

**SEMINAR REPORT**

**By**

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**(2018-11-065)**

**Zero Budget Natural Farming – an alternate form of agriculture**

**Presented on 31-10-2019**

**Submitted in partial fulfillment for the requirement of the course**

**Agron.591 Master's Seminar (0+1)**



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**DEPARTMENT OF AGRONOMY**

**COLLEGE OF HORTICULTURE**

**KERALA AGRICULTURAL UNIVERSITY**

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## CERTIFICATE

This is to certify that the seminar report entitled" **Zero Budget Natural Farming – an alternate form of agriculture**" has been solely prepared By Liz J. Kappen (2018-11-065) under my guidance and has not been copied from seminar reports of any seniors, juniors or fellow students.

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## DECLARATION

I, Liz J. Kappen (2018-11-065) declare that the seminar entitled **“Zero Budget Natural Farming – an alternate form of agriculture”** has been prepared by me, after going through various references cited at the end and has not been copied from any of my fellow students.

Vellanikkara  
25-1-2020

Liz J.Kappen  
(2018-11-065)

## CERTIFICATE

This is to Certify that the seminar report entitled “**Zero Budget Natural Farming – an alternate form of agriculture**” is a record of seminar presented by Liz J. Kappen (2018-11-065) on 31<sup>st</sup> October, 2019 and is submitted for the partial requirement of the course AGRON.591.

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## 1. Introduction

Green revolution has ushered in a new way of farming, not only did it increased agricultural production tenfold but also India became a net exporter of food grains especially wheat. The huge leap in agricultural production was attributed to a number factors such as use of high yielding varieties, increased area under irrigation, use of fertilisers and pesticides etc. But as years pass by the negative impact of green revolution started to show up. The over exploited land failed to give a bounty, the water table in many areas went far below, pest and diseases resurgence became a common phenomenon. Recurrent crop failures resulted in farmers looking for other sustainable alternatives.

Alternate farming systems are gaining wide importance due to increasing focus on human health and sustainable environment. The different alternate forms of agriculture include biodynamic farming, ecofarming, no till farming, premaculture, organic farming and zero budget natural farming. Alternate forms popularity among practising farmers is mainly due to its sustainability and health aspects rather than viability.

## 2. Alternate farming systems

Biodynamic farming, ecofarming, no till farming, premaculture, organic farming and zero budget natural farming

### 3. BIODYNAMIC FARMING



**Plate 1. Rudolf Steiner (1861-1925)**

#### **Father of Biodynamic farming**

Biodynamic farming was a concept put forth by Rudolf Steiner. Biodynamic farming practices include a series of well known organic farming techniques that improve soil health,

whereas dynamic practices are intended to influence biological as well as metaphysical aspects of the farm (such as increasing vital life force) or to adapt the farm to natural rhythms.

In biodynamic farming two classes of preparations are used ie. the preparations directly sprayed onto soil or crops (500 to 501) and preparations added to FYM compost (502 to 507).

Table 1. The biodynamic preparations after Steiner (1924)

No.	Name of formulation
500	Horn manure
501	Horn silica Compost preparations:
502	Yarrow (Flower heads from <i>Achillea millefolium</i> )
503	Camomile (Flower heads from <i>Matricaria chamomilla</i> )
504	Stinging nettle (stalk from <i>Urtica dioica</i> )
505	Oak bark ( <i>Quercus robur</i> )
506	Dandelion (flower heads of <i>Taraxacum officinale</i> )
507	Valerian (juice of flowers of <i>Valeriana officinalis</i> )

## 4. ORGANIC FARMING



**Plate 2. Albert Howard (1873-1947)**

### **Father of Organic farming**

Organic farming is a system of farm design and management to create an ecosystem which can achieve sustainable productivity without the use of artificial external inputs such as chemical fertilizers and pesticides (NPOP)



**Plate 3. Components of organic farming**

### **The key characteristics of organic farming include**

- Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity and careful mechanical intervention
- Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms

- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures
- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention
- The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing
- Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats

## **5. ECOLOGICAL FARMING**

Ecological farming includes all methods, including organic which generate ecosystem services like like

- a) prevent soil erosion
- b) water infiltration
- c) carbon sequestration
- d) increased biodiversity

### **Principles of ecological farming**

- Food production should be ecological in both origin and destiny
- Integration of species that maintain ecosystem services
- Minimise food miles, packaging, energy consumption and waste
- Define a new ecosystem to suit human needs using lessons from existing ecosystems from around the world
- Apply the value of a knowledge-base (advanced data base) about soil microorganisms so that discoveries of the ecological benefits of having various kinds of microorganisms encouraged in productive systems such as Forest Gardens can be assessed and optimised; for example in the case of naturally occurring microorganisms called denitrifiers

## 6. HOMA FARMING

The principle of homa farming is “You heal the atmosphere and the healed atmosphere will heal you”. This system of farming finds mention in the oldest vedic era book rigveda. It is a farming practice of chanting of Sanskrit mantras (agnihotra puja) at specific times in the day before a holy fire. The timing is extremely important and also the ash from pooja is used to energise composts, plants, animals, etc. Agnihotra ash is beneficial at all stages of farming operations—soil treatment, water treatment, seed treatment.

Homa organic farming injects nutrients into the atmosphere to nourish the plants, to prevent disease, bring natural predators and nutritious, timely rains. Homas are specially prepared fires for the purification of the atmosphere. If you make the atmosphere more nutritious and fragrant by performing Homas, a type of protective coating comes on plants and this prevents diseases, fungi, pests, etc. Plants’ capacity to breathe increases and the toxic choking effect due to atmospheric pollution is eliminated.

Agnihotra is the basis of homa farming. This should be performed twice daily in the Agnihotra hut. If cow dung and ghee are readily available they should be used in greater quantity when doing Agnihotra puja.

## 7. NO TILL FARMING



Plate 4. No till farming

No till farming is also known as zero tillage or direct drilling. It is a way of growing crops or pasture from year to year without disturbing the soil through tillage. Here the soil is disturbed only for placing seeds (sowing). It is a form of conservation agriculture.

### **Advantages of no till farming**

- Conserve soil and water
- Prevents weed growth
- Adds organic matter to the soil
- Reduce cost of cultivation
- Reduce labour cost

### **8. PERMACULTURE**

Permaculture or permanent agriculture is a term coined by Bill Mollison and David Holmgren in 1978. It advocates designing human systems based on natural ecosystems. It is a sustainable design system stressing on the harmonious interrelationship of humans, plants, animals and earth.

### **9. RISHI KRISHI**

It is a system of farming practiced in Maharashtra. The use of Amrit pani (20 kg cow dung, 0.125 kg butter, 0.5 kg honey, 0.25 kg ghee) for seed treatment and spraying is a special feature of this farming practice . Addition of amrit pani help maintain soil fertility and crop yield.

### **10. ZERO BUDGET NATURAL FARMING**



#### **Plate 5. Sri. Subhash Palekar( Father of ZBNF)**

Zero budget natural farming (ZBNF) is a farming concept developed by Sri. Subhash Palekar who is an agriculturalist from Maharashtra. ZBNF is an agroecological farming approach that promotes growing crops in harmony with nature. According to Mr. Palekar only 1.5 to 2.0 % of nutrients are taken from soil remaining 98 to 98.5% nutrients are taken from air, water & solar energy. And most of the nutrients that plant needs are in

unavailable form and they need to be converted to available form. Microorganisms help convert them to available form

### 10.1 How the concept ZBNF got attention of general public

In 2002 Karnataka Rajya Raita Sangha (KRRS) leader met Mr. Palekar and invited him to Karnataka for a workshop on ZBNF. Inspired by Palekar's speech many farmers adopted ZBNF. Later ZBNF turned out to be a farmer-led social movement in Karnataka. ZBNF was adopted as a major state programme in 2016 in Andhra Pradesh due to the efforts of Mr. Vijay Kumar (a retired civil servant). Now the NDA government at the centre is planning to adopt ZBNF into a major agricultural policy once the results of the ICAR initiated multi location trials are out.

