“Overview of the natural farming practices: History concept and scope"

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Sustainability at Global level

- A distinguished Japanese professor of history of Science has said that the
- **19th century** was the **century of chemistry**
- **20th century** that of **physics**.
- **In agriculture, chemistry** produced **chemical fertilizers and pesticides**, whereas **physics** helped to create the machinery for agriculture — **tractors, combines**, etc.
- The extensive use of these inventions has also **caused various environmental problems.**
- The professor regards the **21st century** as a **century of biology** and, more specifically, of **bio-industry**.
- Consequently, He believe that **sustainable agriculture is an important factor that will shape the 21st century.**
- If we can **achieve sustainability in agriculture in this century**, it will be a **century of sustainable primary industry**.
- On the other hand, **environment, population, food and energy** are common issues throughout the world because the **survival of human beings and the earth (PRITHVI)** is a major concern.
- **These three critical issues** are closely **related to farming**.
- The **manufacturing industry** is harmful for the environment, so **it cannot therefore be a solution.**
- Consequently, He believe that **sustainable agriculture will be key to the 21st century**.

Sustainability of food production systems in India

linked with

- **Decline in soil health,**
- **Loss of productivity,**
- **Soil infertility,**
- **Desertification,**
- **Reduced agro-diversity,**
- **Pesticide pollution and**
- **Emerging pest-resistance have raised serious concerns about the future of the current chemical and input-intensive model.**
- **Climate emergency: crop losses related to extreme weather events**

Overview of Natural Farming

- Agricultural Practices before independence, Green Revolution its impact and present situation and
- Ill effects of conventional/ modern Agriculture on health of soil, human, animal and environment (Soil Organic Carbon, pH etc)

Agriculture scenario in India

1. The farmers are under stress
2. Modern agriculture loaded with chemicals
3. Productivity declined over years and have several negative consequences.
4. It depletes carbon content of the soil. The present organic carbon content ranges from 0.3 to 0.5 %, against the requirement of > 1.0 for sustainable production.
5. Our farmers are exposed to harmful chemicals leads to incurable diseases.
6. Farmer's indebtedness keeps increasing as they buy inputs with barrowed resources and are unable to pay it back due to changed climate vagaries.
7. This industrial model of agriculture is not sustainable.
8. Finally consumers end up with foods lazed with harmful chemicals.
9. So we have to transform agricultural practices to be more ecologically sustainable.

Consequences

- **Green Revolution**
- **Impacts of the Green Revolution**
- ***Impacts on Agriculture and Environment***
- **Pests and Pesticide**
- **Water Consumption**
- **Air Pollution**
- **Impacts on Soil and Crop Production**
- **Extinction of Indigenous Varieties of Crops**

What Is the Green Revolution?

- The green revolution led to high productivity of crops through adapted measures, such as
- (1) increased area under farming,
- (2) double-cropping, which includes planting two crops rather than one, annually,
- (3) adoption of HYV of seeds,
- (4) highly increased use of inorganic fertilizers and pesticides,
- (5) improved irrigation facilities, and
- (6) improved farm implements and crop protection measures (Singh, 2000; Brainerd and Menon, 2014)

Impacts of the Green Revolution
Impacts on Agriculture and Environment

- **Pests and Pesticide**
- India became one of the largest producers of pesticides in the whole of Asia (Narayanan et al., 2016).
- Although this has contributed to a lot of economic gains (Gollin et al., 2018),
- The average amount of pesticide usage is far lower than in many other countries, there is high pesticide residue in India.
- Causes Water and air pollution
- The predator and prey pests are not in balance, and hence there is an overpopulation of one kind of pest **o**ver other

Water Consumption

- India has the highest demand for freshwater usage globally, and 91% of water is used in the agricultural sector.
- India are experiencing water stress due to irrigated agriculture
- water-intensive crops.
- Most of these crops are cereals, and almost 50% of dietary water footprint is constituted by cereals in India (Kayatz et al., 2019)

Air Pollution

- Burning of agricultural waste is a big issue
- Burning their land for sowing the crops for the next cycle instead of the traditionally practiced natural cycle.
- Crop cycle is of short duration for the hybrid crops introduced in the green revolution
- high amount of pollution due to the burning of agricultural waste
- Release of many GHG's, such as carbon dioxide, methane, nitrogen oxides, etc. (de Miranda et al., 2015).

Soil and Air Health deterioration
Sugarcane trash burning

Stubble burning- paddy/ wheat/ corn

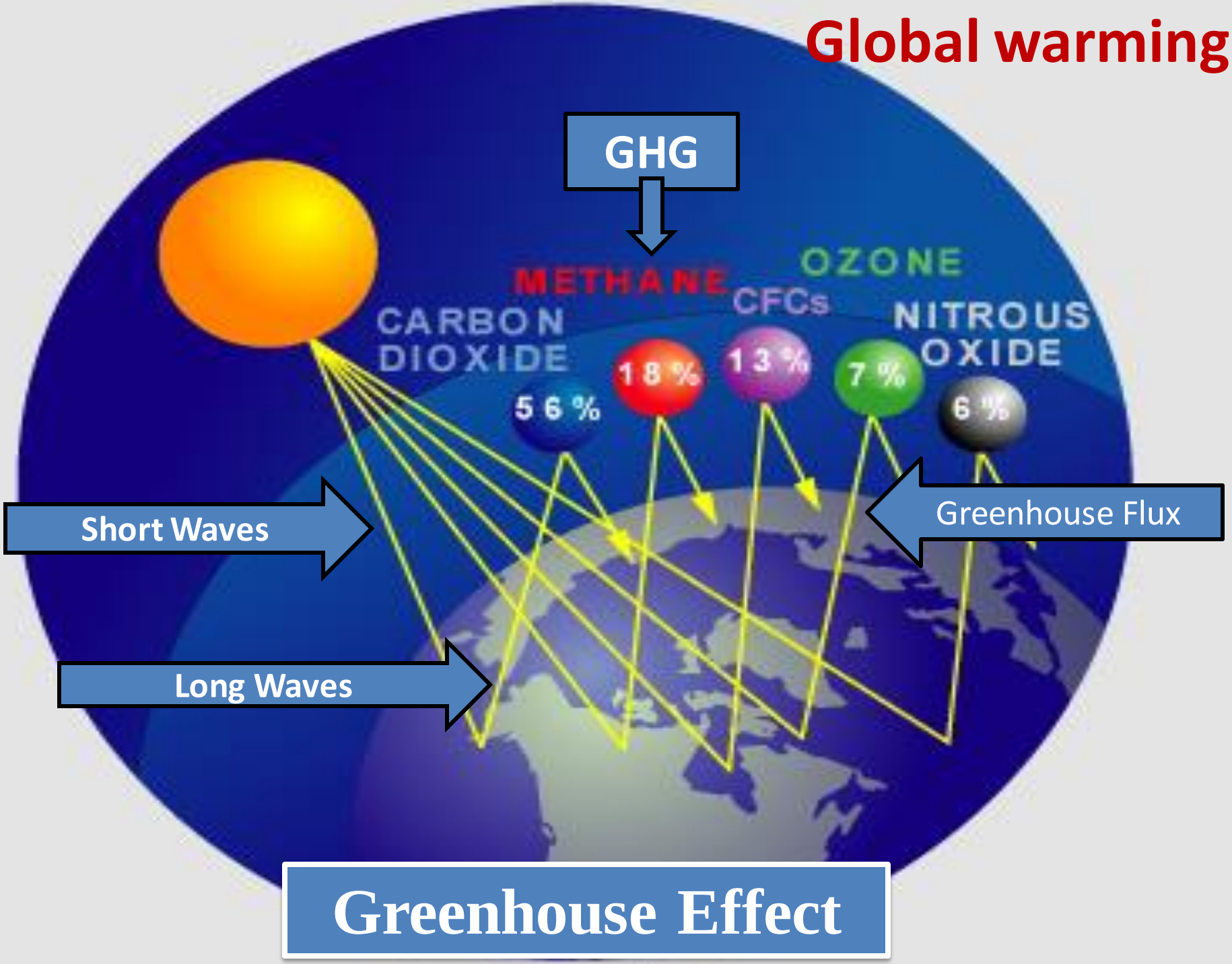
Biomass Burning maize/ stalks & paddy straw

