

## Peer-reviewed publications from APCNF

I. Socio-political science publications						
#	Research paper Title	Publisher	Author(s)	Year	Main Findings	Link
1	Theory, Practice, and Challenges of Agroecology in India	International Journal of Agricultural Sustainability	Bruno Dorin	2021	The paper focuses on the deepening agrarian and environmental crisis in India. It then unveils the promises of a type of agroecology called ‘natural farming’ that has developed in Andhra Pradesh, a State in South India. Andhra’s natural farming has pioneered the adoption of technical and organizational innovations that could lead to the first large-scale agroecological transition in the world. But in 2019, these local innovations were accused of following a regressive path and endangering the country’s food security. This attack reveals the current omnipotence of the industrial sociotechnical regime over science, as well as a conception of science and progress antithetical to agroecology.	<a href="#">Link</a>
2	Political analysis of the adoption of the Zero-Budget natural farming program in Andhra Pradesh, India	Agroecology and Sustainable Food Systems	Divya Veluguri, Jesse B. Bump, Nikhil Srinivasapura Venkateshmurthy, Sailesh Mohan, Karthik Teja Pulugurtha & Lindsay M. Jaacks	2021	Input-driven agriculture has led to an epidemic of impoverishment, farmer suicides, and environmental degradation in India, but has also shown consistent staying power in Indian politics. We examine the case of organic farming policy adoption to explore this paradox. Specifically, our objective was to evaluate how the state-wide Zero Budget Natural Farming (ZBNF) program (now formally known as Community Managed Natural Farming) in Andhra Pradesh, India came to be.	<a href="#">Link</a>
3	Towards redesign at scale through zero-budget natural farming in Andhra Pradesh, India	International Journal of Agricultural Sustainability	Zareen Pervez Bharuchaa, Sol Bermejo Mitjansa and Jules Pretty		Zero Budget Natural Farming (ZBNF) is a form of agricultural system redesign being practiced at scale in India, particularly in the state of Andhra Pradesh. ZBNF is an emerging set of agricultural practices designed dramatically to reduce farmers direct costs (hence ‘zero budget’) while boosting yields and farm health through the use of non-synthetic inputs sourced locally (‘natural farming’). Andhra Pradesh has set out the aim of ‘rolling out’ ZBNF to all 6 million of the state’s farmers through a state-led programme of training and extension. We present data showing statistically significant differences between ZBNF and non-ZBNF yields and farmer incomes at multiple locations and with a variety of crops, as well as preliminary results on farmers’ experiences with crop health and household transitions following the adoption of ZBNF. We conclude with	<a href="#">Link</a>

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				reflections on the lessons derived from Andhra Pradesh’s state support for ZBNF.		
4	Agroecology and sustainable smallholder agriculture: An exploratory analysis with some tentative indications from the recent experience of “Natural farming in Andhra Pradesh”	Indian social science Quarterly, Vol. 41, Number 3, Jul-Sep 2022	D Narasimha Reddy	2022	This paper looks at the potential of agroecology for farming systems in India in order to achieve sustainable and inclusive development of agriculture in the country. It situates the potential of agroecology within the larger structural transformation context of the rural, agricultural and smallholder Indian economy, arguing that the preponderance of the smallholders in India is in contrast to the accepted view and past experiences of development. This calls for the exploration of alternative approaches to the development of agriculture in India. Using the case of ‘Natural Farming’ in Andhra Pradesh, the paper explores the impact and constraints of adopting agroecology on smallholder agriculture through the four indicators of impact of CNF on quality of soil, crops, food and life, the impact of CNF on diversification of farming and sources of income costs, yields and value of crop output in a comparative perspective and farmers’ participation in and practices of CNF. State support is imperative for the stable and gainful adoption of these initiatives at a large scale, which can provide livelihood security to the farmers of the country.	<a href="#">Link</a>
5	Natural farming in Andhra Pradesh – An overview	IASSI Quarterly: Contributions to Indian Social Science, Vol. 40, No. 4, 2021	Prof S. Galab	2022	The studies have examined social, economic and environmental impacts of CNF. They have revealed: CNF is more inclusive of pure tenants and small landholders and it has increased soil fertility; improvement in soil fertility has resulted in higher crop yields; higher crop yields have been achieved by CNF farmers in relation to non- CNF farmers at lower costs of production of crop; and CNF has generated positive externalities in terms of adoption of some of the practices of CNF by non-CNF farmers in growing crops. These leads are pointers to the inclusive and sustainable nature of CNF.	<a href="https://idsap.in/assets/reports/Prof%20S%20Galab.pdf">https://idsap.in/assets/reports/Prof%20S%20Galab.pdf</a>
6	Thematic Collages in Participatory Photography: A Process for Understanding the Adoption of Zero Budget	International Journal of Qualitative methods (Sage publications),	Grady walker, Henny Oshbar, Sarah Cardey, University of Reading	2021	This paper presents the use of <i>thematic collages</i> as a methodological innovation to participatory photography as a research framework. Participatory photography was used to understand the subjective “off-script” motivations behind the full or partial adoption of Zero Budget Natural Farming (ZBNF) by members of women’s self-help groups in Andhra Pradesh, India. The addition of thematic collages to existing participatory photography methods was developed as a mechanism to better support the dialogic generation of new Freirean “generative	<a href="https://doi.org/10.1177/1609406920980956">https://doi.org/10.1177/1609406920980956</a>

