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# Appendices

## Appendix 1

### Table 1

#### GDP Growth Rate across Sectors (% per annum)

Period	Agriculture	Agri & Allied Sectors	Industry-Sector	Service Sector
1960-61 to 1968-69	0.7	1.04	5.05	5.03
1968-69 to 1975-76	2.19	2.24	3.92	3.37
1975-76 to 1988-89	2.74	2.47	5.53	5.4
1988 -89 to 1995-96	2.69	2.76	5.9	6.15
1995-96 to 2004-05	2.23	2.28	4.87	7.86
2004-05 to 2016-17	3.4	3.43	7.51	8.69

Source: MAFW, Various Years

## Appendix 2

### INTERVIEW SCHEDULE

1. Name of the farmer:
2. Age (in years):
3. Village:
4. District:
5. Educational Status:

SI. No	Category	Score
1.	Literate	
2	Functionally literate	
3	Primary school	
4	UP school	
5	High school	
6	College & above	

6. Occupational Status:

SI. No	Category	Score
1.	Fulltime Farmer	
2.	Farming and other occupation	
3.	Any other	

7. Family Type:

SI. No	Category	Score
1.	Nuclear Family	
2.	Joint Family	

8. Family Size:

9. Type of House:

SI. No	Category	Score
1.	Thatched	
2.	Tiled	
3	Concrete	

10. Total Land Size:
11. Area under Organic Cultivation:
12. Year of Organic Certification:
13. Experience in
  - i) Farming:
  - ii) Organic Farming:
14. Crops Grown in the Farm:
15. Type of Farming:

SI. No	Category	Score
1.	Monoculture	
2.	Crop Rotation	
3	Dry land Farming	
4	Mixed and Multistoried	
5	Mixed Farming	

16. Allied Agricultural Activities:

SI. No	Category	Score
1.	Cattle/ Goat/ Piggery/ Rabbit	
2.	Poultry/ Duck	
3	Bee Keeping	
4	Fish	
5	Others	

17. Share of Agriculture in Total Household Income:

SI. No	Category	Score
1.	From farming alone	
2.	Partially from farming	
3	Not at all from farming	



18. Irrigation Potential:

SI. No	Category	Score
1.	Throughout the year	
2.	Seasonal	
3	Not assured	

19. Water Source:

SI. No	Category	Score
1.	Well	
2.	Pond/Tank	
3	Canal	
4	River	
5	Bore well	

20. Farmer's Perception of his Farming Methods:

SI. No	Category	Score
1.	Traditional	
2.	Modern	
3	Partly Organic	
4	Fully Organic	

21. Resources for Organic Farming:

SI. No	Category	Score
1.	On-farm resources	
2.	Off-farm resources	

22. Methods of control for pest and diseases:

23. Farming group membership: Yes/No

24. Other organizational membership: Yes/No

**25. Farm Yield Data for last 5 years:**

Sl. No.	Crops Grown	2016	2017	2018	2019	2020
1						
2						
3						
4						
5						

Sl.No	Organic Farming Technologies	Extent of Adoption		
		Fully Adopted	Partially Adopted	Not at all Adopted
1	Bio-Pesticides			
2	Bio-Fertilizers & Manures			
3	Use of Traditional Seeds			
4	Selective Weeding			
5	Inter Cropping & Crop Rotation			
6	Minimum Tillage & Mulching			

**26. Extent of adoption of major technological innovations in organic farming**

**27. Sustainability of Organic Farming Technologies to Agro ecosystems**

Organic Farming		Rating			
		Always True	Mostly true	Rarely True	Not True
Ecological Sustainability	1. Protects and recharges the farm resources				
	2. Increases the system biodiversity				
	3. Low negative impact on environment				
	4. Chemical free environment				
	5. Reduces soil erosion and Improves soil fertility				
Economic Sustainability	6. Improve net income from the farm				
	7. Enable to accumulate working capital				
	8. Availability of high quality food at reasonable price				
	9. Low dependence on external inputs reduces cost of cultivation				
	10. Help farmers to become self-sufficient with minimal risk in long run				
Social Sustainability	11. Rural poor involved in the approach				
	12. Indigenous knowledge recognized within the approach				
	13. Produces foodstuffs of high nutritional quality and sufficient quantity				
	14. Equitable access to assets				
	15. Technology safer to human and animals				