MAIZE stalk after harvesting

Paddy straw & stubble burning

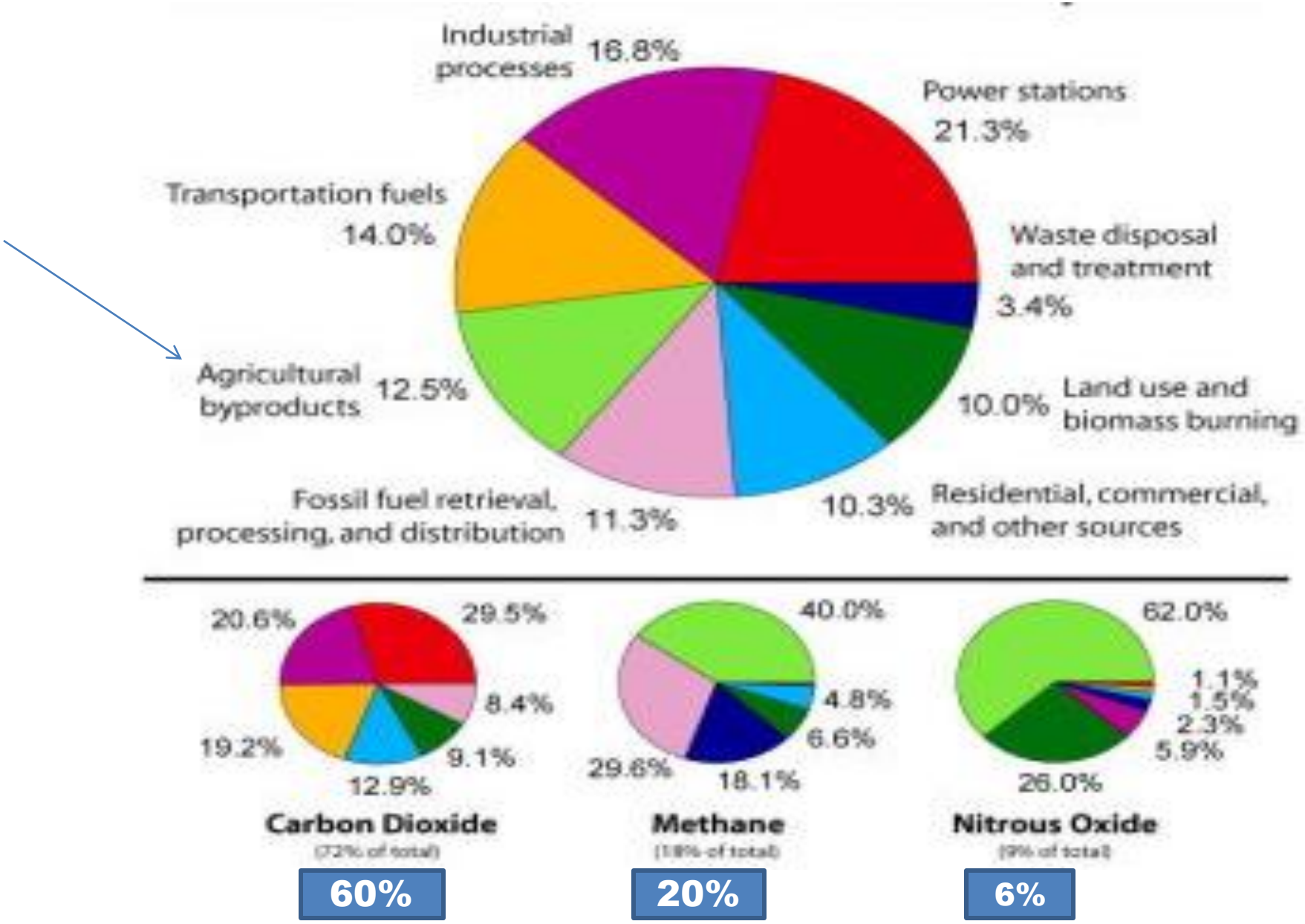
Stubble Burning

Global warming



Greenhouse Effect

Annual Greenhouse Gas Emissions by Sector



GHG Emission (India)

Total 1727.7 Mt CO_2 eq

- Energy sector 57.8 %
- Industry 21.7 %
- Agriculture 17.6 %
- Waste 3.0 %

INCCA Report-2010

Emission from agriculture

Agriculture 334.4 MT CO_2 eq

a) Enteric fermentation	63.4 %
b) Rice cultivation	20.9 %
c) Ag. soils	13.0 %
d) Manure management	2.4 %
e) Residue burning	2.0 %

Crop production 35.9 % CO_2 eq

Bhatia *et al* , 2012

Reversing Global Warming

We can reverse global warming by:

1. Carbon Sequestration & Carbon trading
2. Capturing Carbon in the soil through organic agriculture
3. Increasing plant population & production
4. Reducing combustion

Impacts on Soil and Crop Production

- Crop cycle for increased crop production and reduced crop failure, which depleted the soil's nutrients (Srivastava et al., 2020).
- No return of crop residues and organic matter to the soil, intensive cropping systems resulted in the loss of soil organic matter (Singh and Benbi, 2016).
- Farmers used increasing fertilizers as and when the soil quality deteriorated (Chhabra, 2020).
- Waterlogging, salinity, soil erosion, decline, and rise of groundwater table linked to brackish water and alkalinity, affecting production and food security in the future (Singh, 2000).

Extinction of Indigenous Varieties of Crops

- India lost almost 1 lakh varieties of indigenous rice (Prasad, 2016).
- In turn, there was increased harvest of hybrid crops, which would grow faster (Taylor, 2019).
- increase in the cultivation of wheat, soybeans, and rice.
- In addition, there is a large decrease in the cultivation of sorghum, other millets, barley, and groundnuts.
- Decline in traditionally grown and consumed crops, such as millets, grow easily in arid and semi-arid conditions because they have low water requirements.

