mid May to October	Himgiri



Chapter 6 : Crops Grown on Corners & Ridges

In the diverse agro-climatic zones of Himachal Pradesh, there is ample opportunity to grow a wide variety of crops, especially in the corners and ridges of a plot where space utilization is key. The areas are ideal for planting both fruit trees and smaller, high

maximizing yield while maintaining the soil health. These areas, are often underutilized, can be transformed into productive spaces by planting fruit trees, quick growing crops like coriander, mint, fenugreek that is use in kitchen for daily purpose.

Sr. No.	Family	Crop Name	Planting Time	Prevalent Varieties in Himachal Pradesh
1.	Amaranthaceae	Amaranthus (Chulai)	Feb-March to June-July	Pusa Kiran, Pusa Lal Chulai
2.	Apiaceae	Carrot	September to January	Solan Rachna, Pusa Yamdagani
		Coriander	February to April	Himachal Green, Pant Haritima
		Fennel (Saunf)	Feb-March to July-August	Ajmer
3.	Asparagaceae	Asparagus	February to April	Selection 841, U.C.72
4.	Asteraceae	Lettuce (salad)	October to February	Simpson Black Seeded, Ruby, Alamo-1
		Stevia	March to June	Him Stevia
5.	Chenopodiaceae	Swiss Chard	March to July	Fordhuk
6.	Brassicaceae	Radish	July to September	Pusa Chetki, Japanese White
		Turnip	October to January	White Globe
7.	Fabaceae	Methi (Fenugreek)	November- February	Pusa Early bunching
		Cow Pea (Lobia)	March- July	Pusa Barsati, Gomati
8.	Lamiaceae	Mint (Pudina)	March to September	Himachal Local
		Lemon Grass	February-March, Year round harvesting	Krishna, RRL-16
		Basil (Tulsi)	March-April to August-September	Rama Tulsi, Krishna Tulsi
9.	Liliaceae	Alovera	February-March and Year round harvesting	IC-111271
10.	Solanaceae	Chilli	May to September	Surajmukhi, Him Palam Mirch-1
11.	Alliaceae	Kharif Onion	July to October	AFDR, N-53, Basbant-780



Total annual produce of different vegetables from kitchen garden of 250 m² (one unit) for a family of 4 members

S.No.	Crop	Produce (Kg in 10 mt sq bed)	Av. Rate per Kg	Total Amount
1.	Tomato	30	25	750
2.	Bell pepper	13	40	520
3.	Brinjal	20	30	600
4.	Cucumber	22	30	660
5.	Bitter gourd	15	30	450
6.	Bottle gourd	19	30	570
7.	Okra	14	30	420
8.	French bean	8	40	320
9.	Colocasia	20	50	1000
10.	Cauliflower	12	30	360
11.	Cabbage	15	20	300
12.	Onion	20	30	600
13.	Potato	16	25	400
14.	Garlic	11	80	880
15.	Turnip	13	25	540
16.	Carrot	18	30	300
17.	Radish	15	20	1140
18.	Beet root	19	60	400
19.	Methi	10	40	400
20.	Garden pea	10	40	840
21.	Broccoli	14	60	550
22.	Ginger	11	50	760
23.	Pumpkin	19	40	150
24.	Amaranthus	5	30	196
25.	Spinach	14	14	1000
26.	Crops on ridges and corners (Lum sum)			
Total Produce (kg)		383		14431

Note: The production can vary from location to location, type of agri, inputs used and after care of crops.



Chapter 7 : Natural Farming Concept

Introduction

Natural farming is a sustainable agricultural practice that minimizes external inputs while ensuring high yield, superior quality, a healthy environment, and chemical-free food production. Natural Farming focuses on self-sufficient farming methods that eliminate dependence on market-bought inputs.

The core idea of natural farming is to enable farmers to cultivate crops without relying on chemical fertilizers, pesticides, or market-purchased seeds. By utilizing locally available resources, natural farming ensures zero-budget farming, reducing costs while maintaining soil fertility and productivity.

Four Pillars of Natural Farming

1. Jeevamrit

Jeevamrit is a microbial culture prepared using indigenous cow dung, cow urine, jaggery, pulse flour, and soil from a healthy field. It enhances the microbial population in the soil, making essential nutrients available to plants.

2. Beejamrit

Beejamrit is a natural seed treatment solution prepared using indigenous cow dung, cow urine, lime, and water. It protects seeds from soil-borne and seed-borne diseases, enhancing germination and plant vigor.

3. Mulching

Mulching involves covering the soil with crop residues, organic matter, or living plants to retain moisture, suppress weeds, and enhance soil health.

4. Waaphasa (Soil Aeration and Moisture)

Waaphasa ensures proper soil aeration and moisture retention by reducing excessive irrigation and encouraging soil microbial activity.



Four Principles of Natural Farming

1. Intercropping

Growing nitrogen-fixing crops alongside the main crop enhances soil fertility and reduces input costs.

2. Bunds and Trenches

Constructing bunds and trenches helps conserve rainwater, improving soil moisture levels and reducing water runoff.

3. Local Earthworm Activities

Encouraging local earthworm activity improves soil structure, aeration, and fertility.

4. Indigenous Cow-Based Farming

Using indigenous cow dung and urine for natural fertilizers enhances soil microbial activity and plant health.

Preparation Procedures:

Preparation methods for Jeevamrit, Beejamrit, Ghanamrit, and organic pest management formulations like Neemastra, Agniastra, Brahmastra, and Dashparni Ark.





Inputs	Ingredients	Procedure	Application	Benefits
1. Jeevamrit	<ul style="list-style-type: none"> • 200 lit. water • 10kg cow dung • 5-10lit. cow urine • 1-1.5kg jaggery • 1-1.5kg pulse flour • One feast of soil from many bund of a basin of an old tree 	<ol style="list-style-type: none"> 1. Mix cow dung and cow urine in 200 litres of water in a drum. 2. Add jaggery and gram flour, stirring well. 3. Add a handful of soil to introduce microbes. 4. Stir twice a day for 4-5 days. 5. After fermentation, it is ready for use. 	<ul style="list-style-type: none"> • Soil application: 50-100 litres per ha through irrigation. • Foliar spray: Dilute 10 litres in 100 litres of water and spray every 10-15 days 	Stimulate microbial activity to make nutrients bioavailable and protection against pathogens, also provide some traces of nutrients like nitrogen to the plants.
2. Beejamrit	<ul style="list-style-type: none"> • 5 litres cow urine • 250 g fresh cow dung • 50 g lime • 20 litres water 	<ol style="list-style-type: none"> 1. Mix cow dung, cow urine, and water in a bucket. 2. Add lime and stir well. 3. Leave for 24 hours before use. 	<ul style="list-style-type: none"> • 10 litres per hectare (for seed treatment and root dip) • Dip seedlings for 30 minutes before transplanting. 	Protects young roots from fungus and seed borne or soil borne diseases
3. Ghanamrit	<ul style="list-style-type: none"> • 10 kg cow dung • 500 g jaggery • 500 g gram flour • 1 litres cow urine 	<ol style="list-style-type: none"> 1. Mix all ingredients thoroughly. 2. Dry under shade for 2-3 days. 3. Store in a cool, dry place. 	<ul style="list-style-type: none"> • Apply 250-500kg per ha as a basal dose during land preparation. 	Provide nutrients to plants and help to stimulate microbial activity in the soil. It is more suitable for the rainfed area.
4. Neemastra	<ul style="list-style-type: none"> • 5 kg neem leaves • 5 litres cow urine • 5 kg cow dung • 100 litres water 	<ol style="list-style-type: none"> 1. Crush neem leaves and mix with cow urine and cow dung. 2. Add water and ferment for 48 hours. 3. Stir well before use 	<ul style="list-style-type: none"> • Foliar Spray: 5-7.5 litres per hectare (diluted in 500-1000 litres of water). • Every 10-15 days to control sucking pests like aphids, whiteflies, and jassids 	Used against whiteflies, Aphid, Jassid, Termites, Nematodes, Mill bugs, Sucking pest, Grasshoppers and fruit borers.
5. Agniastra	<ul style="list-style-type: none"> • 5 kg green chili • 500 g garlic • 5 liters cow urine • 2 kg neem leaves • 100 liters water 	<ol style="list-style-type: none"> 1. Crush chili, garlic, and neem leaves. 2. Mix with cow urine and leave for 48 hours. 3. Dilute with water before spraying. 	<ul style="list-style-type: none"> • Foliar Spray: 5-7.5 litres per hectare (diluted in 500-1000 litres of water). • Every 10-15 days to control sucking pests like aphids, whiteflies, and jassids 	Effective against all sucking pests, Small caterpillars and grubs, leafhoppers and fruit borers