## 28. Major constraints to the promotion of organic farming

Particulars		Rating		
		Most Severe	Severe	Not True
Technologic Constraints	1. Lack of timely information related to organic fanning technologies			
	2. Non availability of enough organic inputs			
	3. Lack of a reliable package of practices for organic farming			
	4. Shortage of disease free seeds and planting materials			
Economic Constraints	5. Initial Yield Loss			
	6. Inadequate financial support to the new organic farmers from govt.			
	7. Higher Cost for the Establishment of Manure Source			
	8. Initial Lox\ Price for the Produce			
Social Constraints	9. Inability to produce chemical free food for all in the society			
	10. Hesitation4from neighboring farmers to follow organic practices making the produce of relatively less quality			
	11. The debate still going in the society about the need for the promotion of organic farming			
	12. Lack of proper community movement for the promotion of organic farming			
Personal Constraints	13. Lack of interest to know more about organic farming			
	14. Declining interest due to shortage of owned resources			
	15. Fear of profit loss due to low yield in the initial period			
	16. The belief that °It is better to follow conventional farming today and let tomorrow take care of it			
Certifying Constraints	17. Higher cost involved in the certification process			
	18. The need of a long period for the certification process			
	19. Lack of proper certifying agencies in the nearby place			
	20. The stringent standards and rules of the			
Grading & Marketing Constraints	21. Inability to produce high grade produce with limited resources			
	22. Lack of reliable market information & distribution channels			
	23. Lack awareness about grading & different grade			
	24. Difficulty in selection and development of target markets Ecological Constraints			
Difficulty in selection and development of target markets Ecological Constraints	25. Higher Pest and disease problems			
	26. Requirement of long period to get positive responses from the ecosystem			
	27. Loss of ecosystem viability to maintain a good crop			
	28. Inability to reconstruct the destroyed links of various ecosystem functions			

**29. Factors behind the shift to organic agriculture in Kerala**

<b>Sl.No.</b>	<b>Particulars</b>	<b>Rank</b>
1.	High price of organic produce	
2.	Organic farming produces chemical free food	
3.	Organic farming reduces the environmental pollution	
4.	Organic farming lowers the cost of cultivation	
5.	Increasing domestic market for organic produce	
6.	High demand of organic produce in the export market	
7.	Financial support from government through the Kerala state organic farming policy	
8.	Organic farming enables group farming and marketing	

### **Appendix 3**

#### **CASE STUDY SCHEDULE**

Name of Group:

Village:

Address:

District:

1. When did this group movement of organic farming started?
2. Give a brief background about the agricultural trend before the group movement?
3. Why did you shifted to organic practices?
4. What is the motive behind the shift to organic? Economic or Ecological? Explain
5. Why did you opt for a group movement rather than individual adoption?
6. Do you think that group farming is effective in the spread of organic farming in Kerala?
7. Give a brief background that led you to depend on group farming?
8. From which agency you got certification?
9. What are the activities you did to get it certified?
10. Where do you market"your produce?
11. Give a brief outline about the Grading and marketing process
12. Do you think that organic farming is economically viable over inorganic farming? Why?
13. What do you feel about the present condition of farming?

#### **Appendix 4**

#### **SCHEDULE FOR INSTITUTIONS**

1. Give a brief background information about the formation and mission of the organization/institution/agency
2. What is the mode of extension work of the organization and its effectiveness in the transfer of technology
3. Give a brief account of the different funds and projects for the promotion of organic farming in the state
4. Give a brief outline of the certification and marketing facility given to the organic farmers.
5. Is there any specification in growing crops for the export market? If yes give an outline about the process.
6. What is the major impact observed among the farming community after the entrance of institution/agency into the society?