Impacts on Human Health

- **Food Consumption Pattern**
- Traditionally, Indians consumed a lot of millets, but this became mostly fadded after the green revolution (Nelson et al., 2019).
- FAO has recorded that over the years 1961–2017, there are a decrease in the production of millets and an increase in the production of rice
- GR failed to provide a diverse diet but provided increased calorie consumption.

Health-Related Impacts on the General Population

- Most of the pesticides used belong to the class organophosphate, organochlorine, carbamate, and pyrethroid.
- Indiscriminate pesticide usage has led to several health effects in human beings in the nervous, endocrine, reproductive, and immune systems. Sometimes, the amount of pesticide in the human body increases beyond the capacity of the detoxification system due to continuous exposure through various sources (Xavier et al., 2004).

Impacts on Farmers

- farmers who use pesticides do not use personal protective gear, such as safety masks, gloves, etc.,
- Pesticides, applied over the plants, can directly enter the human body, and the concentration of nitrate in the blood can immobilize hemoglobin in the blood.
- Organophosphates can also develop cancer if exposed for a longer period(Sharma and Singhvi, 2017).
- Significant correlation between agrochemical content in water and total birth defects

Pesticides

The use of pesticides in developing countries and their impact on health and the right to food

- Implications for health

A study sampling 800 residents Kenya, showed **evidence of respiratory, skin, bone and nervous system problems.**

- The frequency of symptoms is higher among **planters, weeders and harvesters** (Tsimbiri et al., 2015).
- problems for **pollinators and aquatic organisms** and are partially banned in the EU.
- Over the longer term, **neonicotinoid use** could have serious implications for biodiversity and the environment.

In conclusion

- The effects of the green revolution are persisting.
- The green revolution, which was beneficial in ensuring food security, has unintended but harmful consequences on agriculture and human health.
- This requires new interventions to be tested and piloted before implementation, and continuous evaluation of the harms and benefits should guide the implementation.
- Similarly, alternative agriculture techniques, such as intercropping, Zero Budget Natural Farming (ZBNF) with essential principles involving the enhancement of nature's processes, and elimination of external inputs, can be practiced (Khadse et al., 2018).

References

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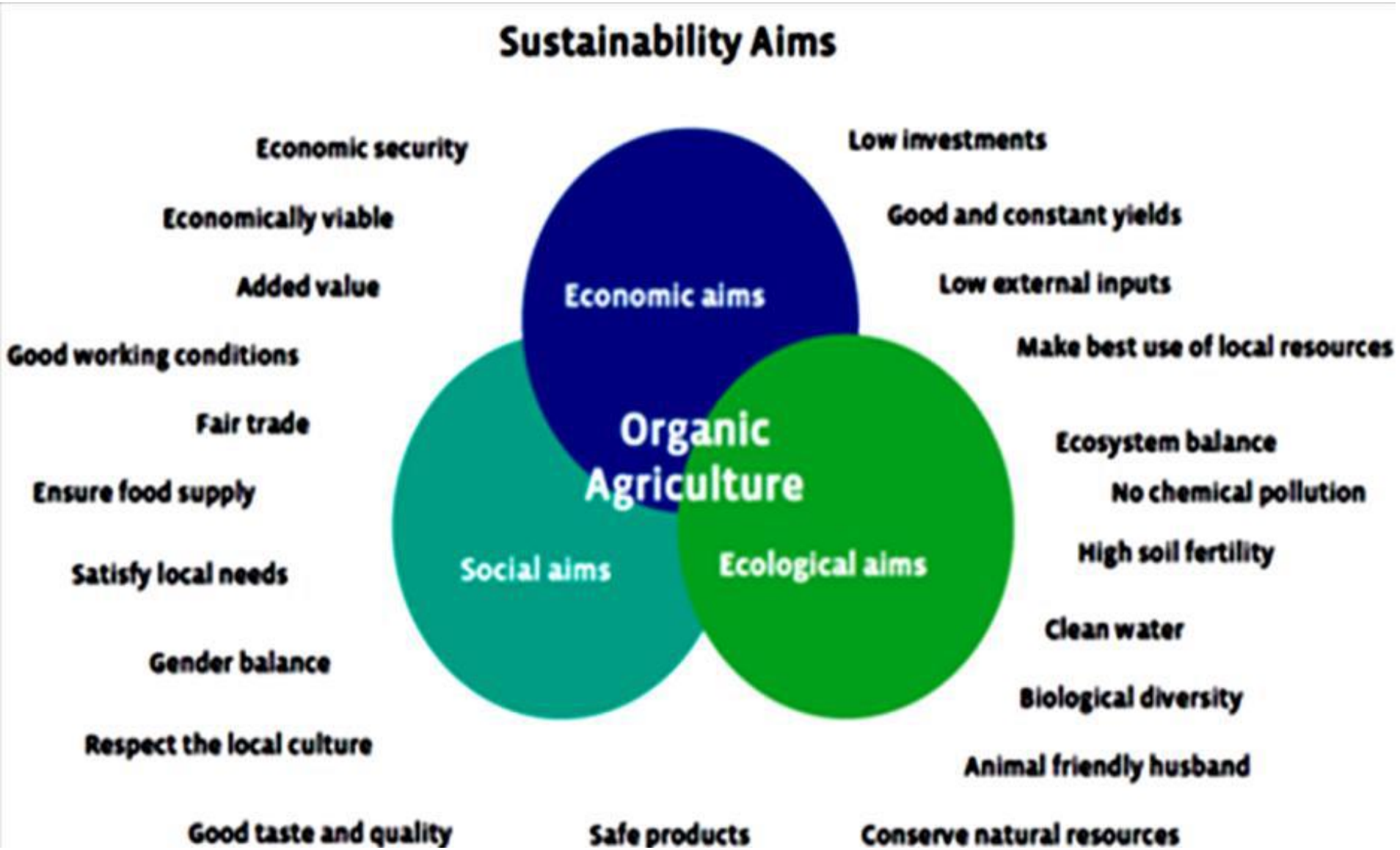
- Prabhu L. Pingali, 2012, **Green Revolution: Impacts, limits, and the path ahead,** edited by William C. Clark, Harvard University, Cambridge, MA, and approved June 25, 2012 (received for review April 2, 2012), July 31, 2012, 109 (31) 12302-12308 https://doi.org/10.1073/pnas.0912953109

- **A resilient and sustainable agriculture system** is required to face different environmental challenges.
- **Sustainable agriculture** includes different eco-friendly farming techniques that boost crop yield and livestock production without having an adverse effect on the environment.

Why Organic/ Natural Agriculture?



Natural Farming: Anchoring a Sustainable Way of Farming!

- **Natural Farming** offers a solution to various problems, such as
- **Food insecurity, farmer's distress, and health problems** arising due to
- **Pesticide and chemical residue in food and water**
- **Global warming, climate change and**
- **Natural calamities.**
- Potential to **generate employment**, thereby stemming the migration of rural youth.
- **Natural Farming**, as the name suggests, is the art, practice and, increasingly, the science of **working with nature** to achieve much more with less.