Inputs	Ingredients	Procedure	Application	Benefits
6. Brahmastra	<ul style="list-style-type: none"> • 3 kg custard apple leaves • 2 kg neem leaves • 2 kg papaya leaves • 2 kg guava leaves • 5 litres cow urine • 100 liters water 	<ol style="list-style-type: none"> 1. Crush all leaves and mix with cow urine. 2. Ferment for 3 days. 3. Filter and dilute with water before spraying. 	<ul style="list-style-type: none"> • Use every 15 days for controlling caterpillars and borers 	Used against sucking pests, big caterpillars and grubs
7. Dashparni Ark	<ul style="list-style-type: none"> • 2 kg neem leaves • 2 kg custard apple leaves • 2 kg papaya leaves • 2 kg guava leaves • 2 kg dhatura leaves • 5 litres cow urine • 100 litres water 	<ol style="list-style-type: none"> 1. Crush all leaves and soak in cow urine and water for 10 days. 2. Stir daily. 3. Filter and use as a foliar spray. 	<ul style="list-style-type: none"> • Foliar Spray: 5-7.5 litres per hectare diluted in 500-1000 litres of water. • Spray every 15-20 days for pest control, especially against borers and caterpillars. 	Used against stem borers and all types of serious insect pests.

Natural Farming ensures chemical-free, sustainable kitchen gardening using Jivamrit, Bijamrit, Mulching, and Whapasa. It enriches soil, Conserves water, and promotes natural pest control. SPNF reducing costs and protecting the environment. Adopting Natural Farming in Kitchen gardening fosters self-sufficiency and a healthier lifestyle.



Attachment No.1

Monthwise Cropwise Plan Of Vegetable Crop From January To December On Plot

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Plot 1	Broccoli	Broccoli	Okra	Okra	Okra	Okra	Tomato	Tomato	Tomato	Tomato	Broccoli	Broccoli
Plot 2	Methi	Methi	Capsicum	Capsicum	Capsicum	Capsicum	Capsicum	Potato	Potato	Potato	Potato Methi	Methi
Plot 3	Pea	Pea	Pea	French Bean	French Bean	French Bean	Cauliflower	Cauliflower	Cauliflower	Cauliflower	Pea	Pea
Plot 4	Spinach	Cucumber	Cucumber	Cucumber	Cucumber	Okra	Okra (rainy)	Okra (rainy)	Okra (rainy)	Okra (Rainy)	Spinach	Spinach
Plot 5	Onion	Onion	Onion	Onion	Onion	Colocasia	Colocasia	Colocasia	Colocasia	Colocasia	Colocasia	Onion
Plot 6	Cabbage	Cabbage	Bitter Gourd/ Bottle Gourd	Bitter Gourd/ Bottle Gourd	Bitter Gourd/ Bottle Gourd	Bitter Gourd/ Bottle Gourd	Radish	Radish	Radish	Cabbage	Cabbage	Cabbage
Plot 7	Garlic	Garlic	Garlic	Garlic		Ginger	Ginger	Ginger	Ginger	Ginger	Garlic	Garlic
Plot 8	Chinese Cabbage	Brinjal	Brinjal	Brinjal	Brinjal	Brinjal	Pumpkin	Pumpkin	Pumpkin	Chinese Cabbage	Chinese Cabbage	Chinese Cabbage
Plot 9	Broad Bean	Broad Bean	Broad Bean	Radish	Radish	Zimikand	Zimikand	Zimikand	Zimikand	Zimikand	Zimikand	Broad Bean

Legend
Sowing Stage
Growth Stage
Harvesting Stage

Attachment No. 2

Monthwise Cropwise Plan Of Vegetable Crop From January To December On Ridges

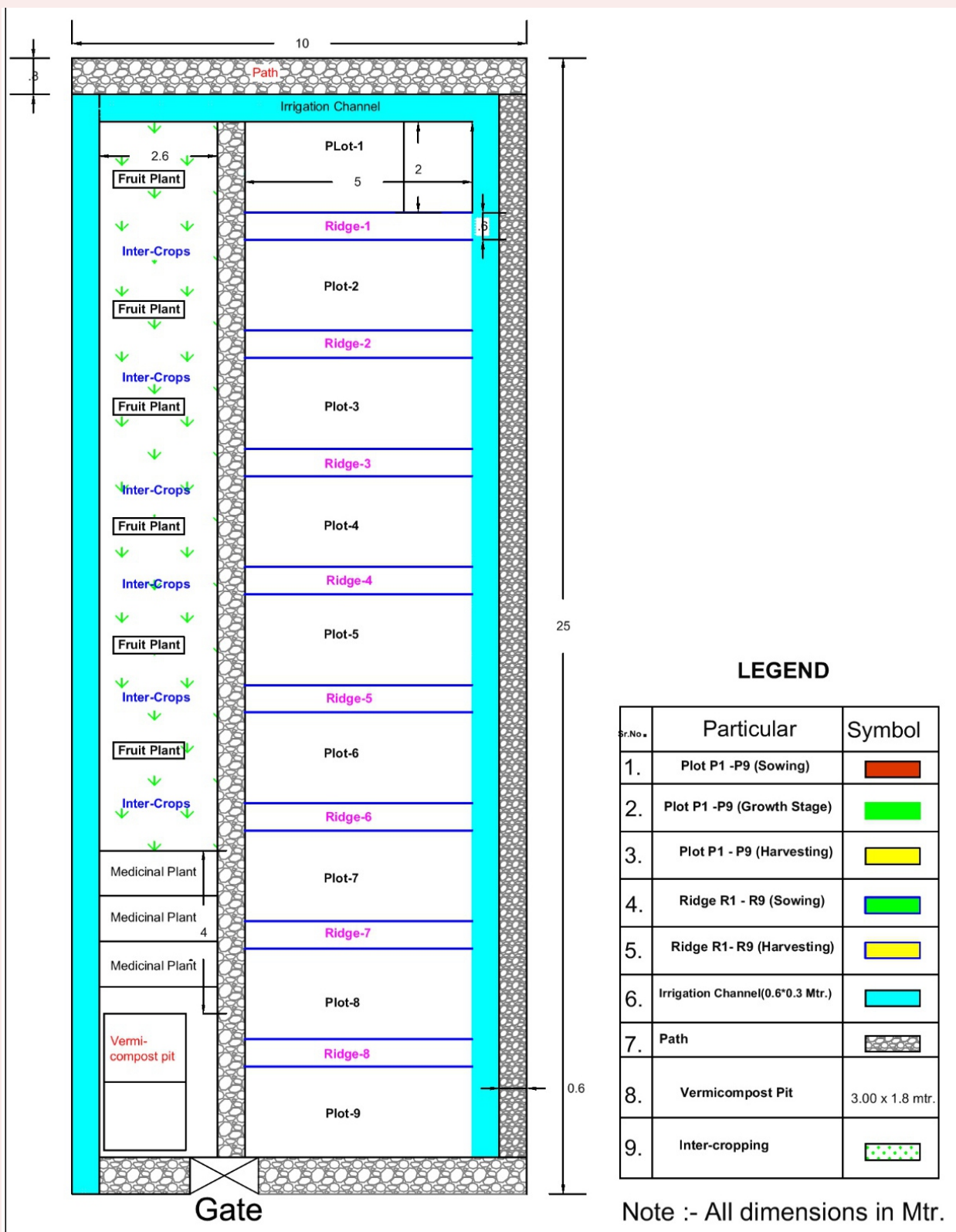
	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Ridge 1	Turnip	French Bean	French bean	French Bean	Chilli	Chilli	Chilli	Chilli	Chilli	Turnip	Turnip	Turnip
Ridge 2	Chaulai	Chaulai	Chaulai	Chaulai	Capsicum	Radish	Radish	Radish	Coriander	Coriander	Coriander	Coriander
Ridge 3	Coriander	Coriander	Coriander	Coriander	Stevia	Stevia	Stevia	Stevia	Stevia	Radish	Radish	Radish
Ridge 4	Carrot	Swiss Chard	Swiss Chard	Swiss Chard	Swiss Chard	Swiss Chard	Swiss Chard	Carrot	Carrot	Carrot	Carrot	Carrot
Ridge 5	Lettuce	Lettuce	Mint	Mint	Mint	Mint	Mint	Mint	Mint	Lettuce	Lettuce	Lettuce
Ridge 6	Fenugreek	Fenugreek	Fennel	Fennel	Fennel	Fennel	Kharif Onion	Kharif Onion	Kharif Onion	Kharif Onion	Fenugreek	Fenugreek
Ridge 7	Beetroot	Beetroot	Ashwagandha	Ashwagandha	Ashwagandha	Ashwagandha	Ashwagandha	Ashwagandha	Ashwagandha	Beetroot	Beetroot	Beetroot
Ridge 8	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera	Alovera

