Natural Farming in Jharkhand

A few issues, concerns and recommendation

Research conducted by School of Agriculture and Rural Development, Ramakrishna Mission Vivekananda Educational and Research institute (RKMVERI)

The background

A long history of agricultural intensification and extensification (the Green Revolution era) in India has resulted in serious environmental externalities on natural resources, raising concerns for plateauing partial factor productivity in agriculture. As a response to these crises, several alternative and sustainable farming approaches have emerged globally that rely on the ecological processes, bio diversity, and cycles adapted to local conditions. Several 'Indian versions' of alternative farming systems - Integrated Farming, Ecological Farming, Zero-Budget Natural Farming, Regenerative Agriculture etc. have been largely supported by civil societies and depended on farmer-led upscaling of the practices, which received donor assistance and state patronage over the course of time. Recently, the government of India has given special attention to Natural farming (NF) through National Mission for Natural Farming.

Multicomponent farming, where the farm input comes from within the farm through recycling, is considered as Natural Farming in this note.

The set of recommendations is drafted from independent research conducted by RKMVERI. Due to several methodological limitations, this report can be considered as empirical insights concerning natural farming (NF), juxtaposed with conventional farming (CF) as practised by the farmers. The empirical evidence draws on 151 sampled farms in eight districts of Jharkhand state that started practising natural farming on their farms in the last nine years. The study compared NF with the 'conventional' farms in terms of farm characteristics, cropping choices and management practices, nutrient and labour use, and production economics. Further, the study assessed the soil physicochemical and microbial properties in selected farms and computed the energy use and emission potential from predominant crops. The insights of the study propose a systems model for natural farming based on the evidence generated from field research.

The issues, concerns, and recommendations

1 Bringing stakeholders together for the co-creation and utilisation of knowledge -
The ontological nature of NF is loaded. However, in practice, NF represents a set of principles rendering its operationalisation difficult and formulaic. Thus, defining and comparing natural farms in farmers' fields is difficult when defined models are not followed completely. This difficulty, stemming from ontological crises and real-world phenomena, affects the epistemology of NF research and makes the study procedures (and outcomes) open to criticism and cynicism. This is more so because of the long tradition of reductionist research in agricultural sciences that sets a handful of short-term policy indicators (yield, profitability) as the basis for judging technological success.

It is important that we develop a set of mutually agreed frameworks and parameters to assess the success of NF that brings science and practice closer. These parameters need to be set through a series of consultations, that draw on the perspectives of multiple stakeholders and respect the spirit of science.

2 Natural farming may not clearly be established as 'superior' unless targeting is precise -
NF may not work equally well for all smallholder farmers. In addition to many other factors, favourable biophysical conditions, soil health, and access to irrigation seem to be drivers of

NF's success. That is why targeting NF (regional and farm-level) projects is important to enhance its success in the early phase of experimentation and upscaling. Once the supportive ecosystems (provisioning for irrigation, institutional development, value-addition, market integration, etc.) for an agroecological transformation of food systems are developed, NF may move to lesser favourable areas.

3 Identifying and targeting niche has a critical link to family labour **-** Barring the imputed value of labour, the labour cost is lower in NF because of the engagement of a higher proportion of family labour. However, this endogenous supply of labour is mediated by family type and size, and migration of male members. A farm typology (considering land size, and family type and size) can be a deciding factor to understand which section of smallholders are more capable of managing NF by engaging family labour and natural resources.

4 Natural farming may not demonstrate 'superiority' unless the scale of operations and aggregations are defined **-** Empirical evidence, in many cases, may not find any significant effect of NF on several system outcomes like system cost of cultivation, system gross revenue, system profitability, and productivity, except a reduction in the cost of inputs,
which might again be cancelled out by slightly higher labour costs. An increased scale of operation renders the returns from NF tangible and reflected in terms of an increase in farm economic parameters. NF must go beyond the homestead or small plots. Thus, a scale-up drive on the same farms (in addition to spreading to other areas) is necessary until the economic benefits for individual farmers are clearly established even without any change in the macro environment (e.g., markets)**.**

5 Monitoring soil health in natural farms -
Monitoring both nutrient management (fertilizer and organic input) and soil health parameters is important to sustain NF at the farm level. By the time a project confirms that an NF is 'practising', the implementing agency must be sure that the practice of nutrient management is 'balanced'. This is important because a proportion of farmers might continue to use synthetic fertilizers, while others will apply unbalanced bulky manure.

The study locations cover eight districts and 13 community development blocks of the Jharkhand and span all three agroclimatic zones of the state. Case study sites covered four districts (Hazaribag, Ranchi, Latehar, Khunti) and we collected soil samples from three districts (Hazaribag, Khunti, Giridih).

Because of the huge heterogeneity of soil even in the same landscape and farm, NF might have a differential effect on soil health and routine soil test might not work across farms. Evidence has not unequivocally established differences between the NF and non-NF in terms of most of the soil physicochemical and biological counts (not activity) except available K_2O. Organic C, available N, and Zn were slightly higher in NF, whereas available P_2O_5, Cu, Fe, and Mn were higher in CF. Since biological fixation from the atmosphere is possible only for nitrogen, NF could limit the supply of other nutrients. From that perspective, monitoring of major nutrient availability is required to avoid possible nutrient mining from NF plots.

