

Approving the implementation and starting of Natural Farming Course at B.Sc. (Hons.) Agriculture Level


જાહેરનામું

નંબર-૮૮૭ /૨૦૨૩

આથી સંબંધકર્તા સર્વેને જાણ કરવામાં આવે છે કે તા.૨૮.૦૪.૨૦૨૩ ના રોજ નવસારી ખાતે મળેલ સંચાલક મંડળની ૪૯ મી બેઠકની કાર્યનોંધના મુદ્દા નંબર ૪૯.૧૬ થી નીચેની વિગતે ઠરાવ કરેલ છે.

"The Board of Management resolved to implement Natural Farming Courses at the B.Sc. (Hons.) Agriculture level viz., (1) Natural Farming (NF-1) (Appendix-49.16 (i) ) (2) Natural Farming-2 (NF-2) (Appendix-49.16 (ii) ) (3) Experiential Learning Program (ELP) (Appendix-49.16 (iii) ) in 4<sup>th</sup>, 6<sup>th</sup> and 8<sup>th</sup> semesters, respectively from the even semester of 2022-23 as per attached course curriculum"

જા.નં.એસીએન/યુજી-સી.૧/સં.મં./૪૯.૧૬/૨૦૨૩-૬૬૨૬/૨૦૨૩  
તા. ૨૧/૦૬/૨૦૨૩  
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આચાર્ય અને ડીન  
ન. મ. કૃષિ મહાવિદ્યાલય  
નવસારી

નકલ સવિનય રવાના :-

૧. સંચાલક મંડળના તમામ સભ્યો તરફ.
૨. યુનિવર્સિટીના તમામ અધિકારીઓ તરફ.
૩. તમામ આચાર્યો તરફ.

નકલ રવાના :-

૧. માન.કુલપતિશ્રીના રહસ્ય સચિવશ્રી, નવસારી કૃષિ યુનિવર્સિટી,નવસારી
૨. કુલસચિવશ્રીના રહસ્ય સચિવશ્રી, નવસારી કૃષિ યુનિવર્સિટી,નવસારી
૩. કુલસચિવ વિભાગની બોર્ડ ઓફ મેનેજમેન્ટ શાખા તરફ (પાંચ નકલમાં)
૪. આ કચેરીની તમામ શાખાઓ તરફ.
૫. જાહેરનામા ફાઈલ



## **Appendix-49.16 (i)**

### **Natural Farming 1**

#### ***Theory Manual***

<b>Sr.</b>		<b>Title of experiment</b>
<b>(1)</b>		<b>Unit 1 History and Heritage of Natural Farming</b>
	L-1	Pioneers and scholars of natural farming and their important classics on heritage of NF
	L-2	Rich heritage of plant protection in NF
<b>(2)</b>		<b>Unit 2 - Concepts of Natural Farming</b>
	L-1&L-2	Principles Agro ecology i. 10 Elements of Agroecology ii. 13 Principles - HLPE
	L-3	Principles of Agroecology
	L-4	Need of NF
	L-5	Different forms of Non chemical farming practices
	L-6	Comparison with organic agriculture
	L-7	Other innovations
<b>(3)</b>		<b>Unit 3 - Inputs in Natural Farming and Usage</b>
	L-1 & L-2	Soil health management
	L-3,4 & 5	Nutrient management
	L-6	Plant protection
	L - 9,10	Water conservation techniques
<b>(4)</b>		<b>Unit 4 - Agronomic Practices</b>
	L-1	Land management – Soil health
	L-2,3,4	Land management NF Crop wise package of practices
	L-5	Land management-Water dynamics
	L-6	Sustainable crop intensification- cropping systems and concept of sustainability in NF
	L-7	Sustainable crop intensification - Sustainable crop intensification in NF for productive resource conserving and climate resilient agriculture
	L-8	Flora and Fauna- Biodiversity management strategies in agri-food production
	L-9	Advantages of NF –Environment dimension
	L-10	Economics of NF
	L-11	Economics of NF: Sosio economics dimention
<b>(5)</b>		<b>Unit 5 - Climate Change and Sustainable Agriculture Systems</b>
	L-1	Sustainable Food and Agriculture
	L-2	Sustainable development goal
	L-3	Circular Farm Economy and carbon cycle – measurement and management