Legend	
Sowing Stage	
Growth Stage	
Harvesting Stage	



Attachment No. 3

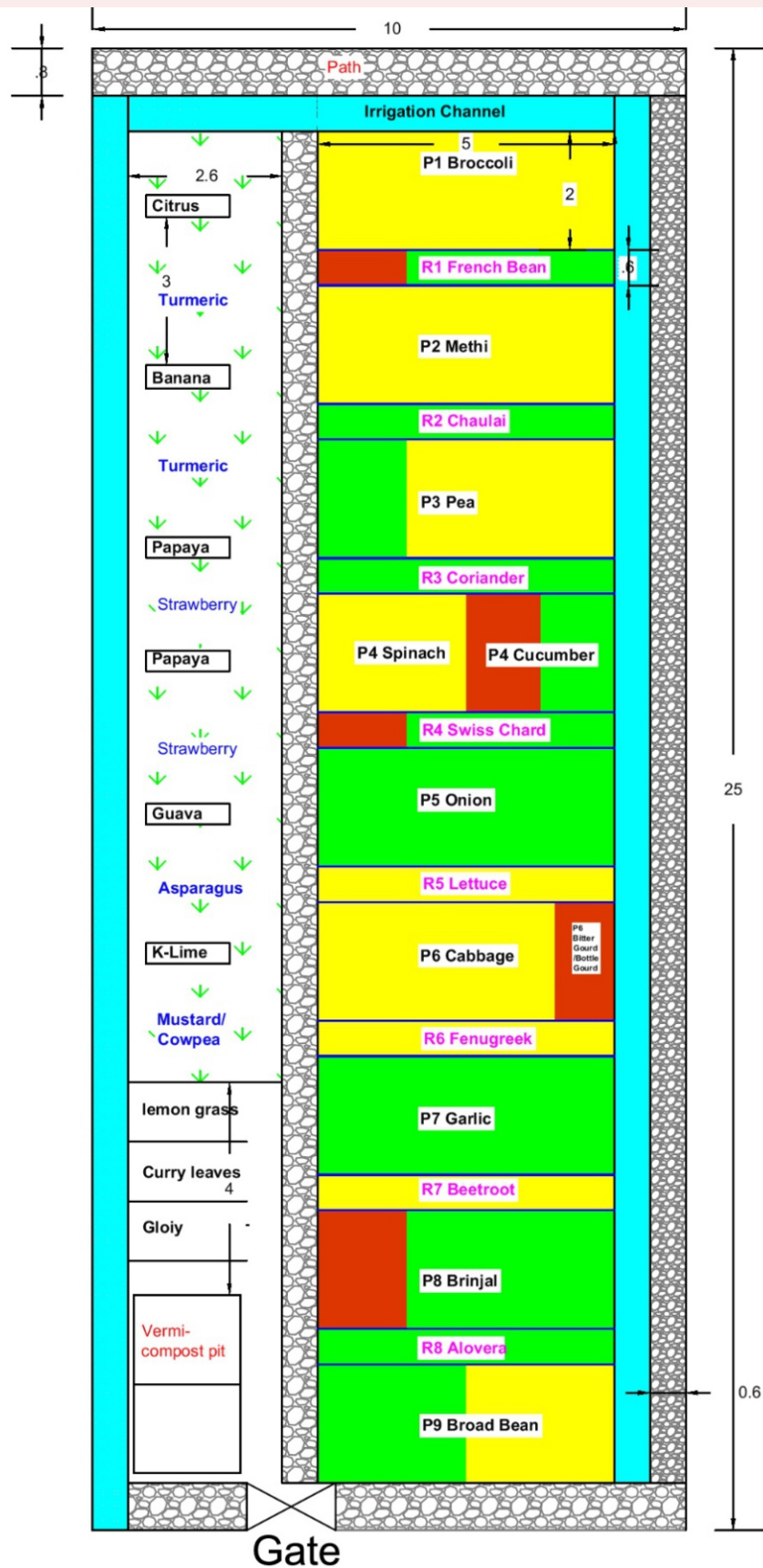
Layout plan for Kitchen Garden (25x10 Mtr.)