Although microorganism count is only an indication of NF's positive impact on the soil (which is still not significantly higher in the study locations), examining the enzymatic activities of the microorganisms is recommended to identify/characterize the group of microorganisms responsible for increasing nutrient availability in the soil. Thus, adding the study of enzymatic activity (in addition to microbial count) and screening microorganisms to identify novel consortiums are recommended for monitoring soil health in NF. This will require institutional collaboration between NF implementing agencies and specialised research institutions.

6 Gender concerns in natural farming initiatives -

While many of the on-the-ground NF implementations draw on women's groups, care is needed to avoid undesirable unpaid workloads for farm women. That means, there might be a clear trade-off between women's agency development and negotiating with the load of unpaid work. Understandably, many of the benefits on the homestead plots may be accessed and controlled by the farm women and the same should proactively be extended to NF practised on larger pieces of land generating marketable surplus.

7 Securing environmental and energy advantages of natural farming -

Natural farming is most likely to trigger significant improvement in energy efficiency and emissions from natural farms. These advantages largely stem from the lower use of synthetic fertilizers and fossil fuels in irrigation and land preparation. This emphasizes the fact that if we intend to maintain better system performance and limit environmental externalities, NF practices must ensure sustainable means for land preparation, irrigation (e.g., solar-powered pumps) and sustainable intensification (e.g., legumes in the cropping systems) options to improve yield and profitability. This may not seem immediately important in the short run, but NF champions should not fall into the trap of yield/income obsession like industrial agriculture.

Unsupervised application of organic manure affects both energetics and emission, and their close monitoring is required to maintain the environmental advantages of the NF. Further, appropriate crop choices, preferably less resource-intensive ones (e.g., millets, pulses and

oilseeds), are to be given due consideration while planning cropping systems for NF. Also, multi-tier cropping or cropping systems producing higher biomass sustainably may be introduced to maintain system efficiency in NF.

8 Integrating conscious farm resource recycling techniques in natural farms -
Resource interaction in small farms is a key to improved system outcomes. Resource interaction linking common property resources, fallow lands, and small livestock seems critically important in the sustainability of low external input natural farming systems. It is recommended that appropriate science and technology intervention be sustained by community-level institutions (the Farmer Field Schools - FFS) to revive common property resources and fallow land for producing farm inputs (fodder, biopesticides, biomass, fuel). Recent evidence of agroforestry-assisted natural farming is particularly encouraging. Innovations in the form of appropriate models of bio-input production may also add circularity to the local agroecosystems.

9 Accounting the ecosystem services of natural farming -
An accounting of the ecosystem services is a prerequisite for advocating NF to the policymakers as a profitable proposition. However, it is difficult and time-consuming to

study NF beyond yield and income and put them into appropriate numbers because of the diversity in input sources and farm management practices. Conventional farming, for which most of the financial and environmental assessment practices are standardized, may not apply to NF as such. For example, while accounting for cost and profit, the exact value of locally managed biomass and the magnitude of labour engagement is challenging. When accounting for energy and emission, the equivalence of several non-chemical inputs (seed treating material, liquid manure, biopesticide) is unavailable in the standard literature. Further, the non-standard measurement units of these inputs and dependence on recall data make the assessment prone to systematic error. It is recommended that an appropriate framework be prepared for accounting ecosystem services in NF based on which record-keeping journals may be developed for the farmers in NF projects.

10 Behavioural Model for future natural farming projects from a Practitioner's Perspective **-** There are certain micro-level contexts within which the introduction and expansion of NF take shape in a region. These are land holding, tenurial system, irrigation opportunities, livestock ownership, and availability of family labour (family type and size). And most of the NF interventions aim to result in higher yield, profit, income diversity, biodiversity, energy efficiency and reduced emission (in addition to nutrition security, health outcome, climate resilience, risk mitigation etc.). NF interventions may be taken through the form of training and mass awareness, demonstration, FFS and institution building in the form of cooperatives/producer organizations. The immediate outcomes of such interventions are manifested in the form of farmers' individual and collective behavioural change, thus resulting in the adoption of good practices, reduced synthetic fertilizer use and increased organic manure applications, crop choice, the decision to use fossil fuel in land preparation and irrigation etc., which affects the cost of cultivation, profitability, and energy efficiency. This shift succeeds in a favourable policy environment that encourages producer-seller conglomerates to facilitate market access and price premiums, payment for ecosystem services, and risk management supports (along with macroeconomic, and sectoral policies such as fertilizer subsidies and energy policies, which were not considered under this study).

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The farm interventions facilitations: Avibyakti Foundation, Srijan Foundation, SPWD, NEEDS and Centre for World Solidarity.
The study was conducted for the project
"Strengthening Rural Governance for Right to Adequate Food" supported by BMZ.

The full report can be found here -

https://welthungerhilfeindia.org/wp-content/uploads/2023/08/Natural_Farming_Jharkhand_02082023_RKMVERI_WHH.pdf