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	Natural Farming in India				themes” for investigation by a group. Further, the use of thematic collages invites the integration of “renegade” or non-thematic images into participant group analysis. ZBNF is an agricultural practice that has become an extension priority in Andhra Pradesh. It emphasizes the use of defined chemical-free inputs and regenerative farming techniques as a holistic approach toward socio-ecological resilience. As part of an interdisciplinary research project, this participatory photography design was piloted parallel to a soil science experiment in three geographically distinct agroecological zones in Andhra Pradesh. We show how participatory photography, with the novel addition of thematic collages, can be integrated into interdisciplinary research as a method to discover the underlying motivations to adopt agricultural practices and participate in agricultural movements like Zero Budget Natural Farming.	
<b>II. Biophysical and Environmental</b>						
1	Impact of Zero Budget Natural Farming on Crop Yields in Andhra Pradesh, SE India	Sustainability	Sarah Duddigan , Chris D. Collins, Zakir Hussain, Henny Osbahr, Liz J. Shaw, Fergus Sinclair, Tom Sizmur , Vijay Thallam and Leigh Ann Winowiecki	2022	It has been claimed that Zero Budget Natural Farming (ZBNF), a burgeoning practice of farming in India based on low-inputs and influenced by Agro-ecological principles, has the potential to improve farm viability and food security. However, there is concern that the success of the social movement fuelling the adoption of ZBNF has become out of step with the science underpinning its performance relative to other farming systems. Based on twenty field plot experiments established across six districts in Andhra Pradesh (SE India), managed by locally based farmer researchers, we present the first ‘on the ground’ assessment of ZBNF performance. We show that there is no short-term yield penalty when adopting ZBNF in small scale farming systems compared to conventional and organic alternatives. In terms of treatment response, we observed differences between agro-climatic zones, but in this initial evaluation we cannot recommend specific options tuned to these different contexts.	<a href="#">Link</a>
2	Can countries Expand Agriculture without losing Biodiversity	Bioscience, Volume 72, Issue 6, June 2022, Pages 501–507	Carolyn Beans	2022	This article compares the biodiversity loss in agriculture, pollinators and other species across globe. Taking the case of APCNF in Andhra Pradesh. Mentioned Interview with Dr.Zakir on the experiences.	<a href="#">Link</a>

