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Organic and inorganic farming practices in east Khasi Hills District, Meghalaya

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Abstract
Agriculture is the primary livelihood source for the people of Meghalaya, where different climatic conditions and rich soils support colourful husbandry systems. Traditionally, growers have rehearsed organic styles similar as mixed cropping, composting, crop gyration, and the use of beast ordure to maintain soil fertility and ecological balance. These practices have sustained original biodiversity and assured long- term soil health. Still, with adding population pressure and the demand for advanced yields, numerous growers have shifted toward inorganic husbandry styles involving chemical diseases, fungicides, and cold-blooded seeds. While inorganic husbandry has helped in perfecting short- term productivity, it has also led to soil nutrient loss, water pollution, and reduced soil microbial exertion. In discrepancy, organic husbandry preserves environmental quality, improves soil structure, and promotes sustainable husbandry, though it may yield lower originally. The concurrence of both systems in Meghalaya reflects an agrarian transition driven by modernization and request requirements. Government enterprise similar as organic instrument, planter training programs, and the creation of bio- fertilizers are encouraging a shift back toward sustainable practices. An intertwined approach that combines traditional organic knowledge with ultramodern scientific ways can balance productivity with environmental safety. This study examines the relative impact of organic and inorganic husbandry practices in Meghalaya on soil quality, crop productivity, and ecological sustainability. It emphasizes the need for region-specific, eco-friendly agrarian models that enhance food security while conserving the state's rich natural terrain.

Keywords: Organic farming, inorganic farming, Meghalaya, soil quality, sustainability

Introduction
This study aims to provide a comprehensive analysis of the agricultural methodologies employed by farmers in this region, focusing on the discernible differences between organic and inorganic approaches. It investigates the implications of these practices on soil health, crop yields, and the broader ecological framework, particularly within the context of East Khasi Hills District[11]. The research seeks to highlight the urgent need for sustainable agricultural models that balance increased food production with environmental preservation, a critical concern given global food and nutritional security challenges[2]. This involves a detailed examination of farmers behavioral, economic, and social attributes, which significantly influence the adoption and future trajectory of organic farming practices[7]. This understanding is crucial for developing region-specific, eco-friendly agricultural models that enhance food security while conserving the state's rich natural terrain, particularly in areas like the Himalayan Foothills which exhibit diverse topography and unique agroecosystems[13]. Organic farming, by integrating traditional ecological knowledge with scientific advancements, offers a viable solution to the environmental degradation often associated with conventional input-intensive agriculture[6,8]. This approach is particularly pertinent given the global emphasis on achieving food sustainability and security while minimizing ecological footprints, as conventional farming practices often strain natural resources[4].

Methods
Study Area: The present investigation was carried in East Khasi Hills District of Meghalaya,

known for its hilly terrain, acidic soils, humid subtropical climate, and smallholder agriculture. Crops grown in the area include paddy, potato, ginger, turmeric, and various vegetables.

Research Design

This study used a comparative descriptive and analytical approach to examine and contrast the practices, productivity, economic viability, and environmental effects of organic and inorganic farming systems in East Khasi Hills District, Meghalaya.

Selection of Field

A multi-stage sampling method is used. In Stage 1, blocks like Mawphlang, Mawkynrew, and Mylliem is selected. In Stage 2, 3 villages and from Stage 3, 4 villages were randomly selected from each block. From each Stafe farmers were randomly selected based on organic and inorganic practices of farming.

