

# How to prepare and use compost for sustainable agriculture + Topics on Green Manure

## Part 4: Benefits of compost.

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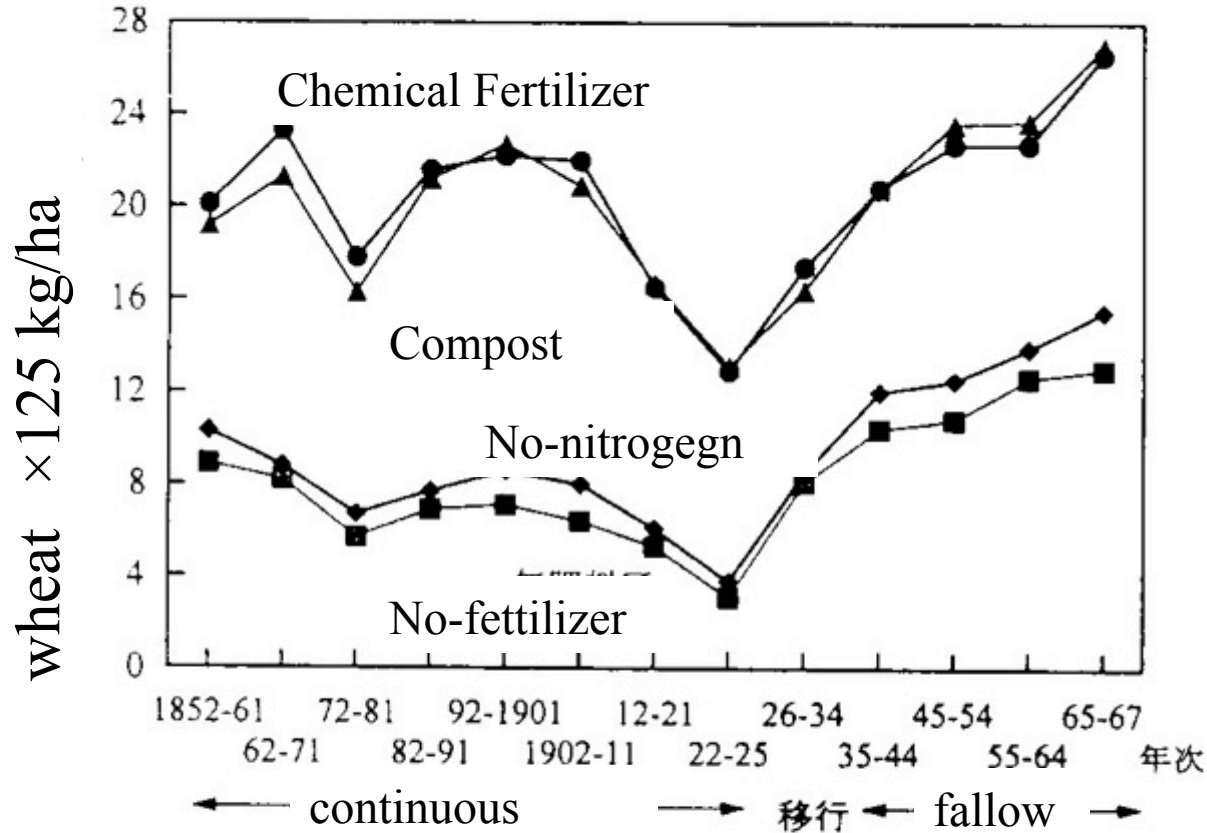
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# Plant available nutrients and micro-nutrients

- As compost breaks down in soils, it provides the fertilizer nutrients of nitrogen, phosphate, and potassium in forms that are readily available to plants.
- Compost functions as slow release store of nutrients, so that nutrients are available to plants as they require them.
- Compost also provides a wide range of important micro-nutrients not found in commercial fertilizers.

