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Status of zero budget natural farming: An overview

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Abstract

Agriculture is considered the backbone of Indian economy since centuries. Initially India had subsistence type of farming but as the dependence on food grains increased with increasing population it had automatically shifted to commercial farming. The present form of agriculture is over burdened with inorganic chemicals, fertilizers and pesticides. Therefore when a farmer with a small farmland invests on expensive inputs, he is exposed to high monetary risk and gets trapped eventually into the debt cycle. With such diverse negative impacts of commercial farming it has become highly essential to adopt other ways which can lead to better results with negligible impact on natural resources. So, here comes the question that, what are the ways in which low-input farming can be practiced to achieve good production outputs? The solution for this question is 'Zero Budget Natural Farming' (ZBNF). The concept was first developed in Maharashtra by Subash Palekar. ZBNF, as the name indicates, where the cost of growing and harvesting is zero. It means that farmers no need to purchase fertilizers and pesticides in order to ensure the healthy growth of the crops and also this system of farming improves the nutritional value and crop production thereby contributing to the food security in the country.

Keywords: Chemical fertilizer, natural farming, pillars of ZBNF, zero budget and critics

Introduction

"When health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless and intelligence cannot be applied". This quote is self-explanatory that health is most important in our lives but today the issue regarding general health of humans is far more than terrible. Our daily lifestyle has worked as a fuel for the fire that is burning our body with diseases we could not possibly imagine a century ago. But far from that, the food we intake to fuel our lives has become a slow poison. From WHO reports, more than 50% of eatables have chemicals which are carcinogenic in nature (Prasad, 2016)^[1].

These days agriculture has become very dominant and imposes critical challenges to both farmers and consumers. The present form of agriculture is over burdened with inorganic chemicals, fertilizers and pesticides. This has contaminated ground water and various ecosystems. Inputs like privatized seeds, and markets are inaccessible and expensive for peasants. Indian farmers increasingly find themselves in a vicious cycle of debt, because of the high production costs, high interest rates for bank loan, price fluctuation on input and rising costs of fossil fuel based inputs. This shows a serious concern in the Agriculture industry. What can a small scale farmer do?

After witnessing the harmful effects of chemical fertilizer, newly introduced agriculture technique among farmers is ZBNF, also known as, Zero Budget Spiritual Farming (ZBSF). "Zero Budget Natural Farming" there is a possibility to end a reliance on loans and drastically cut down the production cost, farmers will end from the debt cycle (Murall, 2016). The word 'budget' is referred to as the credit and expenses, thus the meaning of Zero budget is investment for the main crop – field crop or tree crop - recovered through income from short duration "inter crops" (Ruchi and Akshaya 2017)^[1].

History about ZBNF

The concept of ZBNF was introduced by Shri Subhash Palekar, for which he was honored with prestigious award Padma Shri in 2016 (Anon., 2016)^[2]. Being devoted towards the betterment of his village farm, after graduation, palekar experimented and revealed that continuous use of chemical fertilizers made the farm field barren. So, he decided to find an optimal solution *i. e.*, ZBNF. In, 1986-88 Palekar researched on forest vegetation, and discovered that the natural system that work in forests have the potential to develop and nurture them, while maintaining many healthy ecosystems. And after a huge effort in the field work, he finally gave the formulae of ZBNF.

Over six years of dedicated research, Palekar revealed that

1. Only, the dung from local, Indian cows is effective in the re-enrichment of the barren soil. Dung from Jersey and Holstein cows is not as effective. If one is falling short of dung from local cows, one may even use the dung from bullocks or buffaloes.
2. Dung and urine of the black colored Kapila cow is believed to be miraculous.
3. To get the most out of the cow dung and urine, ensure that the dung is as fresh as possible and that the urine is as stale as possible.
4. An acre of land requires 10 kilograms of local cow dung per month. Since the average cow gives 11 kilograms of dung a day, dung from one cow can help fertilize 30 acres of land per month.
5. Urine, jaggery and dicot flour can be used as additives.
6. The lesser milk the cow gives, the more beneficial its dung is towards reviving the soil (Babu, 2008) ^[6].