Natural Farming (NF)

- **'Natural farming'** refers to a farming approach that emphasizes the importance of **co-production of crops and animals so that synergistic effects** of different parts of the system can be used, relying on easily available 'ingredients' to produce crops on-farm and microorganisms to build the fertility of the soil (Palekar, 2006).
- Natural Farming (NF): it releases nutrients locked up in the soil by triggering **microbial activities** and bring the **earthworms activities** back and encourage plants to fix the moisture from the air.
- NF is regenerative; it **increases the carbon content in the soil** allows us to retain more water in soil creating life in the soil with humus which increases the fertility of the soil.

Natural Farming (ZBNF)

- **Natural Farming** is a holistic agriculture method seeks to eliminate purchase of toxic pesticides and fertilizers, yield healthy crops, healthy living and environment friendly farming.
- **Natural Farming promises to**

1. End a reliance on loans,
2. Cut production costs and
3. Helps rural development

- 'Natural farming' means

farming *with* Nature and *without* chemicals.

Nature has its Own course

- NF gained importance way back 1940's

One straw revolution (Masanobu Fukuoka) : do nothing farming or NO tillage farming

Some of the popular practices :

Rishi Kheti (Agriculture of the sages) :

- Banned the turning of soil,
- Stop use of chemical fertilizer but addition of OM
- The soil turned to soft, airy and moist and encourages the **rejuvenation of the earthworms**
- Natural tillers
- Nourishment of the top soil
- Soil become fertile
- Encourage cover crops or vegetation

CONCEPT & SCENARIO OF

Natural Farming

- It is a diversified farming system that integrates crops, trees and livestock, allowing the optimum use of functional biodiversity.
- Natural Farming if done effectively enhances farmers' income while delivering many other benefits, such as restoration of soil fertility and environmental health, and mitigating and/or reducing greenhouse gas emissions.
- Natural Farming builds on natural or ecological processes that exist in or around farms.

Features of Natural Farming

- According to natural farming principles, plants get 98% of their supply of nutrients from the air, water, and sunlight.
- Remaining 2% can be fulfilled by good quality soil with plenty of friendly microorganisms (Just like in forests and natural systems)
- The soil is always supposed to be covered with organic mulch, which creates humus and encourages the growth of friendly microorganisms.
- Farm made bio-cultures named 'Jeevamrit, Beejamrit etc.' are added to the soil instead of any fertilizers to improve microflora of soil.
- Jeevamrit, Beejamrit are derived from very little cow dung and cow urine of desi cow breed.
- It holds the promise of enhancing farmers' income while delivering many other benefits, such as restoration of soil fertility and environmental health, and mitigating and/or reducing greenhouse gas emissions.

Features Contd

- The system requires cow dung and cow urine (Gomutra) obtained from Indian breed cow only.
- Desi cow is apparently the purest as far as the microbial content of cow dung, and urine goes.
- In natural farming, neither chemical nor organic fertilizers are added to the soil.
- In natural farming, decomposition of organic matter by microbes and earthworms is encouraged right on the soil surface itself, which gradually adds nutrition in the soil, over the period.
- In natural farming no tilting of soil and no fertilizers, is done just the way it would be in natural ecosystems.
- Natural, farm-made pesticides like **Dashparni ark and Neem Astra** are used to control pests and diseases.
- Weeds are considered essential and used as living or dead mulch layer.
- Multi-cropping is encouraged over single crop met

Principles of Natural Farming

- In natural farming chemical or organic fertilizers are not added into the soil
- Decomposition of organic matter by microbes and earthworms is encouraged right on the soil surface itself, which gradually adds nutrition in the soil, over the period.
- In natural farming plowing, tilting of soil is not done and it remains in a way, just like in natural ecosystems.
- Healthy soil microbiome is the key to retaining and enhancing soil organic matter.
- Concoctions are necessary to enhance the fertility of soil.
- There are different ways of making concoctions.
- In India, the most popular concoctions are based on fermentation of animal dung and urine, and uncontaminated soil like Jeevamrit, Beejamrit, Ghanjeevamrit etc.

Scope of Natural Farming

- There are many working models of natural farming all over the world, the zero budget natural farming (ZBNF) is the most popular model in India.
- Andhra Pradesh, Himachal Pradesh and Gujarat are the leading States and other States like UP, MP, Odisha, Chatisgarh and UK are also promoting natural farming.
- Due to diverse agro climate and strength of traditional knowledge, practicing farmers there are lot of scopes for taking up natural farming in our country.
- Natural Farming improves soil fertility, environmental health as well as helps in the reduction of GHG's and also promises the enhancement of farmer's income.
- In broad terms, Natural Farming can be considered as a prominent strategy to save the planet Earth for future generations.

Scope

- Around 85 percent of the operational holdings in the country are small and marginal,

Particulars	2000-01	2010-11	% change
No of marginal holdings	75.41 million	92.83 million	23 %
No of small holdings	22.70 million	24.78 million	9.70%

For small holding organic and natural farming is better option as it provide greater opportunity for on farm management of resources.

Importance of Natural Farming

- Several studies have reported the effectiveness of natural farming in terms of increase in production, sustainability, saving of water use, improvement in soil health and farmland ecosystem.
- It is considered as a cost- effective farming practices with scope for raising employment and rural development.
- Natural Farming offers a solution to various problems, such as food insecurity, farmers' distress, and health problems arising due to pesticide and fertilizer residue in food and water, global warming, climate change and natural calamities.
- Natural Farming, as the name suggests, is the art, practice and, increasingly, the science of working with nature to achieve much more with less.
- It has the potential to manage the various farmland practices and hence sequester the atmospheric carbon in the soils and plants, to make it available for plants.

Benefits of Natural Farming

- **Improve Yield**
  Farmers practicing Natural Farming reported similar yields to those following conventional farming. In several cases, higher yields per harvest were also reported.
- **Ensures Better Health**
  As Natural Farming does not use any synthetic chemicals, health risks and hazards are eliminated. The food has higher nutrition density and therefore offers better health benefits.
- **Environment Conservation**
  Natural Farming ensures better soil biology, improved agrobiodiversity and a more judicious usage of water with much smaller carbon and nitrogen footprints.
- **Increased Farmers' Income**
  Natural Farming aims to make farming viable and aspirational by increasing net incomes of farmers on account of cost reduction, reduced risks, similar yields, incomes from intercropping.

Benefits contd…

- **Minimized Cost Of Production**
  Natural Farming aims to drastically cut down production costs by encouraging farmers to prepare essential biological inputs using on-farm, natural and home-grown resources.
- **Eliminates Application Of Synthetic Chemical Inputs**
  The overuse of synthetic fertilizers, especially urea, pesticides, herbicides, weedicides etc. alters soil biology and soil structure, with subsequent loss of soil organic carbon and fertility.
- **Rejuvenates Soil Health**
  The most immediate impact of Natural Farming is on the biology of soil—on microbes and other living organisms such as earthworms.
- Soil health depends entirely on the living organisms in it.
- **Livestock Sustainability**
  The integration of livestock in the farming system plays a important role in Natural farming and helps in restoring the ecosystem.
- Ecofriendly bio-inputs, such as Jeevamrit and Beejamrit, are prepared from cow dung and urine, and other natural products.