# Rothamsted Field Experiment

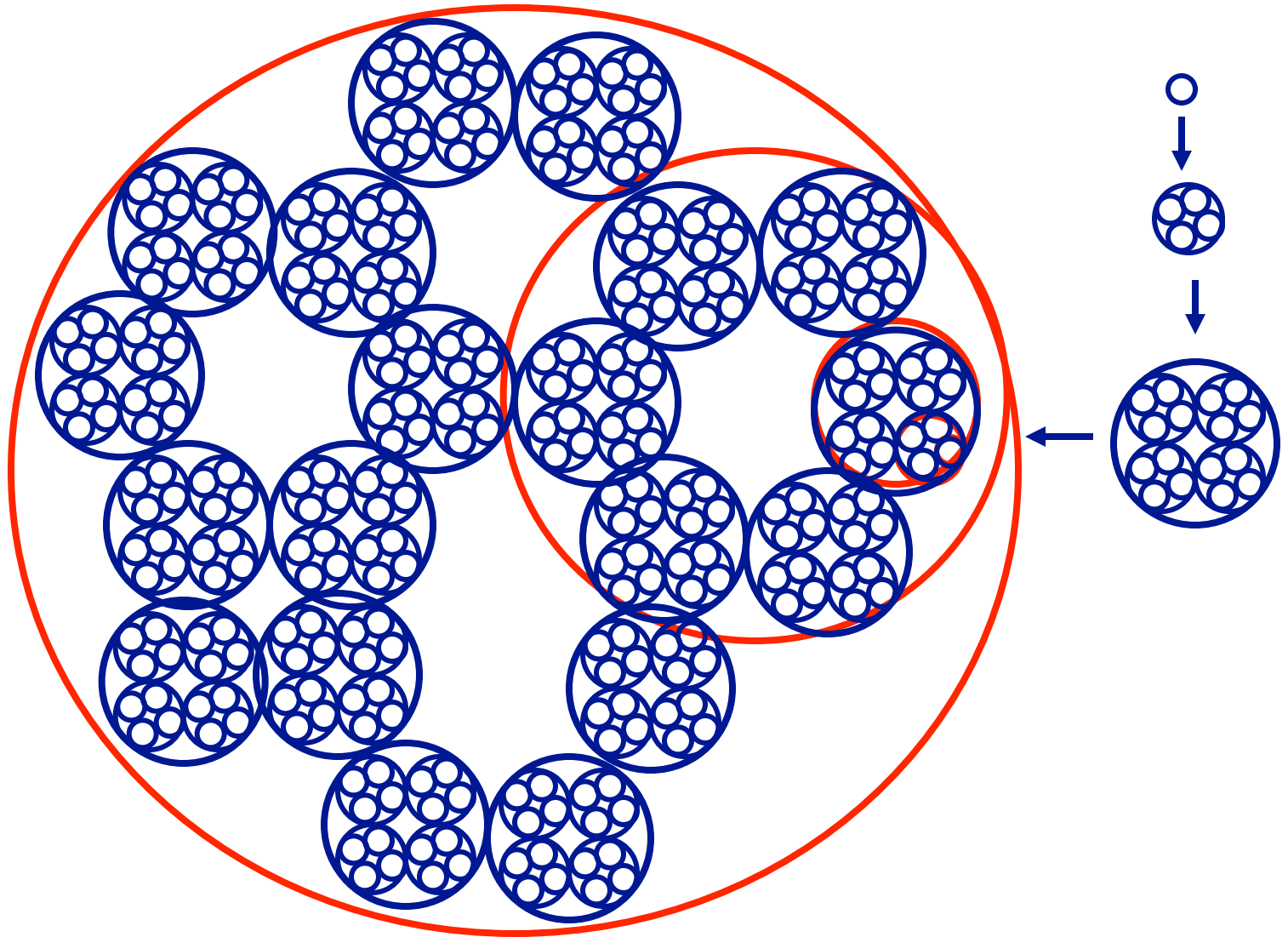
- In the very famous long term field experiment conducted in England, the effect of compost was proved to be no more than the effect of chemical fertilizer.
- It is a very important information, but we have to examine whether it is also applicable to the present agriculture.