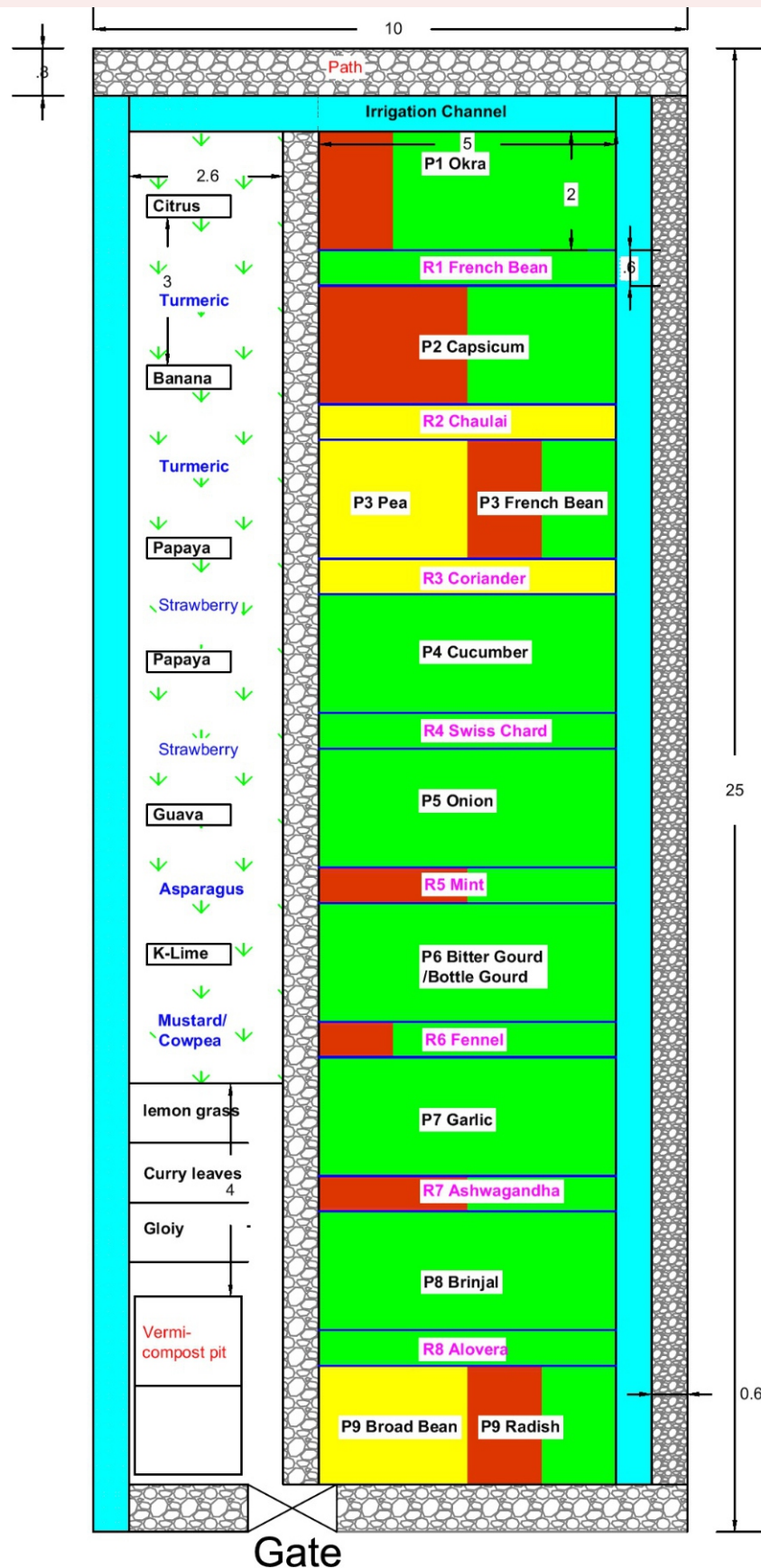


Layout plan for Kichen Garden (25x10 Mtr.) for the month of Febuary



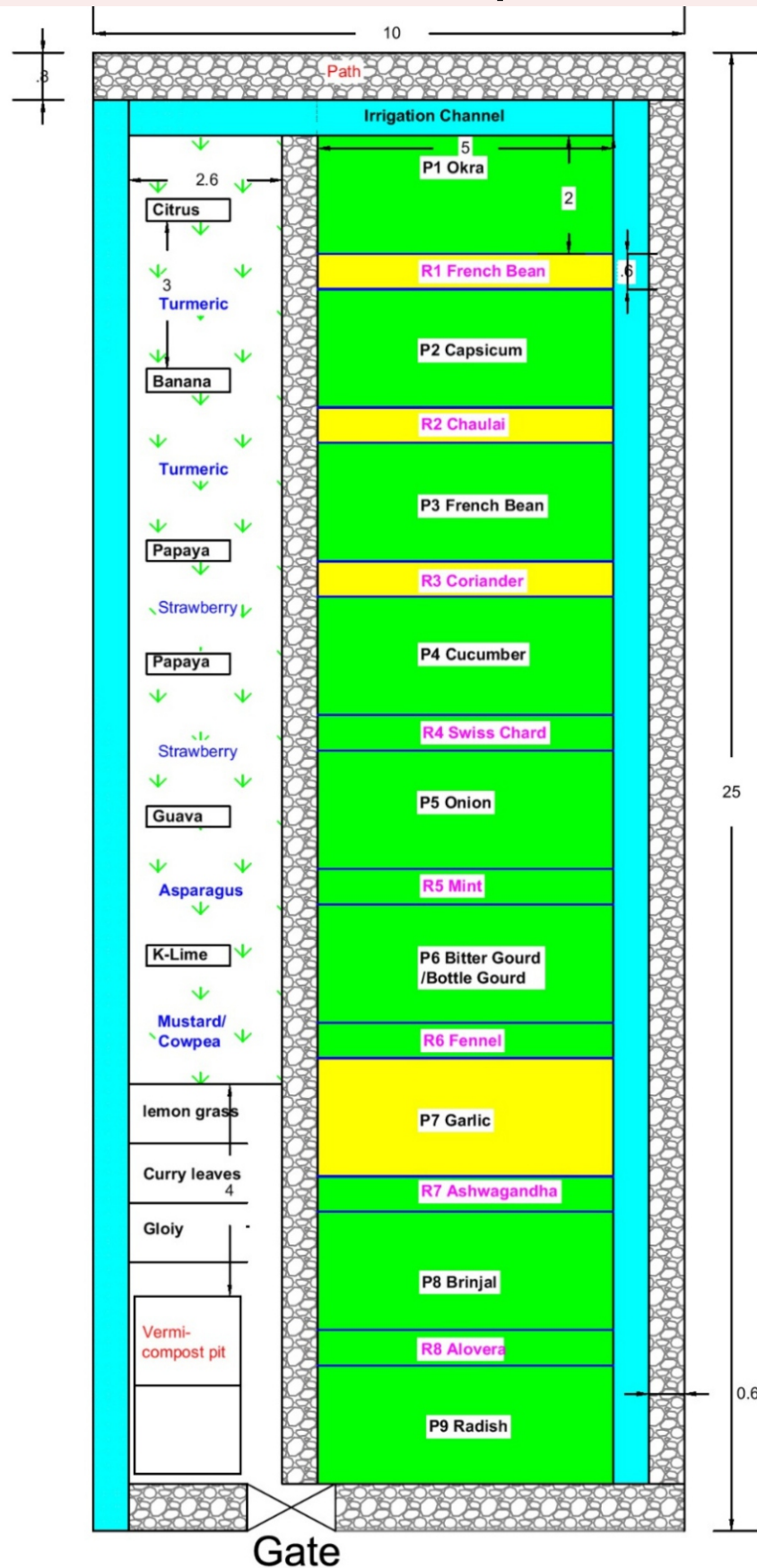


Layout plan for Kichen Garden (25x10 Mtr.) for the month of March



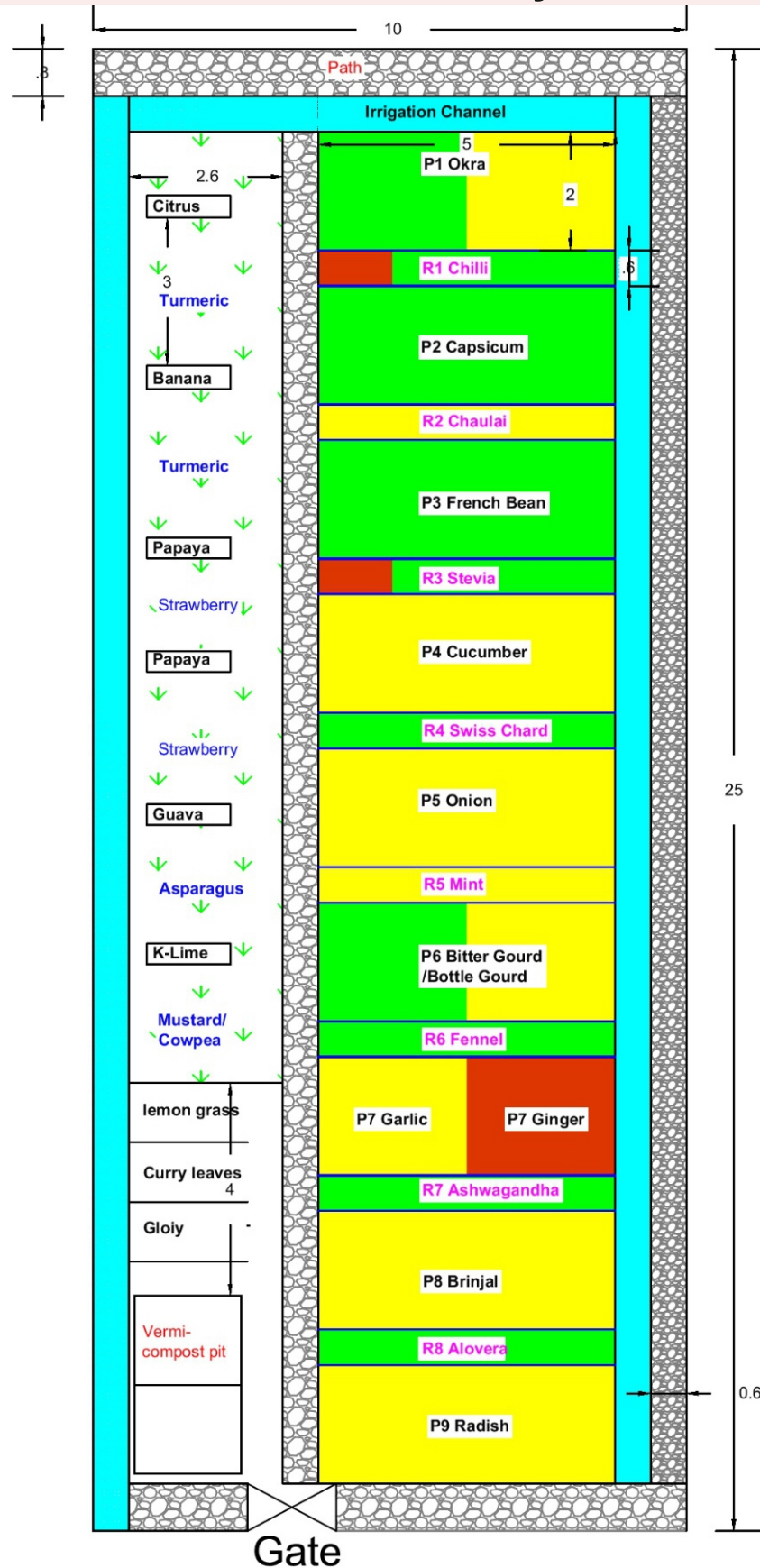