Difference between ZBNF and organic farming

Organic farming	ZBNF
Organic farming is more expensive	With the help of locally available natural resources
Organic farming requires activities such as vermicompost preparation	Decomposition of organic matter by microbes & earthworms is encouraged right on the soil surface
	One Desi cow
Only on chemical free inputs	Chemical free inputs as well as other practices like intercrop and multi-crop
Bio pesticides used for pest control	Homemade pest control methods

Basic Pillars of ZBNF (Palekar, 2014)

Sl. No	Methods	Preparation	Benefits
1.	Jivamrita/ Jeevamrutha	It is composed of the cow-dung (20 kg), urine (5-10 l), jaggery (20 kg) and dicot flour (2 kg) and is applied to the crops with each Irrigation cycle.	It provides nutrients, but most importantly, acts as a catalytic agent that promotes the activity of microorganisms in the soil, as well as increases earthworm activity. Jeevamrutha also helps to prevent fungal and bacterial plant diseases. Jeevamrutha is only needed for the first 3 years of the transition, after which the system becomes self-sustaining.
2.	Bijamrita	It is basically made up of water (20l), cow dung (5kg), urine (5l), lime (50gm) and just a handful of soil.	It is a seed treatment, equipped in protecting young roots from fungus as well as from soil-borne and seed-borne diseases
3.	Acchadana-Mulching	It could be done by soil mulch, straw mulch or live mulch	It conserves soil moisture, by reducing evaporation.
4.	Whapasa – moisture	The irrigation should be reduced and irrigation should be practiced only at noon, in alternate furrows.	Palekar challenges the idea that plant roots need a lot of water, in-fact, what roots need is water vapour, and therefore, Whapasa is the condition where there exist both air molecules and water molecules present in the soil.

Journey of Andhra Pradesh towards ZBNF (Source: RySS, Department of Agriculture, AP)

- The Government of Andhra Pradesh (GOAP) has launched Zero based natural farming. In the face of distress/crises in agriculture, and to cover 500,000 farmers and 500,000 hectares in 1500 villages spread across all agro climatic zones, in half the mandals of the State in all the districts.
- "While the programme was launched in 2015-16 its implementation in the field started in 2016-17 and it has so far covered 704 villages in 131 clusters and there are plans to cover the remaining 796 villages/160 clusters in 2017-18.
- First, the state initiated multi-stakeholder partnerships between the agricultural departments, agricultural scientists in Universities, Non-Governmental Organizations, and others. Second, the state invited Mr Subhash Palekar along with volunteers to organize two training camps on ZBNF involving 5000 participants each in January 2016 and September 2016.
- In these training camps, 85 per cent of the participants were farmers and the remaining were other stakeholders. Third, for effective implementation a dedicated team has been set-up at the state, district and cluster level.
- In each cluster there is one Multi-Purpose Extension Officer (MPEO) from the agriculture department and three master farmers. Fourth, the programme is also an exercise in convergence across different schemes, the Rashtriya Krishi Vikash Yojana (RKVY), the Paramparagat Krishi Vikash Yojana (PKVY), and state plan among others
- Finally, it is also exploring funding and other partnership with other non-state and multilateral agencies like the Azim Premji Philanthropic Initiative, the Bill Melinda Gates Foundation and the International Fund for Agricultural Development among others.
- In 2016-17, 48565 farmers have been covered as against a target of 39300 farmers. Besides, the intervention has also been with regard to ZBNF input shops, identification of potential master farmers, formation of self-help groups (SHGs), and setting up of farmer field schools.

Table 1: District wise enrolment of ZBNF farmers and Extent in Andhra Pradesh

Sl. No	District	Farmers enrolled	Extent (in Acres)	CRPs	ICRPs
1	Srikakulam	19095	18110	61	247
2	Vizianagaram	21593	20513	65	195
3	Visakhapatnam	20794	19754	60	262
4	Ease Godavari	38115	34209	65	181
5	West Godavari	26589	24210	66	146
6	Krishna	28815	26374	44	231
7	Guntur	22814	20673	65	300
8	Prakasam	41097	39042	69	330
9	Nellore	24066	22863	76	202
10	Chittore	24561	23123	111	273
11	Kadapa	36490	33656	66	305
12	Anantapuramu	22628	21497	76	402
13	Kurnool	27343	25976	84	445
	Total	354000	330000	908	3518

Source: RySS, Department of Agriculture, AP, India. 2018

Table 2: ZBNF Scaling-up Plan in AP

Timeline	Milestone
2018 - 19	Reached all mandals (662, on the verge of reaching 500,000 farmers)
2019-20	Reach 750,000 farmers
2021-22	Reach all GPs (12,924); 3.5 million farmers
2023-24	Reach all farm families; 6 million farmers
2025-26	Cover entire cultivable area in AP

Source: Anon., 2018 [3,4]

Karnataka movement in ZBNF

This concept was attained a wide success in southern India, especially the southern Indian state like Karnataka, where it first evolved (Kumar, 2012). A rough estimation of Karnataka puts the figure at around 100,000 farmer families (Prasada, 2016) [11]. This has been achieved without any formal movement organization, paid staff or even a bank account. ZBNF inspires a spirit of volunteerism among its peasant farmer members, who are the main heroes of the movement.