Current Scenario of Natural Farming in India

- There are several states practicing Natural Farming. Prominent among them are Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh, Karnataka and Tamil Nadu.
- Till now 6.5 lakh ha area is covered under natural farming in India.
- State governments of different states are promoting natural farming through various schemes.

Andhra Pradesh

The Government of Andhra Pradesh turned to farming approaches that are **in harmony with nature,** as they build on ecological science, rather than input economics.

- By improving the ecological conditions in each and every site, it is witnessed that Natural Farming reduces the need for synthetic inputs and deliver instead a form of farming that costs less, in financial terms, and is climate resilient.
- **The Andhra Pradesh Community-Managed Natural Farming (APCNF)**

  This programme is being implemented by **Rythu Sadhikara Samstha (RySS),** a not-for-profit company established by the Department of Agriculture, Government of Andhra Pradesh.
- RySS's mandate is to plan and implement programmes for the empowerment and all-round welfare of farmers.

Gujarat

In Budget 2020–21, special financial assistance was announced for promoting Natural Farming practices under the

Gujarat Atma Nirbhar package.

Further, on 17 September 2020, two schemes were launched—

Sat Pagla Khedut Kalyaan and

Pagala for Natural Farming—by the Government of Gujarat.

- **Himachal Pradesh**

Himachal Pradesh practices Natural Farming under the

PK3: Prakritik Kheti Khushhal Kissan Yojana.

The scheme aims to reduce the cost of cultivation and enhance farmers' income.

The scheme seeks to promote the production of food grains, vegetables, and fruits without the use of synthetic chemicals/pesticides and fertilizers.

Rajasthan

Honorable Chief Minister of Rajasthan during the budget speech of FY2019-20 declared support to natural farming to reduce input costs with a view to empower farmers through remunerative agriculture – **Kheti Mein Jaan Toh Sashakt Kisan.**

The scheme in the form of a pilot project was initiated in three districts of the State viz. Tonk, Sirohi and Banswada.

Under the scheme, 18,313 farmers were trained in a two-day long workshop conducted by master-trainers of the Department.

KARNATAKA

- Operational Research Project on Natural farming Project: Covered 20000 ha area under demonstration in 10 agro climatic zones of Karnataka and Research on validation of natural farming in different crops and cropping system
- Chief Ministers Natural farming : Encouraging Natural farming in suitable crops and cropping system in 5000 acres covering all 10 zones of Karnataka. Supported financial assistance @ 20000/ha through DBT for adopting farmers

GoI Initiatives on NF

- **July, 2018:** **First Conference On Natural Farming**
- **Padma Shri–awardee Shri Subhash Palekar,** the pioneer of this practice, was one of the key speakers in this conference.
- **July, 2019:** **Wider Consultation With States:** States were asked to adopt this model and invite Padma Shri–awardee Shri Subhash Palekar to train the farmers.
- **Announcement By Hon'ble Finance Minister In Budget Speech On Promoting Natural Farming** 'We shall go back to basics on one count: Zero Budget Farming.'
- **PM Modi Appeals To Farmers To Cut Down The Use Of Chemical Fertilizers And Pesticides**
- **May, 2020:** **NAARM-CRIDA Collaborative Project On Adoption Of Natural Farming And Its Effect On Crop Yield And Farmers' Livelihood In India**
- **September, 2020:** **National-Level Consultation On BPKP-Natural Farming**
- "Principles and Practices of BPKP (Bharatiya Prakritik Krishi Paddhati)-Natural Farming"

GoI Initiatives on NF contd.,

- **October, 2020: Meeting On Natural Farming**
- To discuss the next steps to take natural farming forward, including the collection of empirical evidence, scientific validation, and preparation of success…
- **December, 2019: New Approaches To Sustainable Farming System:**
- The attendees agreed that it is essential to document all natural farming practices in detail and enhance the value of BPKP products through value addition and decided that the KVK staff should be trained
- **January, 2020: Report Launch Of CEEW-ZBNF:** 'Can Zero Budget Natural Farming Save Input Costs and Fertilizer Subsidies? Evidence from Andhra Pradesh?'

Some of the key findings of AP:

- On average, to cultivate rice, farmers spend Rs 5,961 per acre on chemical inputs. Those practicing ZBNF only spend Rs 846 per acre on natural inputs.
- ZBNF farmers cultivating maize spent Rs 503 per acre on natural inputs, whereas those using chemical inputs spent Rs 7,509 per acre.
- To cultivate groundnut, a farmer using chemical inputs spent Rs 1,187 per acre as against Rs 780 per acre spent by a ZBNF farmer.
- The median input cost of ZBNF farmers cultivating rice was Rs 12,200 per acre compared to Rs 14,700 spent by non-ZBNF farmers.
- For maize cultivators, the median expenditure per acre for ZBNF farmers was Rs 15,660 while that for non-ZBNF farmers was Rs 17,425.
- A ZBNF farmer cultivating rice can avoid fertilizer consumption by 83% to 99%.
- For groundnut, ZBNF would lead to a usage reduction of almost 70% urea and 91% DAP.

May, 2020: High-Level Round table On Agroecology And Natural Farming

- Natural Farming offers a potential pathway out of the agricultural crisis in India—high input costs, fragile production systems, excessive and often polluting uses of inputs, and farmer indebtedness.
- NF can help us 'build back better', not just by making agriculture both resilient and productive, but also by providing new, green jobs and improving the quality of food and ecosystem services.

May, 2020: NAARM-CRIDA Collaborative Project On Adoption Of Natural Farming And Its Effect On Crop Yield And Farmers' Livelihood In India

- The results showed that although crop yield in Natural Farming is not higher compared to conventional farming, however, when supplemented with FYM/ghanajivamrit, the yield improves significantly.
- Due to a substantial reduction in input costs in Natural Farming as compared to conventional farming, a significant reduction in the cost of cultivation of all the crops is also recorded.
- This results into better profitability (B:C ratio) for farmers.
- Natural Farming may not be looked at as a yield-enhancing practice. However, it definitely increases farmers' income through cost reduction.
- The benefits are manifold: ranging from less cost of cultivation, better quality and taste to premium price.