Layout plan for Kichen Garden (25x10 Mtr.) for the month of April



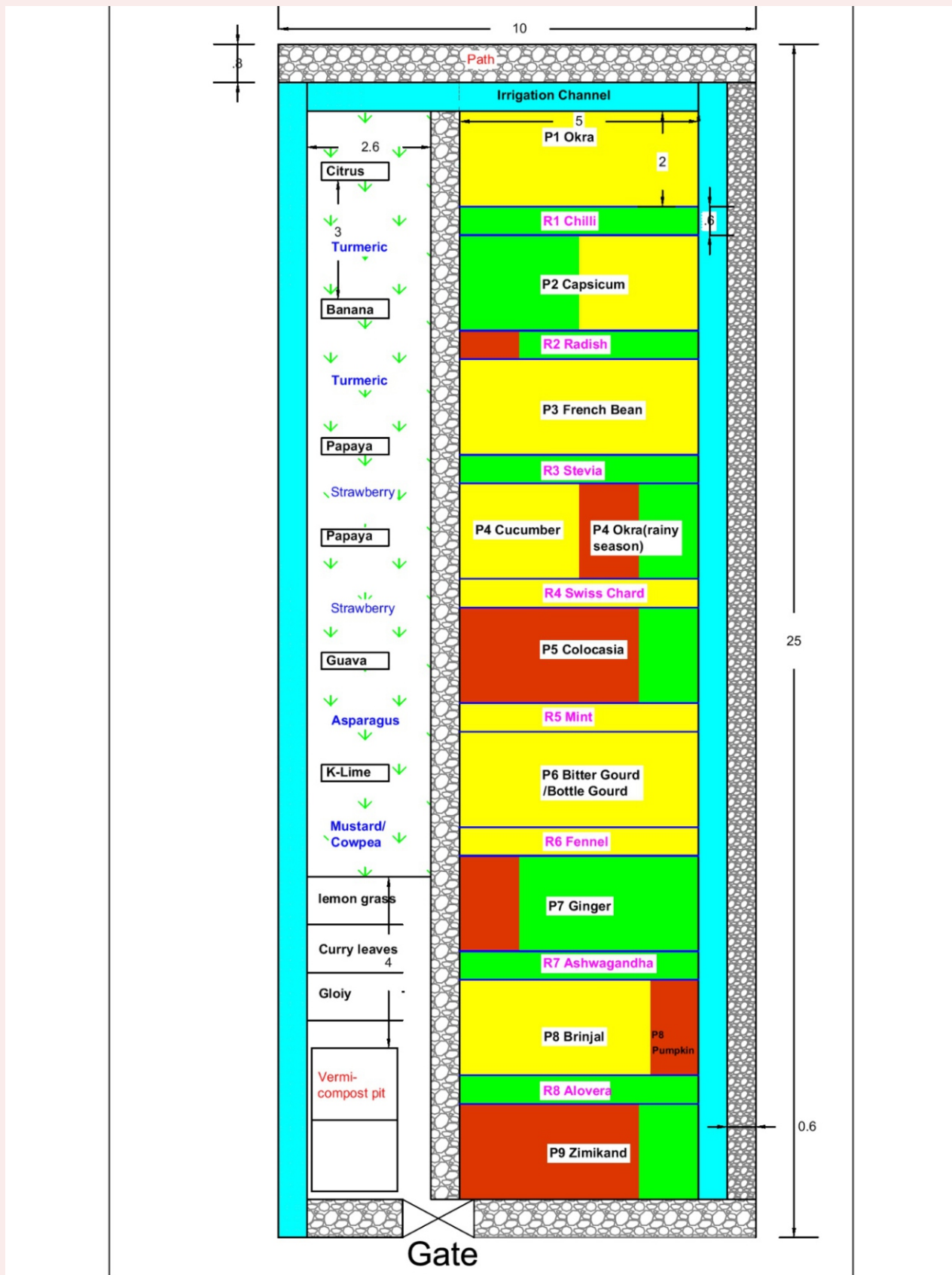


Layout plan for Kichen Garden (25x10 Mtr.) for the month of May



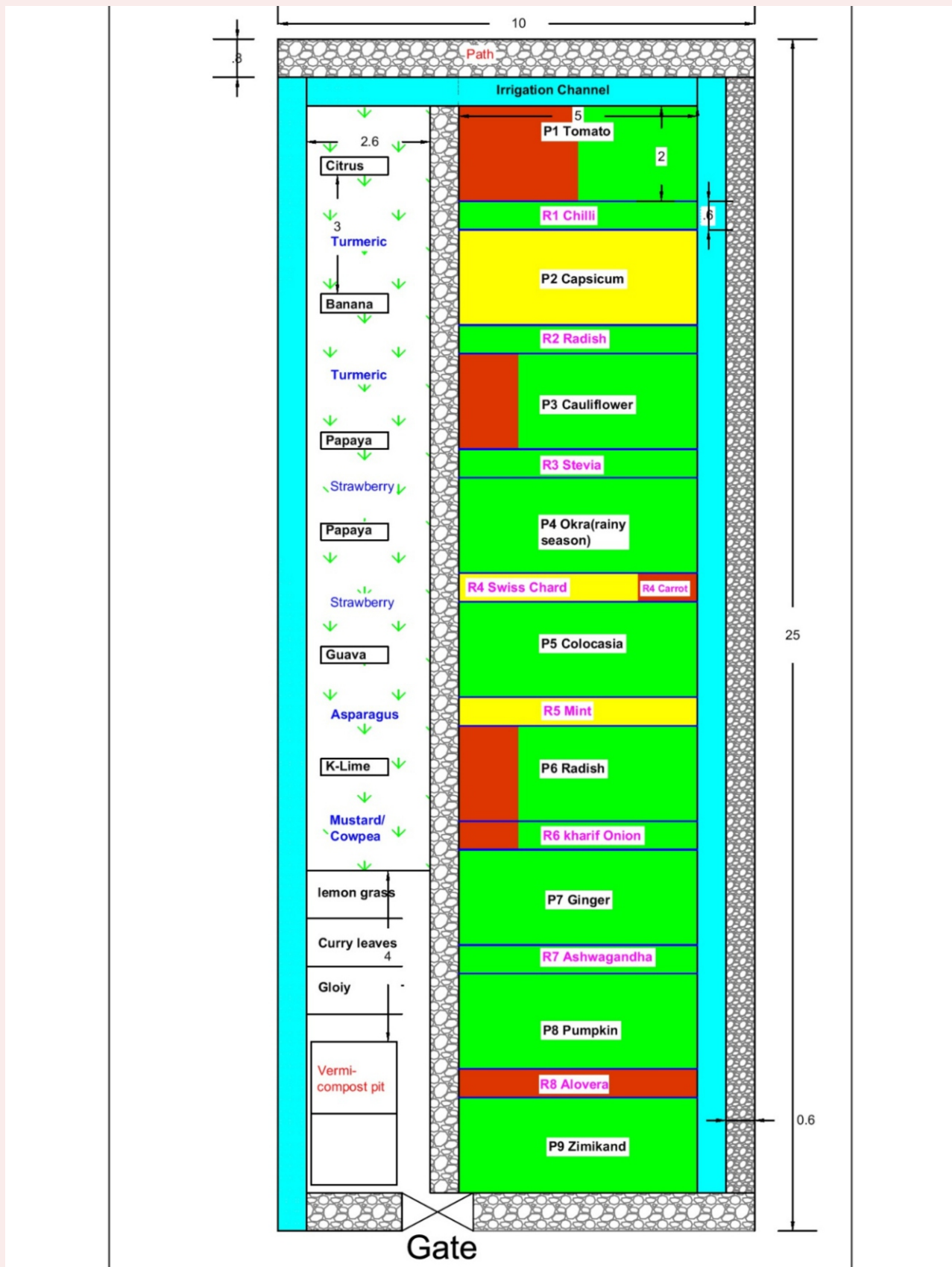


Layout plan for Kichen Garden (25x10 Mtr.) for the month of June