### 10.2 The four wheels of ZBNF

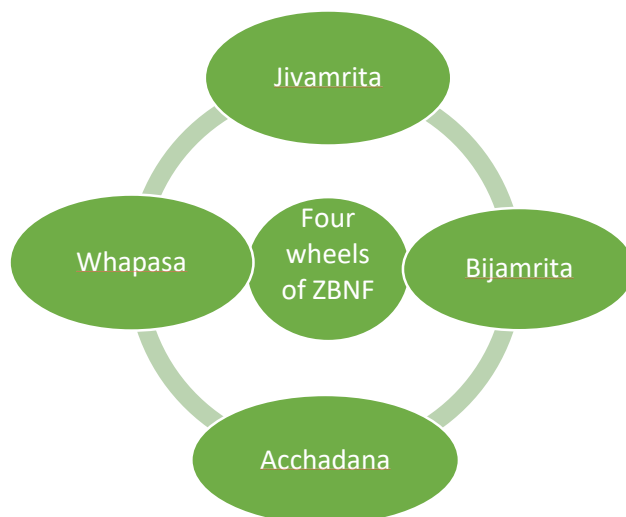


Plate 6. Four wheels of ZBNF

The four wheels of ZBNF are Jivamrita, Bijamrita, Acchadana, Whapasa. Jivamrita consists of cow dung, cow urine, jaggery and pulse flour. It helps in stimulating microbial activity to make nutrients bioavailable and also protect plants against pathogens. Bijamrita essentially consists of cow dung, urine, water, lime and soil. It helps protect the young roots from fungus and seed-borne or soil-borne diseases. Acchadana or Mulching can be done using soil, straw or live mulch. It helps increase humus in soil, conserves top soil, increases water retention, encourages soil fauna, prevents weeds. Whapasa is a condition resulting from the application of jivamrita and acchadana which helps improve soil structure and humus content and thereby increase water availability, water use efficiency and increased resilience to drought. Water available to plants must be in the form of water vapour, then only

plants can take up water. Irrigate the crop at noon time so that water is available in vapour form.

### **10.3 How to prepare Jivamrita**

1. Take 200 litre water in barrel.
2. Take 10 Kg local cow dung and 5 to 10 litres of cow urine and add it in the water
3. Then add 2 Kg jaggery, 2 Kg pulses flour & handful soil from the bund of the farm into it
4. Then stir the solution well & keep it to ferment for 48 hours in the shade .Now Jivamrita is ready for application.

Apply the Jivamrita to the crops through irrigation water or directly to the crops.

Spraying 10% filtered Jivamrita on the crops is also recommended

### **10.4 Ghan-Jiwamrita**

Take 100 Kg local cow dung, 2 Kg jaggery, 2 Kg pulses flour, handful soil from the bund. Then mix it well by adding small amount of cow urine. Then spread it & keep it in the shadow for drying. Afterwards make its powder by hand & apply to the crops in the proportion of 100 Kg FYM & 10 Kg Ghan-Jiwamrita. Ghan –Jiwamrita is used in areas of water scarcity.

### **10.5 How to Prepare Bijamrita**

1. Take 20 litre water, 5 Kg local cow dung, 5 litre local cow urine, 50 gm lime & handful soil from the bund of the farm.
2. Take 5 Kg local cow dung in a cloth and bound it by tape. Hang this in the 20 Litre water up to 12 hours.
3. Take one litre water and add 50 gm lime in it, let it stable for a night
4. Then next morning, squeeze this bundle of the cow dung in that water thrice continuously, so that all essence of cow dung will accumulate in that water.
5. Then add a handful of soil in that water solution and stir it well.