September, 2020 :National-Level Consultation On BPKP-Natural Farming

- Natural Farming systems, which involve the usage of inputs available in the farm, support quality agricultural commodities, improve the livelihood of farmers, and posit a socio-economic sustainable farming practice.
- The consultation provided a platform for an informed exchange on the principles and practices of BPKP for the welfare of Indian farmers and consumers, and discussed **long-term benefits of ground-level implementation on soil health, cost of production, environment, biodiversity, and production and quality of produce.**

- **November, 2020: Lecture Series On Natural Farming**
- Dr Dorin discussed a new paradigm for Indian agriculture: to convert small-scale farming into comparative advantage.
- Land and farm labour productivities can be increased not through few large mono productions (such as that of rice, wheat, sugarcane, and others) with costly industrial inputs (such as through seeds, fertilizers, pesticides, fossil energies, and others), but through context-specific agro-ecosystems boosting biological synergies, below and above the ground
- **June, 2021**
- **A Collaborative Work Plan, Including A Project On Natural Farming Between ICAR And World Agroforestry (International Council For Research In Agroforestry-ICRAF), Kenya, Signed Under The Existing Memorandum Of Agreement**
- **To rejuvinate the denuded land through NF and BPKP**

June, 2021

Meeting With Ministry Of Rural Development For Discussing Scaling Up Of Natural Farming

- It was proposed to undertake pilot studies in Himachal Pradesh, Andhra Pradesh, Gujarat, Meghalaya, Sikkim, Karnataka, Madhya Pradesh and Bihar for cereal crops and a five-layer model of horticulture crops with the involvement of Lokbharti Foundation.
- **May, 2022**
- **National Workshop On "Innovative Agriculture" And Release Of Compendium Of Success Stories Of Natural Farming**
- A bilingual compendium of success stories of natural farming, comprising of 110 success stories from 13 states across India, was released during the event.

Four Wheels of Natural farming

Components of Natural Farming

Deshi cow

Bheejamruth

ಬೀಜಾಮೃತ

Jeevamruth

ಜೀವಾಮೃತ

ನೈಸರ್ಗಿಕ ಕೃಷಿ

ಬೆಳೆ ಸಂರಕ್ಷಣೆ ಪರಿಕರಗಳು

ಅಚ್ಛಾದನೆ

Mulching

Neemastra, Brahmhstra, Agni Astra, Dashaparni ,Shunti astra & Sour butter milk

ವಾಫಸಾ
(ಮಣ್ಣಿನಲ್ಲಿ ನೀರು ಮತ್ತು ಗಾಳಿಯಾಡುವಿಕೆ)

Vaphasa Aeriation

FOUR WHEELS OF ZBNF

1. Beejamrutha

   Seed Treatment using local cow dung, cow urine and Lime)

2. Jeevamrutha

   Applying inoculation of microbial consortia made of local cow dung and cow urine without any fertilizers and pesticides

3. Mulching

   activities to ensure favorable microclimate in the soil

4. Aeration

   soil aeration/ Moisture

Natural farming Practices

- Natural farming aims at restoring soil health, maintenance of diversity, ensure animal welfare, stress on efficient use of natural/local resources and promote ecological fairness.
- Natural farming is an ecological farming approach where farming system works with the natural biodiversity, encouraging the soil's biological activity and managing the complexity of living organisms both plant and animal to thrive along with food production system.

Important practices, essential for adoption of natural farming includes:

- No external inputs,
- Local seeds (use of local varieties),
- On-farm produced microbial formulation for seed treatment (such as bijamrita),
- On-farm made microbial inoculants (Jivamrita) for soil enrichment,
- Cover crops and mulching with green and dry organic matter for nutrient recycling and for creating a suitable micro-climate for maximum beneficial microbial activity in soil.
- Mixed cropping,
- Managing diversity on farm through integration of trees
- Management of pests through diversity and local on-farm made botanical concoctions (such as neemastra, agniastra, neem ark, dashparni ark etc);
- Integration of livestock, especially of native breed for cow dung and cow urine as essential inputs for several practices and
- Water and moisture conservation.

AIMS AND OBJECTIVES FOR NATURAL FARMING PROMOTION:

- Preserve natural flora and fauna
  - Restore soil health and fertility and soil's biological life
  - Maintain diversity in crop production
  - Efficient utilization of land and natural resources (light, air, water)
  - Promote natural beneficial insects, animals and microbes in soil for nutrient recycling and biological control of pests and diseases
  - Promotion of local breeds for livestock integration
  - Use of natural / local resource-based inputs
  - Reduce input cost of agricultural production
  - Improve economics of farmers

Definition of Natural Farming

- “Natural Farming is a chemical-free traditional farming method. It is considered as an agroecology based diversified farming system which integrates crops, trees and livestock with functional biodiversity”-Niti Ayog
- Natural farming is a system where the laws of nature are applied to agricultural practices.
- Natural Farming builds on natural or ecological processes that exist in or around farms. It is largely based on “on-farm biomass recycling with major stress on biomass mulching, use of on-farm cow dung-urine formulations; maintaining soil aeration and exclusion of all synthetic chemical inputs.
- Natural farming is expected to reduce dependency on purchased inputs. It is considered as a cost- effective farming practice with scope for increasing employment and rural development.

BPKP & PKVY National Mission on Sustainable Agriculture (NMSA).

- BPKP aims at promoting traditional indigenous practices, which give freedom to farmers from externally purchased inputs.
- It focuses on on-farm biomass recycling with major stress on biomass mulching; use of cow dung–urine formulations; and exclusion of all synthetic chemical inputs either directly or indirectly.

Japan experience and principles

- Principles and requirement of nature farming today
- 1. It must produce high quality food to enhance human health.
- 2) It must be economically and spiritually beneficial to both farmers and consumers.
- 3) It must be sustainable and easily applied.
- 4) It must confirm to nature and protect the environment.
- 5) It must produce enough food for the world population.

II In harmony with nature

- Living in harmony, Harmony for sustainability

Principles in harmony for nature farming

- Healthy principle, Ecological principle
- Fairness principle, Principle of consideration

Technologies in nature farming systems

- Effective microorganisms (Basic understanding & Types of EM)
- Expanding active EM solution.
- Intercropping for a healthy crop
- Mulching with crop residuals to avoid diseases and increase biodiversity
- Mulching with crop residuals to control weeds
- Mulching with crop residuals to increase biodiversity
- No-tillage to enrich biodiversity and improve soil properties
- Enrichment of symbiotic relationships in crop plant by inoculating mycorrhiza and rhizobia
- Integrated weed control by intercropping and applying organic materials
- Weed control in upland field by applying organic biofertilizer
- Weed control in upland field by mulching with crop residuals
- Weed control in upland field by intercropping a smother crop
- Weed control in paddy field by applying organic materials

Natural Farming for Sustainable Development Goals (NITI AYOG)

Natural farming practices- Socio-economic-environment-friendly farming will support in achieving the UN- Sustainable Development Goals by 2030.

Agroecological practices like Natural Farming being a cost-effective and ecologically compatible alternative would be an enabler in achieving the Sustainable Development Goals.

NHEP

- By reducing input costs, they can ensure better income and financial stability, which would in turn help alleviate poverty, bring in gender equality and ensure sustainable production and consumption patterns.
- This method would ensure food security and zero hunger through better yield, diversity in cropping and access to a suite of nutritional sources and income-generating crops throughout the year.

NF IN SG contd.