## Natural Farming 1

### *Practical manual*

Sr.	Title of experiment
<b>(1)</b>	<b>Unit 1</b>
(i)	<b>Practical 1:</b> Preparation of different types of manures and plant protection inputs for natural farming
<b>(2)</b>	<b>Unit 2</b>
(i)	<b>Practical 1 - Farm Visit</b>
	<b>Practical 2-</b> Identification of Botanicals - In-situ or near in-situ
	<b>Practical 3 - Inventory and Calendar of Inputs – Creation</b>
<b>(3)</b>	<b>Unit 3</b>
(i)	<b>Practical 1-</b> Preparation of Natural farming inputs Jeevamrit, Beejamrit and Ghanjeevamrit.
(ii)	<b>Practical 2-</b> Study about Physical and Chemical Properties of Natural farming inputs.
(iii)	<b>Practical 3-</b> Field visit to Natural farming.
(iv)	<b>Practical 4-</b> Mulching, different types of mulching in different Agro ecosystems.
(v)	<b>Practical 5-</b> Preparation of Agniastra, Brahmastra, Dashparni ark and Neemastra.
(vi)	<b>Practical 6-</b> To prepare desired concentrations of spray formulations and their application against insect-pests.
(vii)	<b>Practical 7-</b> To prepare desired concentrations spray formulations and their application against disease.
<b>(4)</b>	<b>Unit 4</b>
(i)	<b>Practical 1 -</b> [Soil Aggregate Stability - Comparing NF with conventional fields] Understanding the impact of “no tillage natural farming” on soil aggregate stability in comparison to conventional tillage farming. a) Soil clods exposure to the impact of water to test if water resistance soil aggregate are developed which indicates ‘soil sponge’.
(ii)	<b>Practical 2 -</b> [Assessment of the activity of soil life - Comparing NF with conventional fields] a) Earthworm count/mass comparison b) Assessment of microbial diversity in soil with microscope.
(iii)	<b>Practical 3 - Sustainable Crop Intensification -</b> On farm visit and discussion on cropping systems (comparison of NF and Conventional cropping systems). Subgroup analyses on mapping of crop geometry with emphasis of system productivity and ecological sustainability - and panel presentation.
(iv)	<b>Practical 4 -</b> [Assessment of the Economic profitability - Comparing NF with conventional fields] a) Crop Cut exercises subject to availability of crop harvesting time), OR b) Household production and consumption analysis.
<b>(5)</b>	<b>Unit 5</b>
(i)	<b>Practical 1 -</b> Carbon Measurement for Natural Farming Production and Mapping Local Food Systems.

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## Appendix-49.16 (ii)

### Natural Farming 2

#### *Theory manual*

Sr. No		Title of experiment
(1)		<b>Unit 1 Agroecology Systems and Conventional Agricultural</b>
	M-1	Challenges of Conventional Agriculture in future Sustainability (Ecological, Social, Economic)
	M-2	Agroecology for Sustainability
(2)		<b>Unit 2 Processes of Natural Farming</b>
	M-1	Energy Flow Measurement and management
	M-2	Rhizosphere Effect
	M-3	Microbial Management
	M-4	beneficial Arthropods
	M-5	Soil Organic Carbon (SoC) enhancement and sequestration
	M-6	Plant and Soil Nutrient enhancement
(3)		<b>Unit 3 - Natural Farming - Farm Systems Design</b>
	M-1 &2	Farm Macro/Micro-climate analysis
	M-3	Resource use calendar
	M-4	NF –Livestock integration
	M-5	Sustainable crop intensification
	M-6	Seed production management
	M-7	Seed production
	M-8	Weed management and cropping pattern and system
	M-9	Plant protection
	M-10	Water management
	M-11	Post harvest management
	M-12	Technology intervention
(4)		<b>Unit 4 Sustainable Agriculture Systems Management</b>
	M-1	Farmer and Consumer Health
	M-2	Allied Livelihood Activities
	M-3 &4	FPO, Marketing Systems and entrepreneurship (Sustainable food/Agri Systems)

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## Natural Farming 2

### *Practical manual*

Sr. No	Title of experiment
(1)	<b>Unit 1</b>
	<b>Practical 1</b> To find out local crop varieties of the native area
	<b>Practical 2</b> to find Agroecological Practices at any 10 farms
(2)	<b>Unit 2</b>
	<b>Practical 1</b> -Nutrient deficiencies and diagnostic plant symptoms
	<b>Practical 2</b> -Soil-plant interaction on nutrient use efficiency in plants
(3)	<b>Unit 3</b>
	<b>Practical 1</b> - [Microclimate Analysis] Rainfall plume understanding (30 year data in a graph) using an excel application and drawing inferences.
	<b>Practical 2</b> - [Crop calendar] Students will prepare different types of crop calendars.
	<b>Practical 3</b> - [Seed production management] Visit to Seed Production Fields; a. Exposure and hands-on practice for seed quality standards (viability, purity, mixtures of other varieties and other crops, soil and inert matter and seed cleaning equipment use.
	<b>Practical 4</b> - [Weed management] a. Visit to a field - identification of all objectionable weeds - documentation of the characteristics of 5 most notorious weed species.
	<b>Practical 5</b> [Plant protection] Field visit – a. Identification of key insect pests and their natural enemies - find Pest:Defender ratio and draw out inferences to be used for pest management decisions to be taken up. b. Preparation of suitable botanical concoction to control the most dominant pest at that point of time.
	<b>Practical 6</b> - [Practicals for Post harvest Management] Visit to traditional storage structures in tribal areas Hands on experience on seed pelleting and seed treatments with innovative approaches
(4)	<b>Unit 4</b>
	<b>Practical 1</b> - Field Visit to FPO and Market Systems. Preparing report on Sustainable Food Systems mapping with field visit.
	<b>Practical 2</b> - Mapping of Availability of Synthetic Biocides in the nearby markets for Agricultural Use with Class List chemicals and highlighting those that are recommended for Ban in India.