6. Then add 5 litre deshi cow urine or human urine in that solution & add the lime water and stir it well. Now Bijamrita is ready for use. It is used for seed treatment.

### 10.6 Salient beliefs of ZBNF

- Indigenous cow breeds are best suited. Cow dung and urine of black colored Kapila cow is most effective
- If cows are not available, buffalos or even human urine can be used
- The cow dung should be used as fresh as possible and the urine as old as possible
- Only one cow is needed for thirty acres of land
- The cow that gives more milk, its dung and urine is less effective and which gives less milk, its dung and urine is more effective.
- Soil already has all nutrients necessary for plant growth and so no external inputs are required
- Existing nutrients have to be unlocked and made bioavailable via jivamruta .This concept is called as Annapurna
- Mulching reduces weed related labour
- Monocots provide nutrients like potash or phosphate, while dicots help in nitrogen fixing
- 90% of water use can be reduced through ZBNF practices
- Rejects use of vermi compost made by exotic worm species
- As we go deeper into the soil the nutrient content also increases
- The pest management in ZBNF is done using agniastra, brahmastra, neemastra

#### a)Agniastra

Agniastra is made using cow urine, tobacco, green chili, local garlic and neem leaves pulp. It help control leaf roller, stem borer, fruit borer, pod borer.



Plate 7. Agniastra preparation

### **How to prepare Agniastra**

- a. Take a pot.
- b. Add 10 litre local cow urine in it.
- c. Then add 1 Kg Tobacco by crushing it in the Urine
- d. Crush 500 gm of green chili & add it in Urine
- e. Crush 500 gm local garlic & add it in the Urine
- f. Add 5 Kg neem leaves pulp
- g. Then boil this solution well atleast 5 times continuously
- h. Let this solution to ferment for 24 hours
- i. Filter this by cloth

Spray this medicine Agniastra on the pest like leaf roller, stem borer, fruit borer and pod borer.

### **b)Brahmastra**

Brahmastra is prepared by using neem leaves, custard apple leaves, lantana leaves, guava leaves, pomegranate leaves, papaya leaves and white datura leaves crushed and boiled in urine. It controls sucking pests, pod borer, fruit borer, etc.

### **Preparation of Brahmastra**

- Take a pot and add 10 litres of cow urine
- Crush 3 Kg of neem leaves and add the pulp to water
- Add 2 Kg pulp each of custard apple, pomegranate leaves, guava leaves, lantana leaves, white datura
- Boil the solution for five times
- Filter this by cloth
- Ferment for 24 hours
- The dilution is 2 litres in 100 litre water and is effective against fruit borer and sucking pest.

### **c)Neemastra**

Neemastra is made up of cow urine, cow dung, neem leaves and neem pulp which is fermented for 24 hours. It helps control sucking pests and mealy bug.



**Plate 8. Neemastra preparation**

**Preparation of neemastra**

- Take 100 litre of water
- Add 5litre cow urine
- 5 litre of cow dung
- 5 Kg neem leaf pulp
- Ferment for 24 hours and filter

Its used against sucking pest

**10.7 Case study of ZBNF in social, economic agroecological indicators (%) reported by farmers in Karnataka (Khadse *et al.*, 2017)**

The reported benefits of ZBNF in Karnataka ( n = 97) are improved income - 85%, improved quality of produce - 91%,improved yields - 78%, reduced production costs - 90%, reduced need for credit - 92% (Khadse *et al.*, 2017)

Table 2. Case study of ZBNF in social, economic agroecological indicators (%) reported by farmers in Karnataka (Khadse *et al.*, 2017)

Perceived change	% of Respondents				
	Yield	Income	Production costs	Need for credit	Quality of produce

Has decreased	12.8	4.8	90.9	92.5	4.4
No change	8.5	9.5	2.3	3.8	4.4
Has increased	78.7	85.7	6.8	3.8	91.1