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<p>3 Do birds return to Agricultural Landscapes through adoption of Natural farming Practices? A comparison of Natural farming vs chemical farming in Andhra Pradesh</p>	<p>Agricultural sciences</p>	<p>Zakir Hussain, Bhavana Bopanna, Himabindu Aniseti et al</p>	<p>2022</p>	<p>The global decline in farmland bird populations in India is often ignored. The overuse of agrochemicals in farming is the root cause of all these catastrophic results. There is ample evidence in the literature that transitioning to agroecological practices may reverse this trend. We anticipated that the bird population visiting natural farming-Andhra Pradesh Community managed Natural Farming (APCNF), a novel farming approach popular in India, will increase. The study used nested design to compare the number of bird visitations in natural farming versus chemical farming to determine whether natural farming can enhance the bird numbers and diversity. Furthermore, we analyzed the bird species visits to natural and chemical farms in different agroecological zones in Andhra Pradesh, the southernmost state of India. We used the point count survey approach to count the birds on comparable farms. MANOVA and non-parametric analysis are used to examine the findings. The bird species were ranked using a Likert scale. The results show that the average bird population visiting natural vs. chemical farms varies significantly at the 0.05 level of significance, and the bird species visiting both natural farming fields and chemical farms varies between geographies and time interval.</p>	<p><a href="https://scholar.google.com/scholar?hl=en&amp;as_sdt=0%2C5&amp;q=Do+birds+return+to+Agricultural+Landscapes+through+adoption+of+Natural+farming+Practices+%3F+A+comparison+of+Natural+farming+vs+chemical+farming+in+Andhra+Pradesh&amp;btnG=">https://scholar.google.com/scholar?hl=en&amp;as_sdt=0%2C5&amp;q=Do+birds+return+to+Agricultural+Landscapes+through+adoption+of+Natural+farming+Practices+%3F+A+comparison+of+Natural+farming+vs+chemical+farming+in+Andhra+Pradesh&amp;btnG=</a></p>
<p>4 Natural farming improves crop yield in SE India when compared to conventional or organic systems by enhancing soil quality</p>	<p><i>Agronomy for Sustain. Dev.</i> 43, 31 (2023). <a href="https://doi.org/10.1007/s13593-023-00884-x">https://doi.org/10.1007/s13593-023-00884-x</a></p>	<p>Duddigan, S., Shaw, L.J., Sizmur, T. <i>et al.</i> Natural farming improves crop yield in SE India when compared to conventional or organic systems by enhancing soil quality.</p>	<p>2023</p>	<p>Zero Budget Natural Farming (ZBNF) is a grassroot agrarian movement and a state backed extension in Andhra Pradesh, and has been claimed to potentially meet the twin goals of global food security and environmental conservation. However, there is a lack of statistically evaluated data to support assertions of yield benefits of ZBNF compared to organic or conventional alternatives, or to mechanistically account for them. In order to fill this gap, controlled field experiments were established in twenty-eight farms across six districts, spanning over 800 km, over three cropping seasons. In these experiments, we compared ZBNF (no synthetic pesticides or fertilisers, home-made inputs comprising <i>desi</i> cow dung and urine with mulch) to conventional (synthetic fertilisers and pesticides) and organic (no synthetic pesticides or fertilisers, no mulch, purchased organic inputs, e.g. farmyard manure and vermicompost) treatments, all with no tillage. Comparisons were made in terms of yield, soil pH, temperature, moisture content, nutrient content and earthworm abundance. Our data shows that yield was significantly higher in the ZBNF treatment (<math>z</math> score = 0.58 <math>\pm</math></p>	<p><a href="https://link.springer.com/article/10.1007/s13593-023-00884-x#citeas">https://link.springer.com/article/10.1007/s13593-023-00884-x#citeas</a></p>

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				<p>0.08), than the organic (<math>z = -0.34 \pm 0.06</math>) or conventional (<math>-0.24 \pm 0.07</math>) treatment when all farm experiments were analysed together. However, the efficacy of the ZBNF treatment was context specific and varied according to district and the crop in question. The ZBNF yield benefit is likely attributed to mulching, generating a cooler soil, with a higher moisture content and a larger earthworm population. There were no significant differences between ZBNF and the conventional treatment in the majority of nutrients. This is a particularly important observation, as intensive use of synthetic pesticides and fertilisers comes with a number of associated risks to farmers' finances, human health, greenhouse gas emissions, biodiversity loss, and environmental pollution. However, long-term field and landscape scale trials are needed to corroborate these initial observations.</p>	
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