**Rothamsted long term experiment (>150 years) for the effects of chemical fertilizers and compost. Crop: Winter wheat**

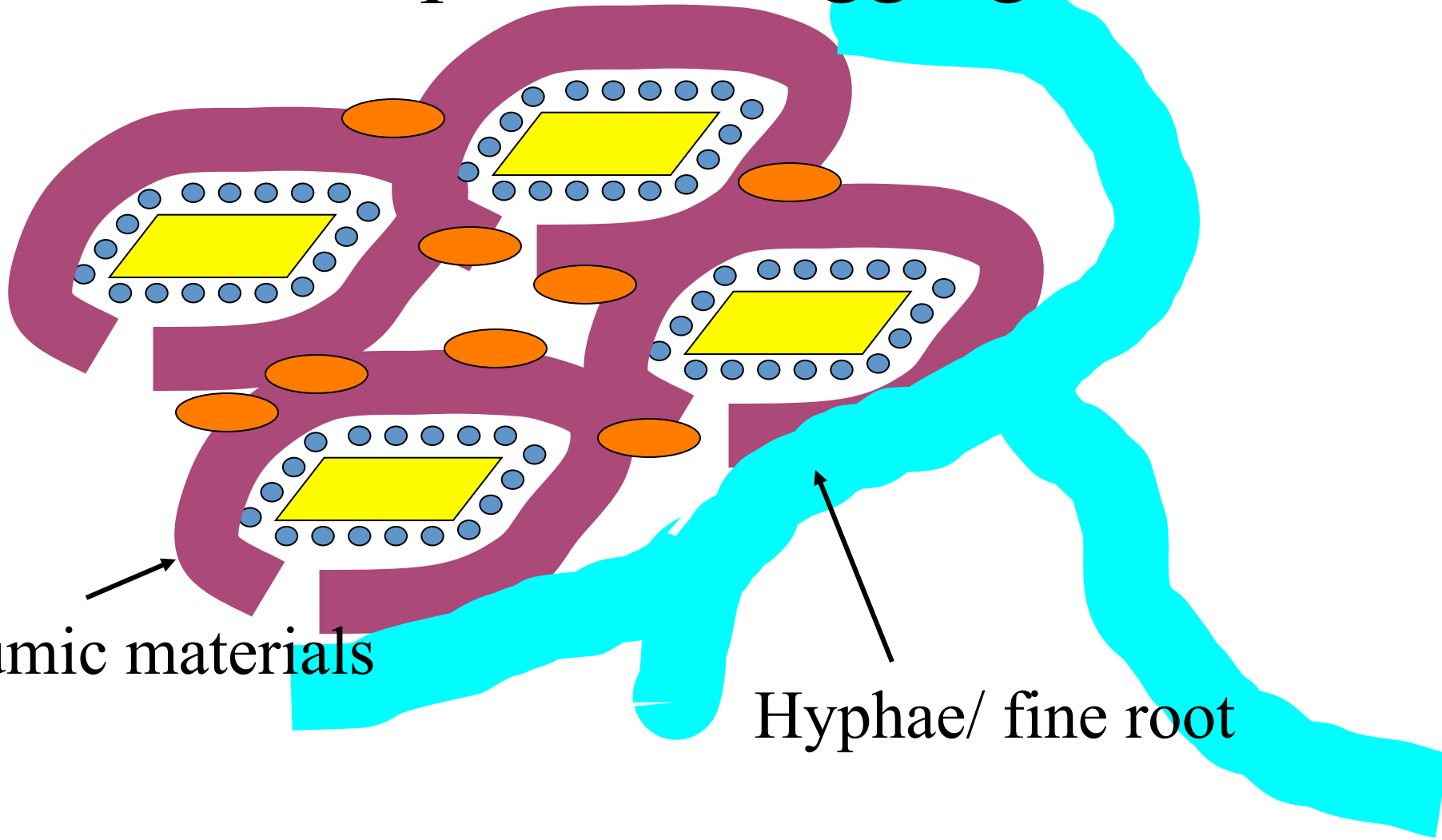
# Organic matter

- The organic matter in compost increases the water holding capacity of the soil.
- Compost makes heavy soils lighter.
- Organic matter retain moisture and nutrients in the root zone.
- Soil structure is improved, allowing effective drainage, extensive root growth, and soil aggregate stabilization.