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## Appendix-49.16 (iii)

### Experiential Learning Program (ELP)

#### Summary

1. Modules:
  - a. Natural farming
2. Number of Lectures: 0
3. Number of Practicals: 10
4. Duration: 10 weeks

#### Practical Outline

##### Week 1

- Farm Visit
- Identification of Botanicals
- Inventory and Calendar of Inputs
- Preparation of Herbal Kunapajala
- Preparation of Jeevamrit
- Visit to a Natural Farming farm

##### Week 2

- Field visit to Natural farming
- Preparation of Beejamrit
- Preparation of Ghanjeevamrit
- Physical, Chemical and biological Properties of Beejamrit
- Physical, Chemical and biological Properties of Ghanjeevamrit
- Physical, Chemical and biological Properties of Jeevamrit

##### Week 3

- Preparation of Agnistra,
- Preparation of Brahmastra,
- Preparation of Dashparni ark
- Preparation of Neemastra
- To prepare desired concentrations of spray formulations and their application against insect-pests
- Mulching, different types of mulching in different Agro ecosystems.

##### Week 4

- Assessment of microbial diversity in soil
- Earthworm count/mass comparison
- On farm visit and discussion on cropping systems (comparison of NF and Conventional cropping systems). Subgroup analyses on mapping of crop geometry with emphasis of system productivity and ecological sustainability - and panel presentation.
- Soil clods exposure to the impact of water to test if water-resistant soil aggregates are developed which indicates 'soil sponge' (slake test or clods immersion in water column)

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- To prepare desired concentrations spray formulations and their application against diseases
- Understanding the impact of "no tillage natural farming" on soil aggregate stability in comparison to conventional tillage farming.

#### Week 5

- Carbon Measurement for Natural Farming Production and Mapping Local Food
- Crop Cut exercises (subject to availability of crop at harvesting time)
- Field Visit to FPO and Market Systems. Preparing report on Sustainable Food Systems mapping with field visit
- Household production and consumption analysis
- Mapping of Availability of Synthetic Biocides in the nearby markets for Agricultural Use with Class List chemicals and highlighting those that are recommended for Ban in India.
- Planning, seed bed preparation and layout of field experiments

#### Week 6

- Estimation of crop yield on the basis of yield attributes
- Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities, intercropping operations in different crops
- Phonological studies at different growth stages of crops
- Practice of Seed treatment, seed germination and crop establishment in relation to soil moisture content
- Raising of herbarium of different cereals, millets and pulses
- Working out harvest indices of various crops

#### Week 7

- Construction of crop growth curves based on growth analysis data
- Crop planning in relation to changing scenario of water availability
- Cropping pattern and cropping intensity
- Determination of infiltration rate and available soil moisture
- Field measurement of root-shoot relationship in crops at different growth stages
- Study of water use efficiency in different crops

#### Week 8

- Analysis of organic carbon and major nutrients (N, P, K) and its interpretation
- Calculation of crop water requirements- average, peak and seasonal water use
- Computation of irrigation needs of crops for life saving irrigation
- Determination of moisture retention characteristics of soil by pressure plate apparatus
- Soil sampling from field
- Soil sampling: procedure, precautions, preparation and storage

#### Week 9

- Soil Analysis for Physical properties (Soil Texture and Bulk Density)
- Soil Analysis of Micronutrients (Fe, Mn, Zn, Cu and B) and its interpretation
- Soil Analysis of secondary nutrients (Ca, Mg, S)
- Preparation of saturated paste and saturation extract and determination of pH<sub>8</sub> and E<sub>ce</sub>
- Plant Analysis: Plant sampling, Sampling stage, Critical concentration, Digestion of

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- sample, Interpretation of result
- Digestion of sample (Practical)
- Plant Analysis: Analysis of Total organic carbon and major (N, P, K) nutrients

#### **Week 10**

Evaluation by considering the following aspects.

- Technical skill development
- Report writing skill
- Regularity
- Project planning and Writing
- Presentation
- Output delivery
- Monthly assessment
- Entrepreneurship skill
- Business Networking skill
- Final presentation