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BIO-FARMING AS A TEACHING METHOD FOR SURVIVAL: VOCATIONAL TRAINING IN RAJASTHAN DURING THE ANTHROPOCENE ERA AND ADDRESSING PLANT BLINDNESS

Abstract: This article discusses organic farming initiatives in Rajasthan, mainly carried out by groups such as Jan Shikshan Sansthan (JSS), as a local response to the challenges of the Anthropocene, including biodiversity loss, soil degradation, desertification, and climate unpredictability. In addition, certain social problems have intensified, such as health risks, debt, and financial dependence. This has forced farmers to abandon agriculture and move to cities in search of livelihoods. The article focuses on two issues. In the first part of the article, we present the theory of the Anthropocene and plant blindness in the Indian context. In the second part, we attempt to show how important educational institutions are for the Indian community in order to recreate its agricultural traditions through organic farming classes such as JSS. The aim of the article is to familiarize the reader with the process of utilizing farmers' indigenous knowledge of various biological resources from a pedagogical perspective. This study is based on extensive ethnographic research conducted in India between 2012 and 2024, focusing on educational initiatives related to agriculture.

Keywords: Bio-farming, India, Anthropocene, plant blindness, SDG 4

1. Introduction

The discussion of the Anthropocene becomes crucial in places like Rajasthan, India. Extreme temperatures, unpredictable monsoon patterns, declining groundwater, and continuous soil degradation brought on by climate change pose an existential threat to the local communities, where women, internal migrants from small villages, and poor farmers are the most affected groups. In this situation, vocational education like bio-farming is not just a route to social advancement but a way to survive and re-establish a connection with the environment.

The term Anthropocene is derived from anthropo- taken from the Ancient Greek ἄνθρωπος (ánthropos) signifying “human” and -cene from καινός (kainós) meaning “new” or “recent”. While the Anthropocene is frequently used in the language of geology, inspired by the research of Jason W. Moore (Moore, 2016), Donna Haraway (Haraway, 2015), and Anna Tsing (Tsing, 2015), this article advocates for an engaged interpretation of the era. In the Anthropocene, a period marked by ecological inequality, the Global South is burdened by the consequences of capitalist expansion. Reflection on the effects of capitalism, colonialism, and industrialization (the so-called Capitalocene, a word coined by Jason W. Moore) and the necessity of restructuring human connections with nature and with one another are all part of the Anthropocene as a theoretical category. According to Rosi Braidotti, education in the Anthropocene has to be a type of “planetary education” that emphasizes interconnectedness, responsibility, and interspecies justice (Braidotti, 2013).

At the same time, analyses of the Anthropocene emphasize that its effects are deeply intertwined with colonialism (Shiva, 1993; Guha, 2000; Nandy, 1995). As Dipesh Chakrabarty argues, the Anthropocene challenges us to think simultaneously on a planetary scale and through the lens of historical inequalities, including colonialism and capitalism. In India, global environmental processes intersect with local histories of dispossession and uneven development (Chakrabarty, 2009).

Rajasthan’s climate has remained dry for some time; in recent years human activities have intensified desertification. Age-old means of living such as subsistence agriculture and livestock herding are growing increasingly unstable because of the depletion of groundwater, excessive grazing, forest clearing and alterations in land usage alongside monsoon trends linked to climate change. Historical documents suggest that desertification, in the Thar area is not new. The scale, speed and human-driven intensity of the present stage distinguish it from earlier times. In Rajasthan, prolonged droughts and the collapse of the economy have led entire families to move to urban areas, either permanently or temporarily.

According to data from the Unified District Information System for Education Plus (UDISE+), released by the Indian Ministry of Education for 2022-23, school dropout rates remain relatively high in Rajasthan, where the secondary school dropout rate was around 11.1% (UDISE+, 2023, 25). Factors such as environmental instability, seasonal migration, and rural poverty contribute to school dropout, particularly among children from farming families and disadvantaged communities. To better understand rural-urban migration and their role in search of work during periods of prolonged drought which leads to children temporarily or permanently dropping out of school, this study presents alternative educational initiatives, including vocational training programs, such as the bio-agriculture courses offered by institutions like the Jan Shikshan Sansthan (JSS) in Bikaner, Rajasthan.