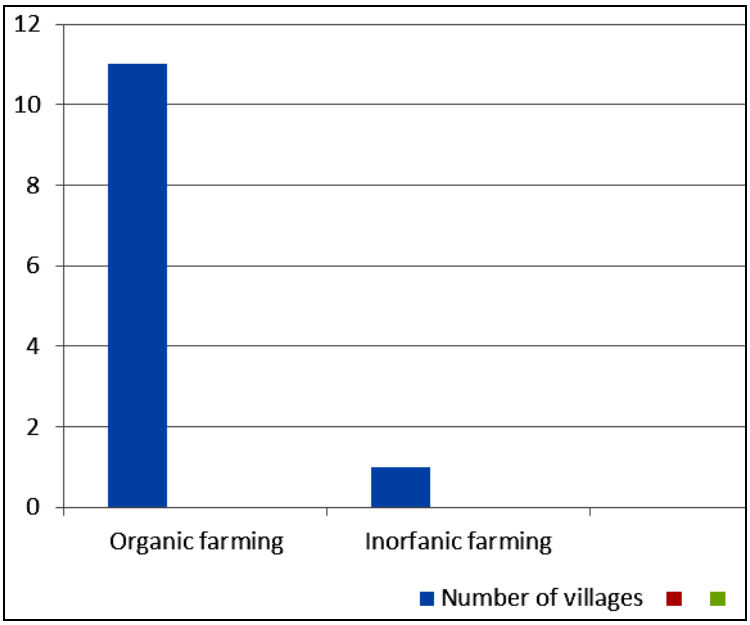
Data Collection: Data for this study were collected through a field survey by interacting with the local farmers. The survey was conducted in 2024-2025 to make sure that all aspects are covered. The information on pattern of cropping, use of fertilizers and pesticides, and overall farming techniques has been gathered through this approach. This will ensure the accuracy, reliability, and representativeness of data regarding agricultural conditions in the study area**.**

Results

Table 1: Summary of organic and inorganic farming practices among farmers across 12 blocks of East Khasi Hills district, Meghalaya.

Village name	Organic farming Practices	Inorganic farming practices
Laitmawsiang	Yes	
Laitkynsew	Yes	Yes
Diewiong	Yes	
Sohkynduh	Yes	
Mawshuit	Yes	
Thangkyrta	Yes	
Sohrarim	Yes	
Khrang	Yes	
Diengpasoh	Yes	
Mawmihthied	Yes	
Mawtongreng	Yes	

The above table represents the data collected from the farmers practicing organic and inorganic farming practices in 12 blocks of the East Khasi hill district of Meghalaya. It shows majority of the farmers in this district practices organic farming.



Graph 1: The above graph shows a comparative account of organic and inorganic farming practices mong the farmers of East Khasu Hill District of Meghalaya.

Table 2: The above table shows the name of the farmer along with their region and the type of crops they grow.

Farmer	Village	Crop
Rikmenlang Nongrum	Laitmawsiang	*Pisum sativum* *Brassica juncea* *Zea mays* *Eleusine coracana* *Phaseolus vulgaris* *Mucuna pruriens* *Houttuynia cordata*

		Cucurbita species, Cucurbita pepo, Cucurbita maxima, or Cucurbita moschata *Cucumis sativus* *Sechium edule* *Solanum tuberosum* *Ipomoea batatas* *Allium tuberosum* *Mentha arvensis or Mentha spicata* *Coriandrum sativum* *Saccharum officinarum* *Glycine max*
Unok Nongrum	Laitmawsiang	*Dioscorea spp.* *Ipomoea batatas* *Zingiber officinale* *Manihot esculenta* *Cucurbita maxima* *Cucumis sativus* *Capsicum annuum* *Eleusine coracana*
Ialamlang Nongrum	Laitmawsiang	*Pisum sativum* *Brassica juncea* *Raphanus sativus* *Brassica oleracea var. capitata* *Brassica oleracea var. botrytis* *Mentha spp.* *Houttuynia cordata* *Allium tuberosum* *Lathyrus sativus* *Mucuna pruriens* *Cucurbita maxima* *Cucumis sativus* *Sechium edule* *Solanum tuberosum*
Skaising Khongshei	Thangkyrta	*Citrus sinensis* *Litchi chinensis* *Mangifera indica* *Artocarpus heterophyllus* *Ananas comosus* *Musa acuminata* *Carica papaya* *Areca catechu* *Piper betle* *Citrus limon* *Passiflora edulis* *Elaeagnus latifolia* *Capsicum annuum* *Piper nigrum* *Eleusine coracana* *Zingiber officinale* *Dioscorea spp.* *Manihot esculenta* *Ipomoea batatas*
Salorisha Marbaniang	Laitkynsew	*Citrus sinensis* *Litchi chinensis* *Mangifera indica* *Artocarpus heterophyllus* *Ananas comosus* *Musa acuminata* *Carica papaya* *Areca catechu* *Citrus limon* *Passiflora edulis* *Elaeagnus latifolia* *Capsicum annuum* *Piper nigrum* *Eleusine coracana* *Zingiber officinale* *Raphanus sativus* *Solanum tuberosum*
Inicashisha Kharumnuid	Diengpasoh	*Oryza sativa* *Solanum lycopersicum* *Mangifera indica*