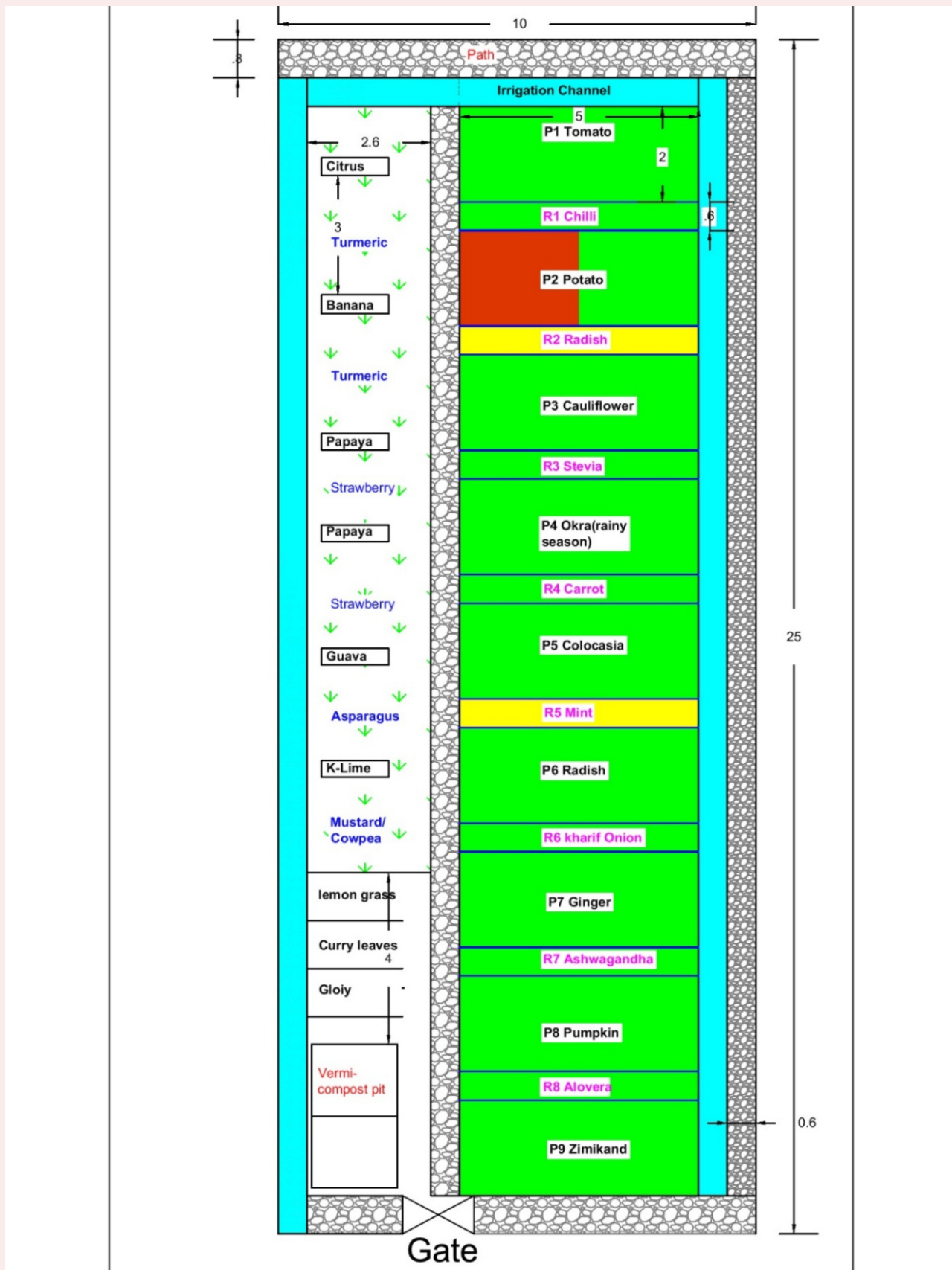


Layout plan for Kichen Garden (25x10 Mtr.) for the month of July



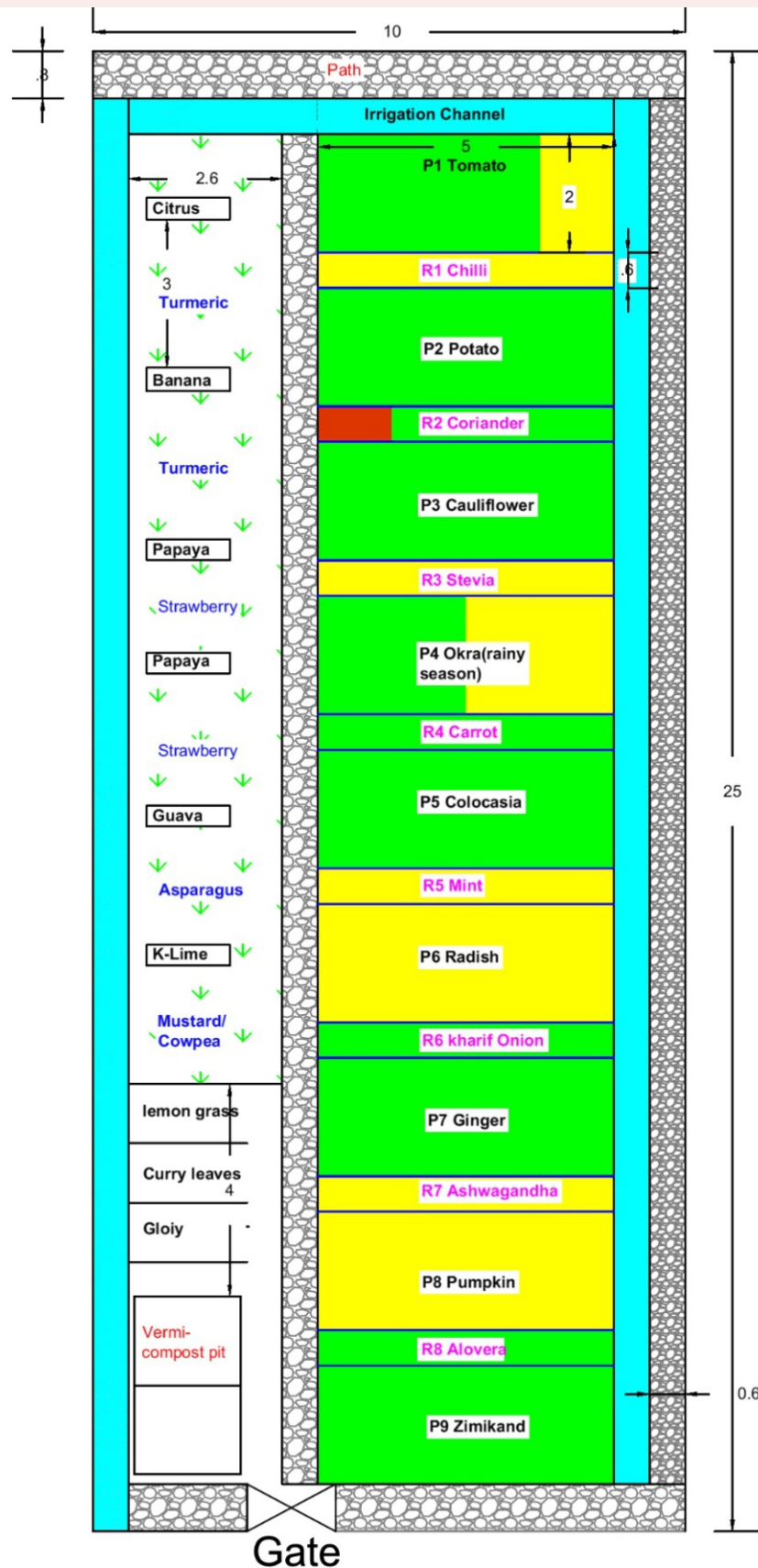


Layout plan for Kichen Garden (25x10 Mtr.) for the month of August



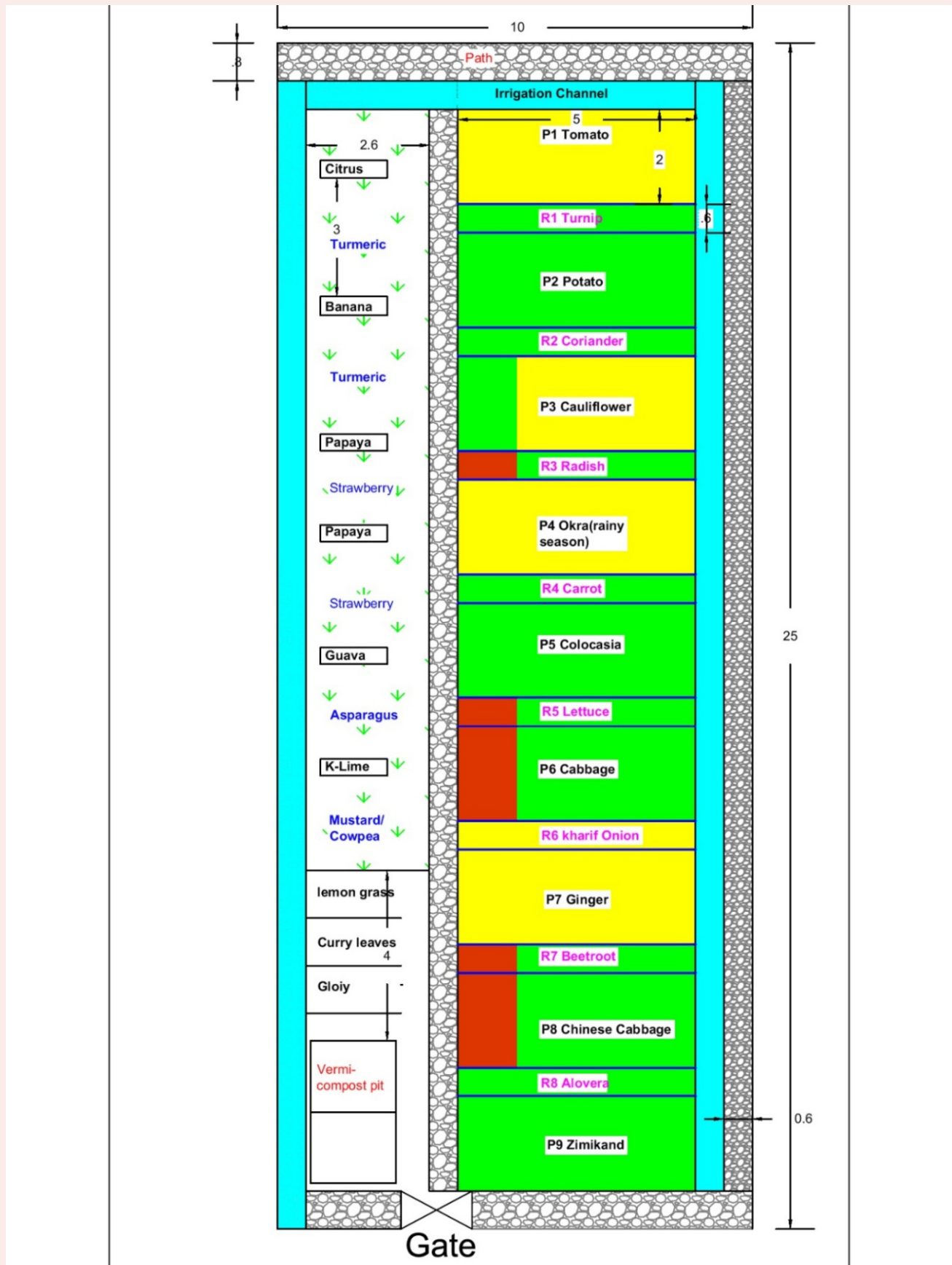


