

## Eco-Friendly Agriculture Through Natural Farming: Opportunities for Arunachal Pradesh

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Agriculture forms the backbone of the Indian economy, particularly in Arunachal Pradesh, where more than half of the population depends directly or indirectly on farming (Sharma et al., 2023). Unlike many other parts of India where chemical-based farming dominates due to high population pressure, Arunachal Pradesh has maintained relatively low chemical input usage, increasing marginally from

0.54 to 0.82 thousand tons between 2007 and 2010 (Ministry of Agriculture and Farmers Welfare, 2010).

The Green Revolution of the mid-1960s transformed Indian agriculture but also introduced a range of environmental and health concerns due to excessive chemical use, leading to severe degradation of soil biological health. This highlighted the need for

sustainable farming systems that enhance income while reducing dependency on external inputs.

Natural farming has emerged as a promising alternative. Based on the principles of Masanobu Fukuoka and later popularized in India by Subhash Palekar through Zero Budget Natural Farming (ZBNF), the system aims to reduce cultivation costs while increasing farm

profitability (Mandla & Sharma, 2022). ZBNF is now being recognized as a holistic, ecologically sound, and farmer-friendly approach.

### Salient Features of Zero Budget Natural Farming (ZBNF)

1. Farmers do not need to invest in seeds, fertilizers, or plant protection chemicals from the market.



- 2. Seeds can be locally produced or exchanged among farmers, with no reliance on external chemical inputs.
- 3. Minimal dependence on hired labour, as ZBNF discourages frequent intercultural operations.
- 4. The philosophy promotes farmer self-reliance and reduces vulnerability to debt and market-driven input costs.

### The Four Pillars of ZBNF

(Naik & Ashokkumar, 2021)

#### 1. Jeevamrita/Jivamrutha

A fermented microbial culture that enhances soil microbial activity and earthworm populations. Made using cow dung, cow urine, pulse flour, jaggery, water, and healthy topsoil, it enriches the soil and supports plant health.

#### 2. Beejamrita/Beejamrutha

A microbial seed treatment mixture used to protect seeds and seedlings from soil- and seed-borne diseases. It enhances early-stage plant vigour.

#### 3. Acchadana (Mulching)

Mulching helps conserve soil moisture, suppress weeds, and improve soil aeration. Types include:

- **Soil Mulch:** Protects topsoil and promotes reduced or zero tillage.
- **Straw Mulch:** Uses dried biomass to retain moisture and suppress weeds.
- **Live Mulch:** Uses intercrops that enhance biodiversity and nutrient cycling.

#### 4. Whapsa (Moisture Condition)

Emphasizes maintaining a soil condition where both air and water coexist, reducing the need for excessive irrigation. Palekar recommends irrigation only at noon and in alternate furrows.

### Preparation of Jeevamrit

Sl. No.	Methods	Preparation Details	Benefits
1	Jeevamrita/Jivamrutha	Prepared using indigenous cow dung (50 kg), urine (50 L), jaggery (10 kg), dicot flour (10 kg), topsoil (10 kg), and water (1000 L). The mixture is fermented for 7–10 days. Apply 500 L/ha once or twice a month through irrigation. Foliar spray: 5% during early crop growth (up to 25 DAS), then 10% every 20–25 days. Fruit trees: 2–5 L per tree per month.	Supplies nutrients, enhances soil microbial activity, boosts earthworms, and reduces fungal and bacterial diseases. Jeevamrit is essential for the first 3 years; after that, the system becomes self-sustaining (Kumari et al., 2022).
2	Beejamrita/Beejamrutha	Made with water (20 L), cow dung (5 kg), urine (5 L), lime (50 g), and a handful of	Protects seeds and seedlings from fungal, soil-borne, and

		soil. Seeds are coated and dried before sowing. Seedlings may be dipped.	seed-borne diseases (Kumari et al., 2022).
3	<b>Acchadana/Mulching</b>	Soil, straw, or live mulch.	Conserves soil moisture and reduces evaporation (Kumari et al., 2022).
4	<b>Whapsa/Moisture</b>	Reduced irrigation; water only at noon in alternate furrows.	Ensures ideal soil moisture condition where both air and water molecules coexist, improving root health (Kumari et al., 2022).

### Jeevamrit Preparation and Packaging at ICAR RC NEH, Arunachal Pradesh

The Mission Organic programme launched in Arunachal Pradesh in 2017 guided ICAR Basar in promoting natural and organic farming practices. This resulted in the development of Jeevamrit, a versatile, zero-budget input functioning as a fertilizer, pesticide, and fungicide.

Prepared using locally available resources—including dung and urine from the region’s indigenous Balang (*Bos indicus*) cattle strain—the product was officially showcased on Independence Day (15 August 2023). The technology demonstrated a favourable Benefit–Cost ratio (B:C ratio) of 3.29, indicating strong economic viability.

#### Purpose of Ingredients in Jeevamrit

Sl. No.	Ingredient	Purpose
1	Cow dung	Provides nitrogen and nutrients; supplies beneficial microbes.
2	Cow urine	Supplies nitrogen and micronutrients; enhances microbial activity.
3	Jaggery	Energy source for microbial proliferation.
4	Besan (pulse flour)	Nitrogen source for microbial growth.
5	Water	Ensures proper dilution and fermentation.
6	Fertile topsoil	Introduces native microbial populations.

### Conclusion

Sustainable agriculture requires a holistic focus on nutrition, productivity, and farmer resilience. Zero Budget Natural Farming offers a pathway to debt-free farming while regenerating soil health. Its success

depends on supportive government policies, institutional involvement, and farmer participation. The integration of livestock, eco-friendly inputs, and traditional wisdom—combined with scientific validation—can transform agriculture in Arunachal

Pradesh. Initiatives such as Mission Organic and natural farming to promote environmentally sound and innovations like Jeevamrit highlight the capacity of economically viable agricultural systems.

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