## Appendix 5

### SIX GROUPS OF ORGANIC FARMING PRACTICES

1. **Bio-fertilizers and Manures:** The use of the bio-fertilizers and organic manures are important while practicing organic farming. Some of the commonly used bio fertilizers for enhancing nitrogen fixation in the soil are: Rhizobium (Bradyrhizobium and Azorhizobium) induces better root stems nodulation of pulses, oil seeds and legume green manures. Azotobacter suitable only for upland crops like vegetables, tapioca, and plantation and orchard crops, Azospirillum - suitable for both upland and wetland conditions. Blue green afgae-recommended for wetland rice cultivation. Azolla- suitable for wetland rice cultivation. The major bio-fertilizers that improve the uptake of available phosphorus include Phosphate solubilising bacteria and fungi-recommended for upland crops raised in neutral and slightly alkaline soils, and Vesicular/Arbuscular Mycorrhiza - recommended for upland and transplanted crops.
2. **Bio-Pesticides and Cultural Control:** In organic farming, recommendations for controlling pests and diseases are use of mechanical/cultural controlling techniques like light traps. pheromone traps. yellow sticky traps, and use of products from local plants and of biological origin prepared at the farm like Neem seed kernel extract. Tobacco decoction. Neem oil garlic 2% emulsion, and Cashew nut shell liquid emulsion.
3. **Use of Traditional Seeds:** Instead of genetically engineered crops use of those locally available traditional varieties that can well adapted to the environment without the addition of chemical fertilizers is one of the important aspects of organic farming. Here the seeds preserve mostly by sun drying after mixing with cow dung slurry so that seeds can be store better without much pest or disease problems.
4. **Selective Weeding:** Selective weeding is one of the recommendations in organic farming not only to preserve natural diversity but also to protect the crop plants. Most of the weeds can be act as alternate host of several pests and some weeds have allelopathic effect to controlling the problem/noxious weeds, and the root exudates of some weeds can repel nematodes also.

## Appendix 6

### PREPARATION OF SOME OF THE BIO- PESTICIDES AND ORGANIC NUTRIENT SUPPLEMENTS

1. **Leaf / Plant (5%) Extract:** Macerate 50g of leaf/ plant in a mixer grinder. Soak the macerated product in 1 litre of water for 24-48 hours. Strain the solution and spray.
2. **Neem Seed Kernel (5%) Extract:** Grind Neem kernel to coarse powder. Take 50 g of the powder in a cloth bag and dip it in ½ litre of water for 24 hours. Squeeze the cloth bag repeatedly till the out flow turns light brown. Dissolve 5 g of ordinary bar soap in 0.5 litre of water. Add the soap solution to the kernel extract, stir well and spray.
3. **Tobacco Decoction:** Steep 500g of tobacco waste in 4.5 litre of water for 24 hours. Dissolve 120g of ordinary bar soap separately in 0.5 litre of water. Add the soap solution to the tobacco extract and stir vigorously. Add 5 litres of water to this stock solution and spray.
4. **Neem oil + Garlic 2% Emulsion:** To prepare 10 litres, 200ml Neem oil, 200g garlic and 50g ordinary bar soap are required. Slice the bar soap and dissolve in 500ml luke warm water. Grind the garlic pearls, mix it with 300 ml water and strain to prepare garlic extract. Pour the 500ml soap solution into 200ml neem oil slowly and stir vigorously to get a good emulsion. Mix the garlic extract in the neem oil + soap emulsion. Dilute this 1 litre stock solution by adding 9 litres of water to get 10 litres of 2% Neem oil + garlic emulsion.
5. **Cashew Nut Shell Liquid (CNSL) 5% Emulsion:** To prepare 10 litres of 5% CNSL emulsion, 500ml of CNSL and 50g bar soap are required. Slice the bar soap and dissolve in 500 ml of water. Pour 500 ml of CNSL slowly and stir vigorously to get a good emulsion. Dilute this one litre solution by adding 9 litres of water to get 10 litres of 5% CNSL emulsion.
6. **Inter Cropping and Crop Rotation:** Intercropping is recommended as a part of organic farming to ensure crop diversity and intercropping/crop rotation with