In this article, the authors argue that bioagriculture should not be understood solely as an agricultural technique, but as a pedagogical practice that reconstructs

ecological and social relations in the Anthropocene, especially in contexts marked by environmental degradation and postcolonial inequalities.

This article consists of three main parts. The first part explores the Anthropocene as both a global and regionally differentiated condition, with particular emphasis on its manifestations in the Indian context. The second part introduces the concept of plant blindness, interpreted from a postcolonial perspective as a historically constructed form of disconnection from plant life and relationships with the environment. Finally, it examines bioagriculture as a practical and pedagogical response to these challenges, drawing on ethnographic evidence to illustrate how educational practices can transform human-plant relationships and support the reconstruction of ecological and social bonds.

2. Methods

Methods: Based on fieldwork in India from 2012 to 2024, this article presents a narrow section of research focused on sustainable agriculture education programs in Rajasthan and at the Jan Shikshan Sansthan in Bikaner in the context of plant blindness. The research was conducted according to a decolonial approach, emphasizing the recognition of rural and subaltern knowledge, co-presence, and contextualizing ecological learning practices. The researcher communicated with participants in primary Hindi and Urdu, enabling culturally sensitive engagement.

Protocols: The research was conducted with funding from the Institute of Pedagogy of the University of Wrocław, and previously from Nicolaus Copernicus University as part of a doctoral dissertation (2012-2017). Fieldwork was conducted in accordance with ethical principles, with formal consent obtained from research participants and management for all research activities, including observations, recording interviews, and photographing. Data collection included participant observation of training activities, semi-structured interviews with farmers (20), educators (5), and course participants (30), and text analysis, including curricula, training materials, and internal institutional documents. Triangulation was achieved by combining sources and perspectives. Interviews at the JSS were conducted in Hindi (Marwari dialect) and Urdu, with interviews translated into English by a translator to ensure accuracy and cultural sensitivity. Detailed field notes were taken immediately after the interactions, and the material was then organized thematically and coded, with particular attention paid to recurring patterns related to human-plant relationships, ecological knowledge, and everyday agricultural practices related to the concept of plant blindness.

Tools and Techniques: participant observation, semi-structured interviews, and document analysis, supplemented by a sensory approach and embodied learning, allowing for the hands-on capture of agricultural practices and ethical relationships with non-human life. These techniques allowed us to track the evolution of agricultural teaching methods over a twelve-year period and reveal a knowledge

framework integrating local ecological traditional sciences and university-based agroecological sciences.

3. Results

In this article, the authors use the concept of “plant blindness” as an analytical framework to help interpret the educational practices developed within the bio-agriculture program. It allows us to analyze how vocational education in agriculture can transform the relationships between people and plants and develop environmental awareness of the participants.

“Plant blindness” is the inability to notice plants in one’s environment, to realize their importance for human, and to recognize their importance in ecological systems through different mechanisms (Wandersee, Schussler, 1999). This phenomenon is a cognitive and cultural tendency to marginalize plants in education, public consciousness, and environmental ethics (Amprazis, 2021; Balas & Momsen, 2014; Barrutia et al., 2022; Brownlee, 2023; Link-Pérez, 2010; Nates 2010).

In the context of desertification in Rajasthan, where people’s livelihood and state economy still mostly depend on agriculture, plant blindness can become not only a perceptual issue, but also a political and existential one: the absence, unsustainable or inaccurate relationships with plants reflect a broader disconnection from the land and the conditions of collective survival and leading toward underestimating plants as solely resources than considering them also as living organisms while increasing awareness toward plants could assist filling gaps such as issues regarding harvested yield or crops, and low production of fruits, vegetables and spices in the region in a sustainable manner. Regarding the discussion point of this paper, bio-farming, increasing plant awareness and enhancing the plant-based knowledge in the training materials and curriculum can assist identifying or increasing the cultivation and usage of domestic plants in both fueling and improving the bio-farming potential as well as acknowledging plants as living organisms, and considering and expanding properties for pursuing ecological concerns. This matter is moreover important due to the toughness of agriculture in Rajasthan’s weather (Chand, Raju, 2009).