Hierarchical Structure of Soil Aggregate

# Concept of soil aggregate



Humic materials

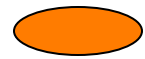
Hyphae/ fine root



Clay



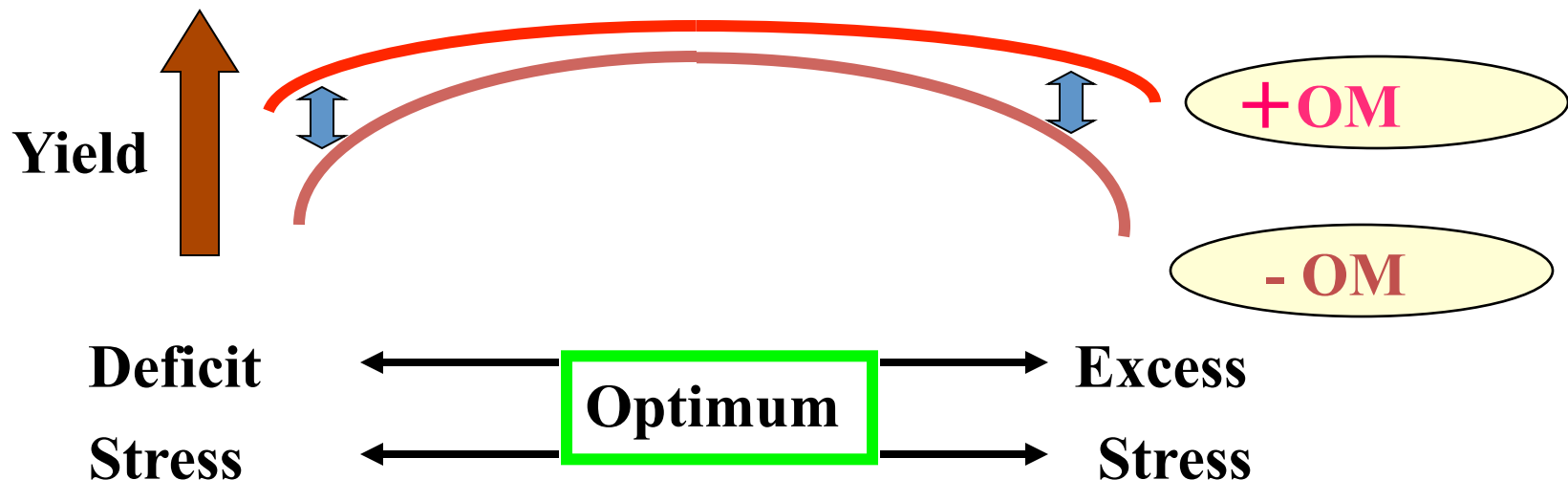
Polyvalent cations



Bacteria

# Plant growth promoting effect of OM

1. Hormone like action
2. Abate the disorder under cold or irregular weather
3. Stable production under deficit or excess of nutrients





# Biological activity

- **Earthworm activity is encouraged, so that further enhancing fertility.**
- **Compost supplies a range of microorganisms that enhance the health of both soil and crops.**
- **Compost appears to suppress some types of plant diseases.**
- **Compost will be a food for heterotrophic soil microbes and supports the richness and heterogeneity of soil fauna.**

# Weed seed and pathogen free

- Properly processed compost will not introduce weed seeds or human pathogens when applied.

# Improve the quality of crops

- Crops grown with compost contain less nitrate and more carbohydrates and vitamins. Thus, it improves the health of people who eat the crops.

# Difficulties in Compost Utilization

- Uneven distribution and deficiency of raw materials for compost making
- Hard work for preparation and application of compost
- Special technology, skill, and facilities are required for the production of compost
- Variation in constituents and effectiveness of compost

# Difficulties in Compost Utilization 2

- Occurrence of microbes tolerant to antibiotics, and germ microbes (in case compost was produced at low temperature)
- Enhancement of soil born plant disease for potato and soy bean.
- Contamination of raw materials by heavy metals

# Conclusion 1

- Production of compost is indispensable for reducing the environmental load of dairy farming, maintaining the fertility of farm soils, and creating healthy soils and crops. The qualities of composts, however, differ considerably from product to product, because different kinds of raw materials are used besides animal feces and various methods of compost preparation are adopted.

# Conclusion 2

- Some of the composts may be unfavorable for use in agriculture. It is important for us to **keep the principles in compost preparation** (for example, activating aerobic process, experiencing the thermophilic period, providing enough duration for maturing, minimizing the mixing of heavy metals and foreign / artificial materials), in order to make safe and effective composts.

# Conclusion 3

- On the other hand, preparation and utilization of compost both require a huge labor. Reward for this labor is not remarkable, because higher yield of crops can be achieved by the use of cheaper chemical fertilizers and cheaper crops may be imported from foreign countries.



# Conclusion 4

**Community based organic matter recycling project --- Subsidy**

**and the understanding from the consumer is, therefore, very important.**

**Awareness to environment, ecology, and health helps the utilization of compost.**