		Capsicum annuum *Cucurbita maxima* *Cucumis sativus* *Psidium guajava* *Allium sativum* *Lathyrus sativus*
Aiborlang Ksing	Diewiong	*Curcuma longa* *Citrus sinensis* *Elaeagnus latifolia* *Citrus limon* *Capsicum annuum* *Cucumis sativus*
Khoin Kharphanbuh	Diewiong	*Citrus sinensis* *Elaeagnus latifolia* *Piper nigrum* *Eleusine coracana* *Curcuma longa* *Brassica juncea*
Dimaster Khongshei	Sohkynduh	*Areca catechu* *Piper betle* *Artocarpus heterophyllus* *Zingiber officinale* *Carica papaya* *Musa acuminata* *Ananas comosus* *Solanum tuberosum* *Curcuma longa*
Thomal Khongsit	Khrang	*Zea mays* *Eleusine coracana* *Brassica juncea* *Dioscorea spp.* *Ipomoea batatas* *Zingiber officinale* *Manihot esculenta* *Cucurbita maxima* *Cucumis sativus* *Houttuynia cordata* *Passiflora edulis* *Elaeagnus latifolia* *Solanum lycopersicum*
Dat Khongshei	Mawtongreng	Brassica juncea Sesamum indicum Solanum tuberosum Raphanus sativus Morus nigra Prunus persica Pyrus communis Vigna mungo
Lavinia Dohling	Mawmihthied	*Solanum tuberosum* *Brassica juncea* *Brassica oleracea var. capitata* *Brassica oleracea var. botrytis* *Mentha spp.* *Houttuynia cordata* *Prunus persica* *Prunus domestica* *Sesamum indicum* *Pisum sativum* *Ipomea batatas*

Discussion: Our survey in the East Khasi Hills district shows that most farmers here practice organic farming. Organic fertilizers naturally made by these farmers are mixtures of soil, pig dung, and dry grasses. This traditional approach to fertilizing recycles farm wastes and enriches the soil with important nutrients. Pig dung contains high levels of nitrogen, phosphorus, and potassium-the essential nutrients that plants require for growth and that the soil needs for its productivity. Besides, the addition of carbon-rich dry grass in the compost improves the physical properties of the soil, like texture and water-holding capacity, thereby increasing microbial activity in the soil and thus its fertility.

Meanwhile, farmers who use inorganic farming methods mainly rely on chemical fertilizers like urea and limestone. Though these types of fertilizers give quick nutrition to the crops, their long-time use causes damage to the soil and leads to nutrient imbalance and reduced microbial activity. Organic methods of farming maintain the natural fertility of the soil and preserve

ecological balance, making these methods of farming more eco-friendly and sustainable in the longer run.

Our findings have shown that the soil quality in an organically cultivated field is much better and more fertile compared to the fields managed under inorganic farming practices. Organic materials from pig dung and dry grasses improve the soil structure, nutrient availability, and moisture retention. Thus, encouraging organic farming among local farmers can help in improving the condition of the soil, quality of crops, and long-term sustainability of agriculture in the East Khasi Hills district**.**

Fig 1: map of the East Khasi Hill District of Meghalaya

Fig 2: soil mixed with pig dung and dry grasses

Fig 3: farm of *Cucumis sativus L.* from Laitmawsiang village

Fig 4: plantation of *Pisum sativum* from Laitmawsiang village

Fig 5: farm of *Ipomea batatas* and *Pisum sativum* from Mawmihthied village

Fig 6: farm of *Solanum lycopersicum* from Diengpasoh village,

Fig 7: farm of *Solanum lycopersicum* from Khrang village

Fig 8: farm of *Raphanus sativus* from Laitkynsew village,

Fig 9: farm of *Capsicum annuum* from Diewiong village

Fig 10: plantation of *Solanum tuberosum* from Laitkynsew village.

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