Bio-farming may be understood as a pedagogical practice that challenges plant blindness. Through hands-on training, participants learn to identify local species, read the landscape, and restore relational ecologies with plants as co-creators of life and it is where awareness about plants can overcome the challenges that bio-farming encounters and develop the yield and diversity of cultivating plants, specifically native plants adapted to the weather or endangered due to overharvesting. Thus, bio-farming is not only a technical skill set but also a perceptual and ethical revisioning of human-plant relationships.

Table 1: Curriculum for Bio-Farming

The table presents the Bio-Farming curriculum, including theoretical and practical modules with the number of hours. It lists consecutive topics covering the production and use of organic manures, bio-agents, bio-pesticides, and life enrichment education related to health, environmental protection and social integration.

No.	Modules	Theory	Practical work
1.	Production and application of Organic manures: Composting, Vermi Compost, Bio-fertilizers, Green leaf manuring.	10	20
2.	Production and application of Bio-agents: Egg parasitoid, Chrysoperla predators.	10	20
3.	Production and management of Bio-pesticides: Nucleo Polyhedrosis Virus, Entomopathogenic Fungi, Bio-Pesticides for plant disease.	10	20
4.	LEE: Population and development education; Health, hygiene and nutrition; National Integration; Environmental Protection; Public relation skills; Women Empowerment.	6	6

Source: *Field Visit Report 2007-2008: A role of Jan Shikshan Sansthan*, University of Bikaner 2008.

During one of the classes the author attended at the Jan Shikshan Sansthan Center in Bikaner, participants gathered in a small, sunny courtyard next to the training building. They all sat on the bare ground, the blazing sun shining directly into their eyes. The instructor asked them to examine the soil before planting. Kneeling on the ground, he took a handful of soil and pointed to tiny fragments of plant matter mixed with compost. Such observations demonstrate how the training practices developed in the bio-agriculture program actively challenge plant blindness by directing participants' attention to plants as living organisms embedded in ecological relationships.

"Healthy soil is alive", he explained, encouraging participants to touch and smell the earth. Several participants followed his example, examining the soil's structure and discussing how organic fertilizers affect plant growth. At this point, the training felt less like a traditional classroom lesson with desks and more like a collaborative process of learning to carefully observe plants, soil, and ecological relationships. It was like a metaphysical, elusive relationship between humans and the environment, in such a harsh environment as the desert. This example illustrates how learning, through engaging with the soil as a living organism, can challenge reductionist, utilitarian approaches to agriculture and farmwork. By focusing on soil vitality and its organic composition, training breaks the plant blindness that renders ecological processes invisible to farmers.

During one session, participants were asked to prepare organic fertilizer using cow manure that had been sun-dried for several days. The instructor encouraged them to carefully observe the changes occurring in the compost. One participant, a small-scale farmer from a nearby village, noted that before the course, he focused primarily on yields and market prices, fertilizer debts, and the money to rent a neighbor's tractor, paying little attention to the processes occurring in the soil and

plants. Thanks to the training, he began to see crop cultivation as a more complex ecological relationship involving soil, water, insects, and microorganisms. *Before, I only thought about how much I could earn from the crops. Now I see that the soil, plants, and even insects are interconnected. If one of them is damaged, everything suffers.* Such moments during the training demonstrate how the program encourages participants to more closely perceive plant life and ecological interactions. Moving beyond the sole focus on yields and economic outcomes and recognizing ecological interdependencies, we see that bioagriculture training fosters a more relational understanding of agriculture. This becomes a key mechanism for gradually overcoming plant blindness.