Layout plan for Kichen Garden (25x10 Mtr.) for the month of September



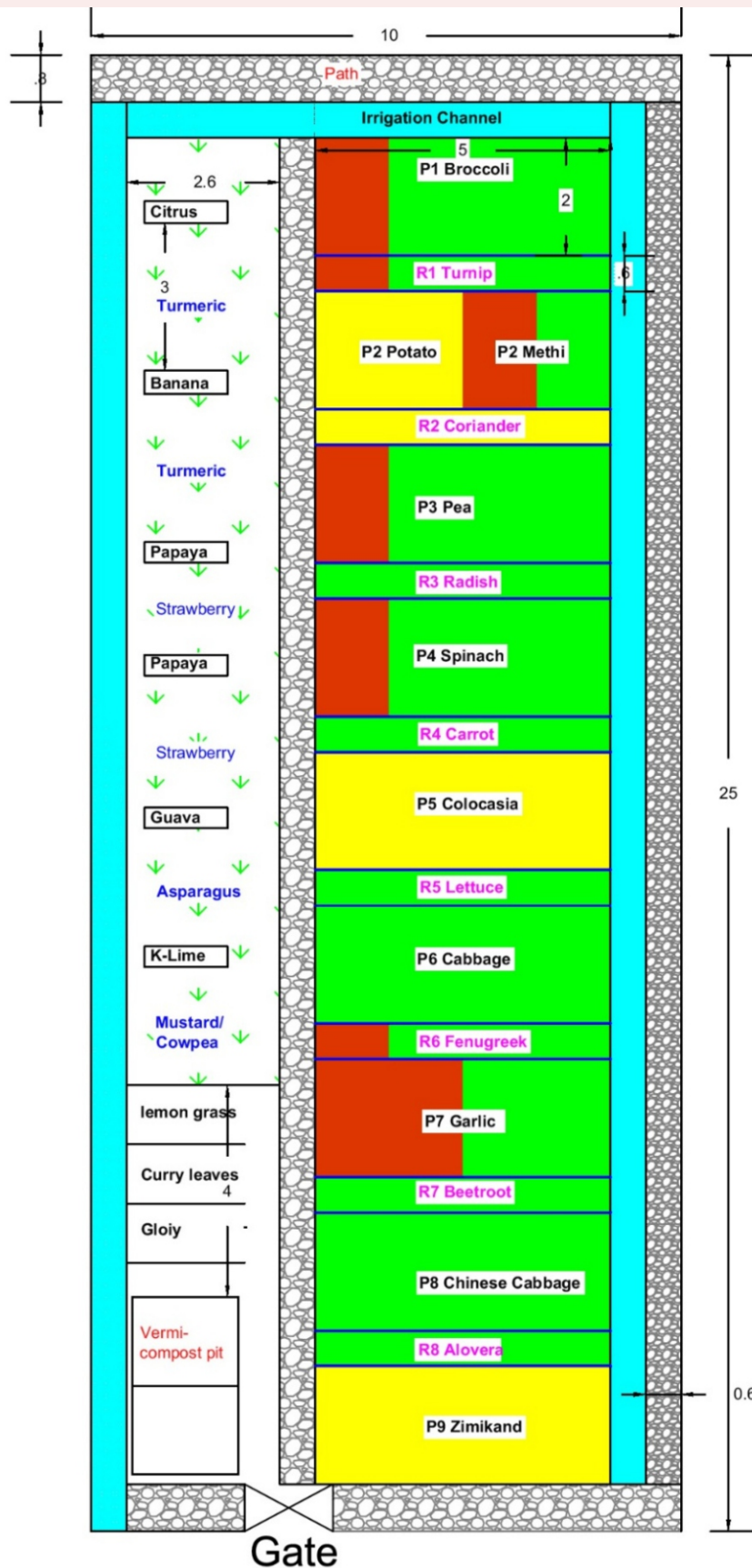


Layout plan for Kichen Garden (25x10 Mtr.) for the month of October



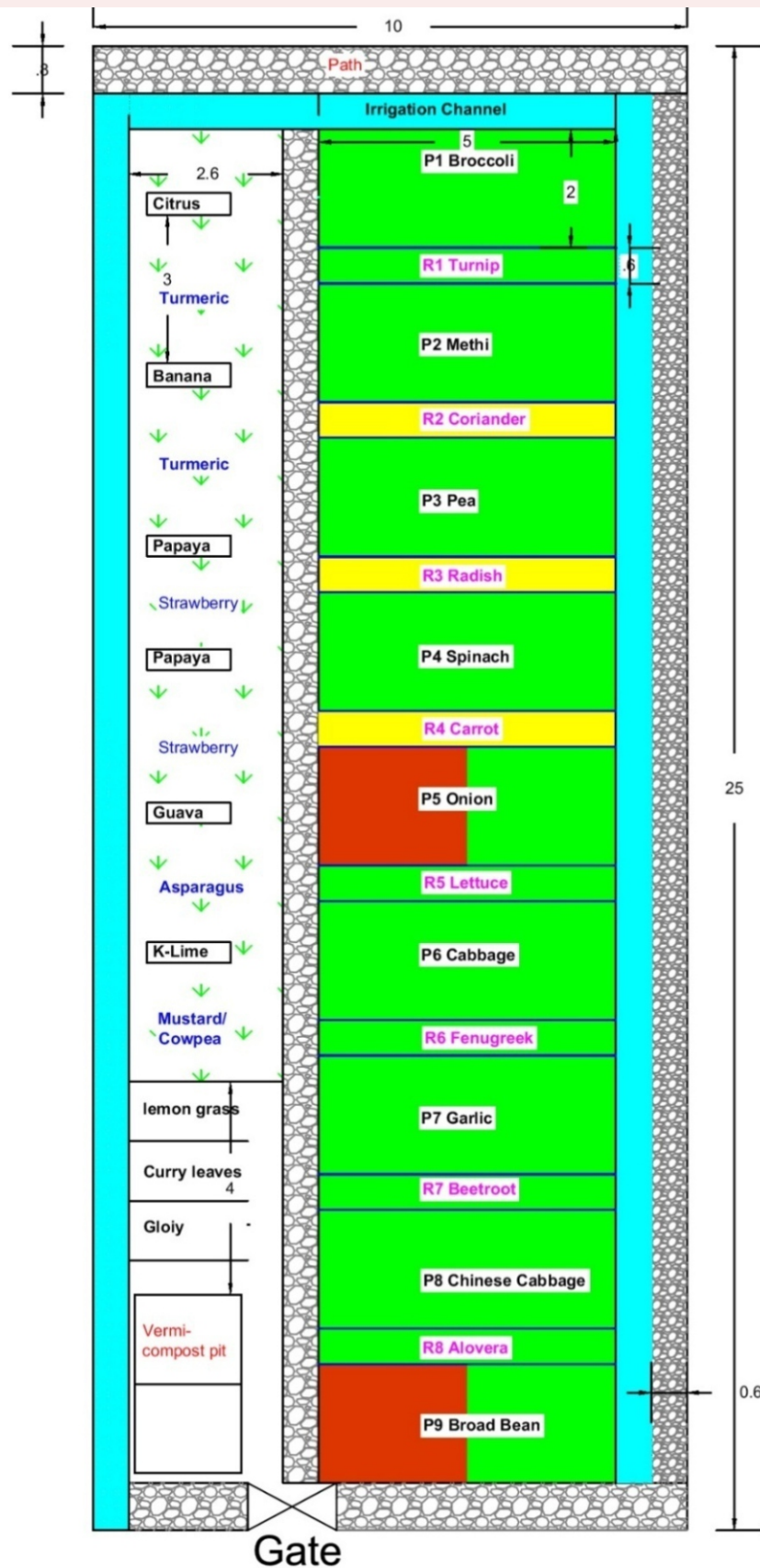


Layout plan for Kichen Garden (25x10 Mtr.) for the month of November





Layout plan for Kichen Garden (25x10 Mtr.) for the month of December





Glimpses of Kitchen Gardens



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KITCHEN GARDENING MANUAL



**Himachal Pradesh Agriculture
Development Society**
GOVERNMENT OF HIMACHAL PRADESH