- The movement in Karnataka state was born out of collaboration between Mr Subhash Palekar, who put together the ZBNF practices, and the state farmers association Karnataka Rajya Raita Sangha (KRRS), a member of La via Campesina (LVC).
- KRRS was instrumental in mobilizing farmers at the grassroots level and organized many massive ZBNF training camps with the help of other allies. One might say that the organizational fabric of KRRS was like the culture medium upon which the ZBNF movement grew.
- At the state level, the ZBNF movement has a loose network of volunteer coordinators – drawn from the pool leaders of KRRS, local community leaders, progressive political party representatives, various independents, and Subhash Palekar, who is often referred to by farmers as the “guru” of the movement.
- At the local level, the movement has a self-organized dynamic and runs in an informal way. Most practicing ZBNF farmers are informally connected to each other and carry out both organized and spontaneous farmer-to-farmer exchange activities.

The experience of the practicing farmers and field observations over a period of time lends credence to the following conclusions

- a. The system of ZBNF is extremely suited to the farmers’ particularly small and marginal farmers because of its simple procedure, adoptability and drastic cut in cost of cultivation of crops. However during the initial period of conversion to new system, the results will not be encouraging because of the remaining effects of chemical farming.
- b. Treatment with Beejamrutha and Jeevamrutha has given extremely encouraging results for successful cultivation of crops. Beejamrutha does provide suitable protection to crops from insects and diseases during the initial stages of germination and establishment. Mortality in case of treated crop is reported to be almost negligible.
- c. Experience with this method of farming corroborates the fact that adequate mulching it promotes humus formation so that it can maintain soil moisture, suppresses weeds and greatly reduces the water requirement of the crops. Live mulching particularly with leguminous crops has been found to be not only a subsidiary source of income but also a safeguard against depletion of nutrients by crops.
- d. Mixed cropping particularly with short duration legumes, vegetables and even medicinal plants has certainly expanded the income source of farmers. Sri. Bannur Krishnappa obtained an additional income of more than Rs. 15,000/- by planting Ashwagandha and Coleus in one acre as intercrop with sugarcane.

Table 3: Risk Mitigation under Different Stylized Scenarios

Scenarios	Year	Input	Output	Net Return	Consumption	Cumulative Savings
Traditional	1	1.00	3.00	2.00	1.30	0.70
	2	1.00	3.00	2.00	1.30	1.40
	3	1.00	3.00	2.00	1.30	2.10
	4	1.00	0.00	-1.00	1.10	0.00
Input Intensive	1	3.00	6.00	3.00	1.80	1.20

	2	3.00	6.00	3.00	1.80	2.40
	3	3.00	6.00	3.00	1.80	3.60
	4	3.00	0.00	-3.00	0.60	0.00
Sustainable, Zero Budget Natural Farming (ZBNF)	1	1.50	4.50	3.00	1.50	1.50
	2	1.50	4.50	3.00	1.50	3.00
	3	1.50	4.50	3.00	1.50	4.50
	4	1.50	0.00	-1.50	1.20	1.80

Source: Mishra, 2015

Cultivation under a traditional scenario uses 1 unit of input and gives an output of 3 units in a normal year. The net return (output minus input) from this is 2 units. Out of this, the household consumes 65 per cent (1.3 units) and saves the remaining amount (0.7 units). If this normal situation prevails for three years then the household has cumulative savings of 2.1 units at the end of the third year. Now, if there is a calamity and the household gets no output in the fourth year, it uses the cumulative savings to pay for the input costs and reduces its consumption to 1.1 units.

The second scenario represents an input-intensive case. One can associate this with the green revolution that saved us from a ship-to-mouth existence, and in the current context, with financial interventions (say, in the form of credit and insurance products) that are part of the input structure designed for the input-intensive scenario. This is indeed laudable, as it is seen to have doubled the overall output. However, in purely numerical terms, in a normal year, input is 3 units, output is 6 units and net return is 3 units; consumption is 60 per cent (1.8) units and savings is 1.2 units. At the end of three normal years, the cumulative saving is 3.6 units.