We used to cut down everything we could find. We didn't know it harmed the trees. Now we're told to only harvest what's dry so the tree can live. Instructors demonstrate that cutting branches requires knowledge, pointing out which parts of the tree can be safely removed, referring to the common practice of children breaking branches haphazardly. Women and children often carry firewood on their heads for home use or for sale, making the collection and use of plants a key part of local life. Participants also learn how to use cow dung as fuel by shaping it and carefully drying it, a particularly difficult task during the rainy season, when flat roofs can become saturated with the material.

The training in the Rajasthani desert thus becomes not only a technical lesson in agriculture but also a pedagogical practice that transforms the way participants perceive and interact with plant life. One might even get the impression that the relationship is shifting from an object-oriented to a subjective one. Such moments during training illustrate how participants are encouraged to observe plants more attentively, challenging what scholars describe as plant blindness.

4. Discussion

The empirical evidence presented above, based on participant accounts and observed training practices, suggests that bioagriculture training goes beyond imparting technical agricultural skills. Participants gradually reconstruct their understanding of plants, soil, and ecological interdependencies. In this sense, bioagriculture can be interpreted as a pedagogical practice that reconfigures human-environment relationships, particularly in colonial contexts.

The bio-farming course framework demonstrates an integration of technical expertise, environmental sustainability and socio-cultural understanding. The curriculum is segmented into interrelated sections: organic inputs (manures and fertilizers) biological pest and disease control and life-enriching education (LEE). The initial three modules allocate time with a 2:1 balance favoring practical over instruction highlighting experiential hands-on methods—a teaching approach ideal, for rural and agroecological environments.

The bio-farming course's design, which emphasizes organic fertilizers, bio-agents, and biopesticides along with life-enriching education (LEE), reflects the educational principles promoted for regaining ecological wisdom, managing biodiversity responsibly, and democratizing food systems, all of which closely align with the curriculum's theoretical and practical components.

5. Conclusions

In the Anthropocene, bio-farming education should not be reduced to a set of techniques for sustainable production. As this study demonstrates, it is a pedagogical practice that enables the reconstruction of ecological awareness and social relations, particularly in contexts affected by environmental degradation, migration, and economic vulnerability. By reintroducing plants into perception, everyday practice, and ethical reflection, bio-farming challenges extractive modes of relating to the environment and supports more sustainable and relational ways of living.

A model of integrated sustainability education based on regional realities and worldwide urgencies is provided by this modular framework. We have to understand that, in the Anthropocene, bio-farming courses must not only teach students how to grow food differently, but also how to live, interact, and the most important, behave differently in terms of ecology, society, and ethics. Bio-farming-based agricultural education can be viewed as an Anthropocene-era teaching strategy that emphasizes renewal. It reintroduces plants into perception, consciousness and daily living alongside imparting farming skills and fostering an awareness. Therefore, addressing plant blindness is crucial for education during this time of desertification. Even at the periphery of global production systems, education can restore social and ecological ties in addition to imparting technical knowledge, as demonstrated by Rajasthan's bio-farming courses. In this sense, bioagriculture education is part of a trend that Chakrabarty describes as the challenge of thinking globally and historically in the Anthropocene.

Importantly, bio-farming education can reduce migration and secure rural livelihoods. Strengthening agricultural education grounded in local realities can enable young people to remain in their communities. This is crucial, as rural migrants often become part of the exploited urban workforce in unstable informal sectors. As a pedagogical practice, bio-farming therefore presents itself not only as a response to the environmental crisis but also as a way to strengthen local autonomy and to reduce the structural pressures that drive migration and exploitation. The transferability of the results and limitations of the Bikaner case study can be applied to other regions, such as Iran and the Persian Gulf countries, where droughts have been increasing in recent years. Compounding these challenges is economic and political problems, along with armed conflict in 2025 and 2026, which could lead to mass migrations to Europe, comparable to those of 2015.

Statements

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