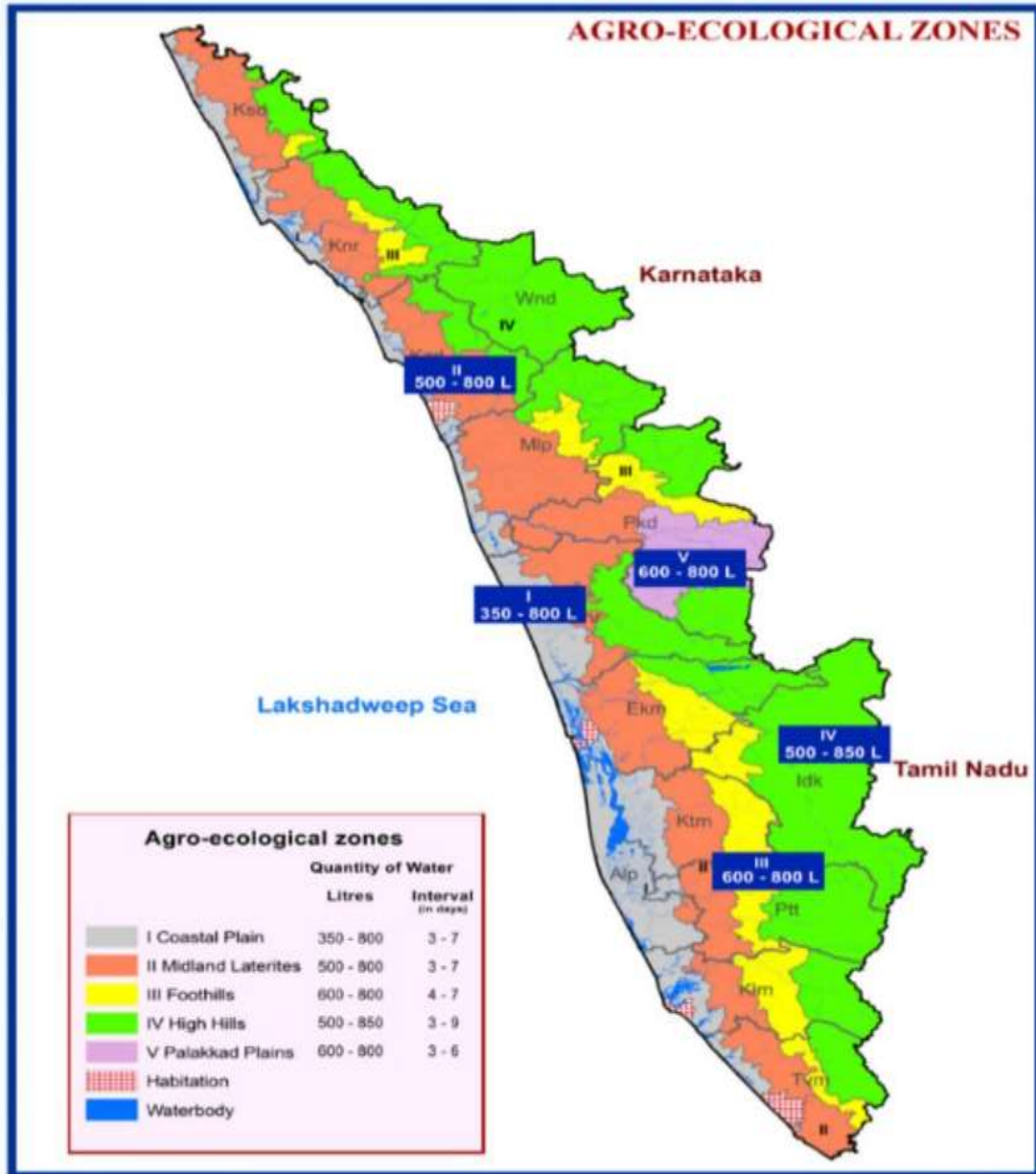
pulses and leguminous crops to enhance nitrogen fixation. Intercropping with various crops like pineapple, turmeric, ginger, roots and tuberous crops with perennial crops help to enhance nutrient extraction from different soil layers so that there will not be any fast depletion in nutrient level in soil.

7. **Minimum Tillage and Mulching:** Minimum tillage or zero tillage of the field and mulching is recommended for organic farming as a part of soil and water conservation measures as this prevent erosion of top soil so that soil fertility can be improved, and improves water holding capacity of the soil thus enhance the recharge of water resources in the farm. Here, clearing of land through burning organic matter recommended to be the minimum and clearing of primary forest is prohibited.

## Appendix 7

### Figure 1

#### Map showing Agro-Climatic Zone of Kerala



Source: Economic Review 2020

**Figure 2**  
**Harvesting of Organic Vegetables Thiruvanthapuram 2020**



Source: Primary Survey

**Figure 3**  
**Intercropping by the Organic Farmers at Wayanad 2020**



Source: Primary Survey

**Figure 4**  
**Paddy seedlings by the Organic Farmers at Alapuzha 2020**



Source: Primary Survey

**Figure 5**  
**Water channeling by the Organic Farmers in Thrissur 2020**



Source: Primary Survey

**Figure 6**  
**Applying of pests in organic farms Farmers at Thrissur 2020**



Source: Primary Survey

**Figure 7**  
**Paddy seedlings organic farms Farmers at Thrissur 2020**



Source: Primary Survey