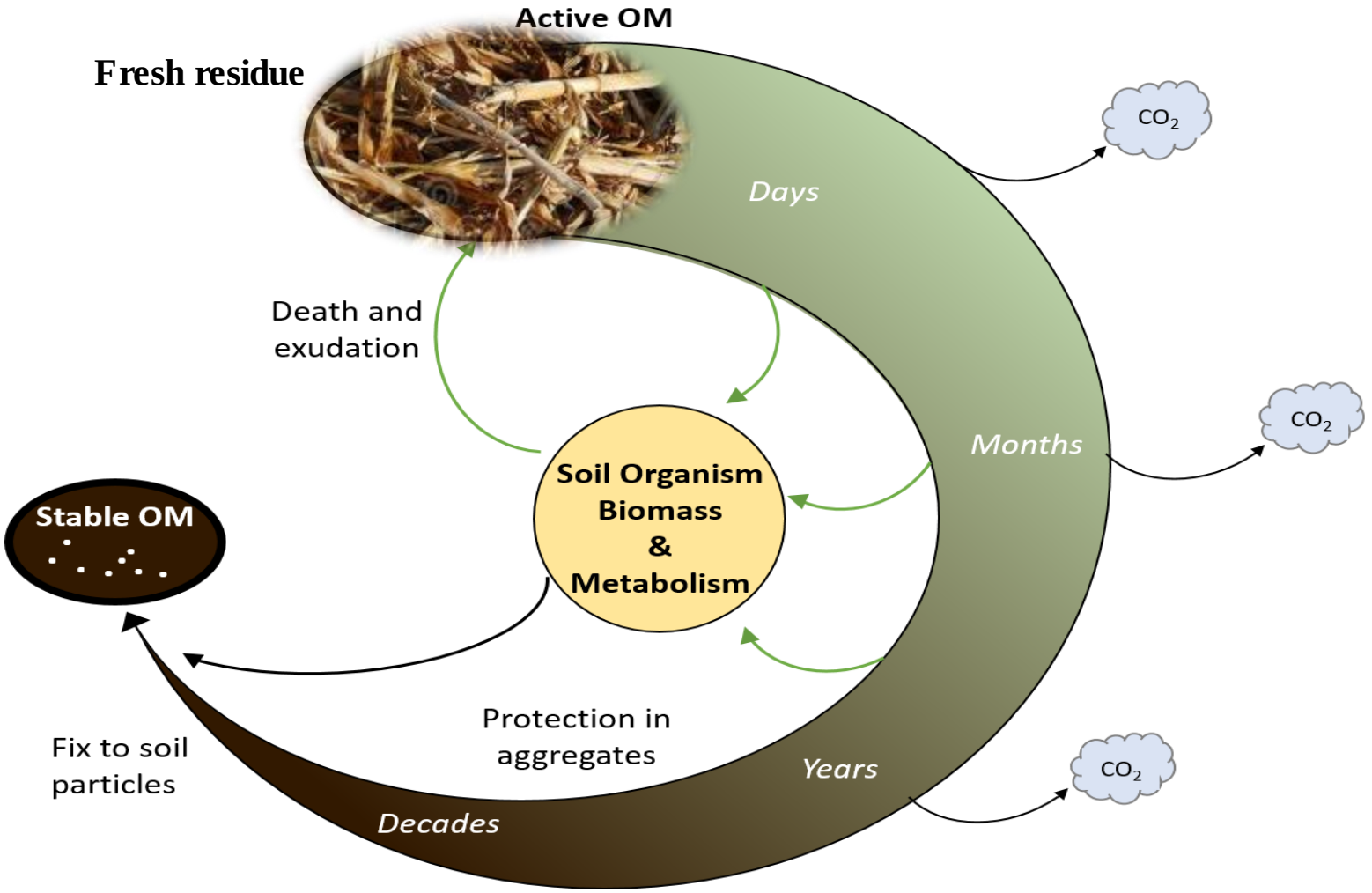
- The water-conserving and ecological-preservation aspects of Natural Farming contribute to the availability and sustainable management of water, reduction of CO2 emissions in various stages of agricultural value chain.
- The reduced use of chemical inputs in agriculture in turn would result in arrest of land degradation; reduce ocean acidification; and marine pollution from land-based activities.
- Natural Farming would ensure good health of farmers consumers and can contribute to the reduction of various diseases in the community.
- (*Source:* https://www.ceew.in/publications/zero-budget-natural-farming-sustainable-development-goals-

Thank You

Soil Organic Carbon and Soil Health

‘Healthy soil for healthy life’

Transformation of organic matter in soil

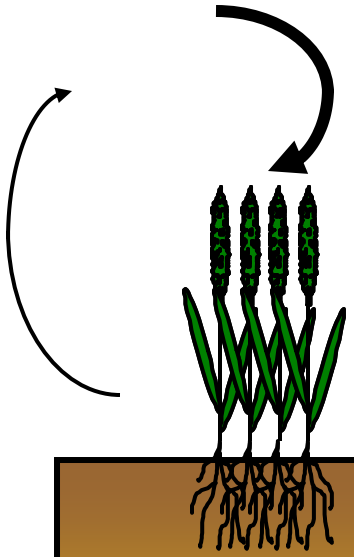


Better C-sequestration-

Identify crops and cropping systems which produce

- **more biomass**
- **greater root volume**
- **more lignin content**

Improved Agricultural Practices



Soil organic matter

Trash management

Trash as mulching in sugarcane

Trash roller

Trash as feedstock for bio refineries

Trash Rolling

Corn stalk straw biomass pellets

Organic Agriculture

- **Organic agriculture** is an integrated production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity (FAO/WHO Codex Alimentarius Commission, 2007).