The third scenario represents ZBNF an one can state that it has an input of 1.5 units-higher than that in the traditional

scenario but much lower than that in the input-intensive scenario—and an output of 4.5 units (lower than that in the input-intensive scenario). However, from the farmer's point of view net return under this scenario is the same as that under the input-intensive scenario. Now, if his consumption and saving behaviour are similar to the input-intensive scenario then, when calamity strikes in the fourth year, after paying for the input costs (1.5 units) and having reduced consumption to 1.5 units, the household will still be left with saving of 0.6 units. However, this example postulates relatively austere consumption behaviour that is in keeping with our commonsense understanding of sustainable agriculture (zero budget natural farming). Thus, we impose a consumption level of 50 per cent of net return. The saving that emanates from this has two advantages.

Case study: Improved income for farmers

Name: Kandimalla Kondala Rao

District: Prakasam, Andhra Pradesh

Year: 2016/17

Crop: Papaya

Land size: 13 acres (Non-ZBNF-6 acres, and ZBNF- 4.5 acres)

Non-ZBNF	ZBNF
Input cost on non-ZBNF land: Rs 70,450 per acre	Input cost on ZBNF land: Rs 36,450 per acre
Yield under non-ZBNF 40 tonnes per acre	Yield under ZBNF 56 tonnes per acre
Net income per acre: Rs 320,000	Net income per acre: Rs 448,000
Kandimalla also reported due to ZBNF: Improved quality and taste of the fruits. Crop longevity and storage value also improved	

Source: Saurabh *et al*, 2018 ^[12]

A research study carried out by Khadse *et al*, ^[5] in Tumkur district of Karnataka during 2017 on Taking Agro ecology To Scale: The Zero Budget Natural Farming Peasant Movement in Karnataka, India with a sample size of 97 ZBNF farmers

(who have already attended many training camp) and farmers were selected for interviews based on recommendations from KRRS and ZBNF leaders.

Table 1: Efficacy of ZBNF in some social, economic, agro ecological indicators (%) as reported by farmers in Karnataka

Sl. No	Indicators	Number of farmers (%)		
		Has Decreased	No Change	Has Increased
1	Yield	12.8	8.5	78.7
2	Soil Conservation	2.1	4.3	93.6
3	Seed diversity	12.8	10.3	76.9
4	Pest attacks	84.1	4.5	11.4
5	Quality of produce	4.4	4.4	91.1
6	Seed autonomy	2.4	4.9	92.7
7	Selling price	7.9	34.2	57.9
8	Income	4.8	9.5	85.7
9	Production costs	90.9	2.3	6.8
10	Need for Credit	92.5	3.8	3.8
11	Health	0	0	100.00

Source: Khadse *et al*, 2017 ^[5]

Table 1 shows revealed that respondents reported that by adopting ZBNF, over time 78.7 per cent saw improvements in yield, 93.6 percent in soil conservation, 76.9 percent in seed diversity, 91.1percent in quality of produce, 92.7 percent in seed autonomy, 87.8 percent in household food autonomy and

85.7 percent in income, while 90.9 percent experienced reduced farm expenses and 92.5 percent saw a reduced need for credit.

The impact has been positive and affirms the claims that the method can reduce risk. There is, however, an independent

need to evaluate the adverse experiences, even if they are few in number, so as to help us understand the reasons and if possible to address them so that the efficacy of the method can be further improved.

Critics of ZBNF movement

- Still there is no scientific validation of Palekar's principles of ZBNF
- Many of the small and marginal farmers are not having desi cow
- It require minimum cost for preparation of Jeevamrutha and Beejamrutha
- There is no much difference between organic farming and ZBNF
- Require time to shift from chemical farming to ZBNF
- Why ZBNF has been not successful in Maharashtra?
- There is No standard for ZBNF food produce for certification
- Lack of right platform to market ZBNF produce

Conclusion

Ensuring nutritional security, producing more output with less resources and building the resilience of smallholder farmers are important in creating a food-secure future. Therefore, new system of zero budget natural farming has freed the farmers from the debt trap and it has instilled in them a renewed sense of confidence to make farming an economically viable venture. To support the new farming system from Govt. and different organisations is highly important for its mobilization and practical implementation.

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