Characteristics of organic agriculture

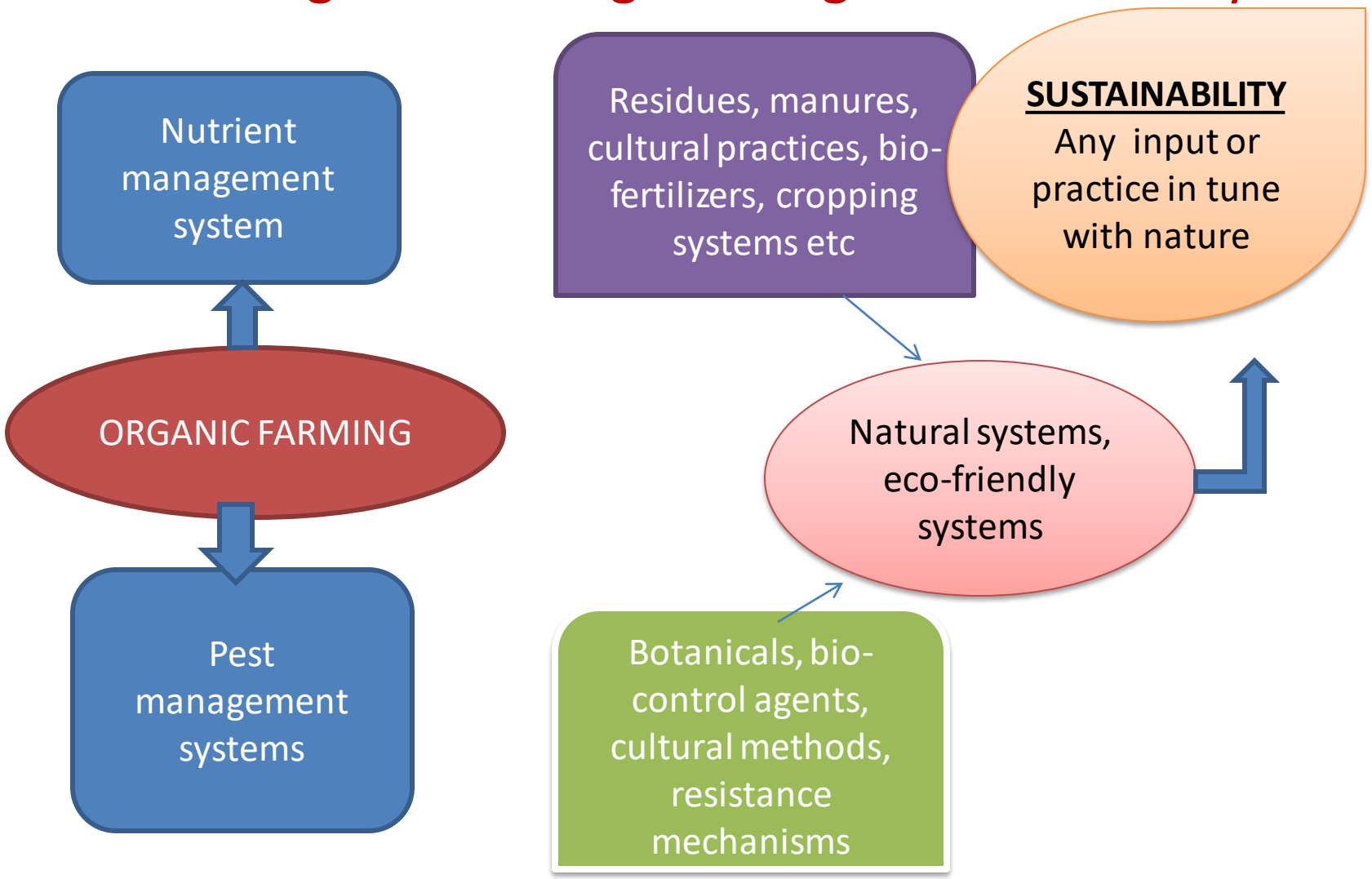
- Farm practices that emphasize ecological sustainability.
- Less driven by off-farm inputs
- Embedded in ecosystem functions.
- Positive effects on
- Soil fertility,
- Biodiversity maintenance and
- Protection of the natural resources like

soil, water and air.

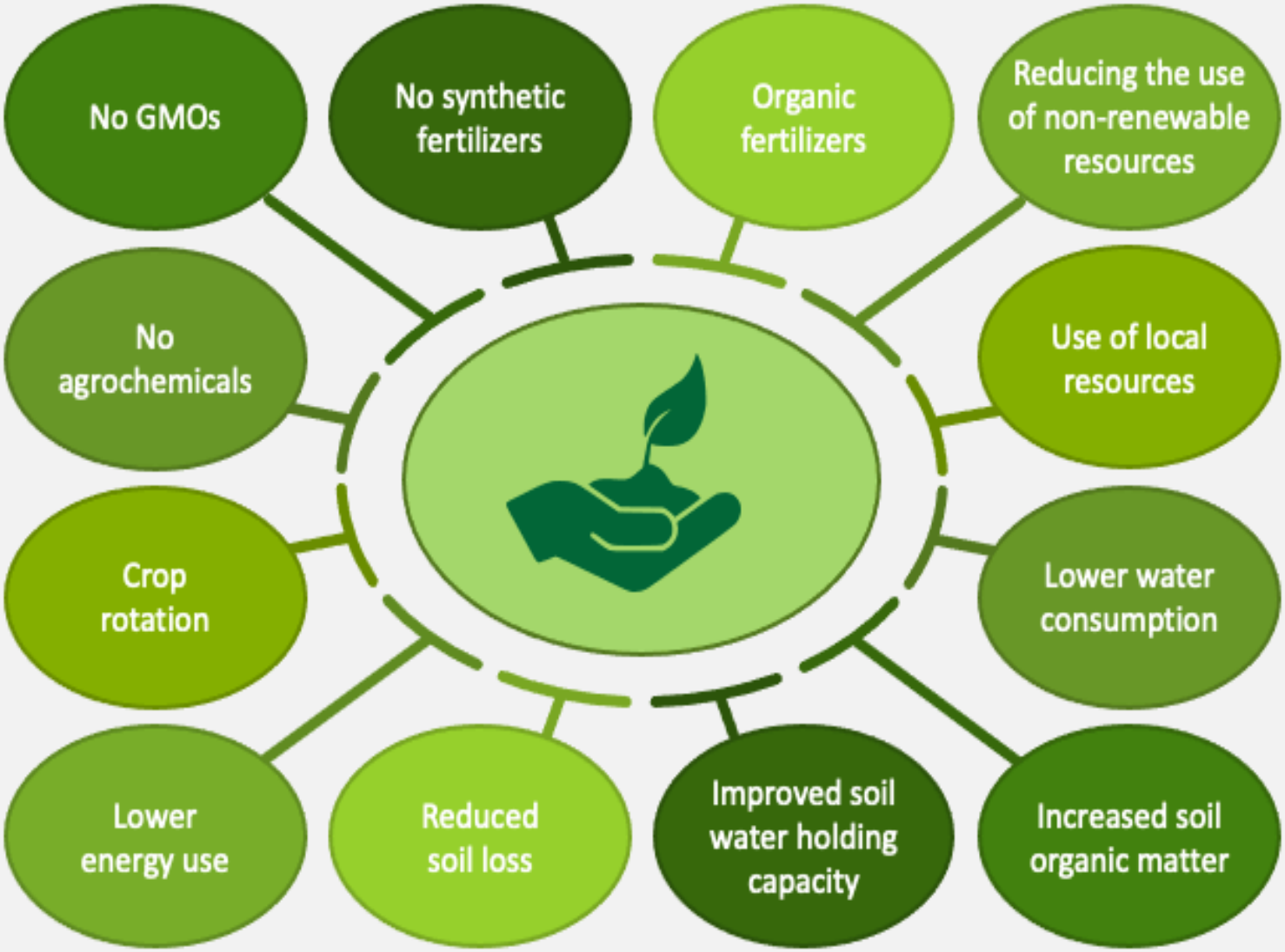
Principles of Organic Farming

- Principle of health
- Principle of ecology
- Principle of fairness
- Principle of Care

Features of organic farming- leading to sustainability



Practices in organic farming



ORGANIC FARMING

Benefits of Organic Farming

01 Discourage environmental exposure to pesticides & chemicals

02 Builds healthy soil

03 Helps combat erosion

04 Fights the effects of global warming

05 Supports water conservation & water health

06 Discourage algae blooms

07 Supports animal health and welfare

08 Encourage biodiversity