### 10.9 Criticism of Andhra Pradesh ZBNF

- Though AP ZBNF saw huge participation of women, it is important to ask whether increased participation has increased opportunities for better gender relations
- Issue of land ownership by women
- Involvement of global financial entities raise concerns on transparency and accountability (Saldanha, 2018)
- Involvement of Bill and Melinda Gates Foundation who openly support transgenic and gene editing technology
- No scientific evidence exist to support ZBNF mass adoption
- Excessive state support can lead to dependency
- Sustainability of ZBNF, once state support is removed is a matter of concern
- Focus on export crops can lead to export dependence(Munster, 2016)

### 10.10 Specific criticism of Palekar's ZBNF

- He considers all other systems of agriculture including organic farming , biodynamic farming as a result of western conspiracy eg. The tractor is a demon, which destroy your future (Palekar, 2011).
- His emphasis on religious and mythical elements is also a cause of worry
- Agricultural Universities have no any right to say that chemical farming is a science and truth. It is a fraud (Palekar, 2013)

### 10.11 Case study of ZBNF in AP ( Sarada and Kumar, 2018)

Table.3.Case study of ZBNF in AP ( Sarada and Kumar, 2018)

Sl.No	Perception	Disagree (in %)	Agree (in %)	Undecided (in %)
1.	ZBNF is relatively advantageous over chemical farming	53.33	8.33	38.33
2.	ZNBF gives more net returns	40	23.33	36.67
3.	ZNBF reduces cost of cultivation to a greater extent	45	41.67	13.33
4.	ZBNF is difficult to practice	53.33	21.67	25
5.	ZNBF increases micro organisms and earth	80	20	0
6.	Adoption of ZBNF on large scale is possible	8.33	36.67	55
7.	Availability of traditional varieties seed is difficult	35	31.67	33.33
8.	Weed management is difficult in ZBNF	55	11.67	33.33

### 11. Conclusion

Sustainability of Zero Budget natural farming can only be verified by doing scientific research. Test trial on zero budget natural farming undertaken by ICAR is still in its

initial stage. If the results prove the efficacy of ZBNF, they can be recommended on a larger scale, until then it should not be implemented as a state sponsored programme.

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## 13.Discussion

1. According to you can ZBNF be a solution to meet the ever increasing population ?  
No,it can be an environment friendly and sustainable method but cannot be the total solution to meet the food needs of the ever increasing population.
2. Why should we go for indigenous earth worms?  
According to Mr. Palekar indigenous earth worms will not take up heavy metals from soil .

3. Are there any published reports or study on ZBNF?

Yes , ICAR is currently conducting an experiment and the report has been released by them but it is not accessible to the public.

4. How ZBNF will become remunerative ?

Because the cost of production keeps on decreasing as years pass by and even if price remains constant the total profit margin increases ( as cost of production decreases).

5. Why white datura is used ?

Because white datura is more rich in the poisonous substance.

**KERALA AGRICULTURAL UNIVERSITY**  
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**Department of Agronomy**

**Agron. 591: Masters Seminar**

Name	: Liz J. Kappen	Venue	: Seminar hall
Admission No.	: 2018-11-065	Date	: 31-10-2019
Major advisor	: Dr. Deepa Thomas	Time	: 9.15 am

**Zero Budget Natural Farming- an alternate forms of agriculture**

**Abstract**

One among the most significant changes in input use in agriculture was brought about by the green revolution. The occurrence of green revolution in India was at a crucial time in history when the country was witnessing unprecedented drought and famine and green revolution helped India to attain self-sufficiency in food grain production. Though the excessive use of pesticides and fertilizers had its impact in increasing production, these added benefits were accompanied by some negative impacts like decreasing soil fertility and pest and disease resurgence. Hence there is an increasing tendency of 'back to nature' movement and therefore more sustainable alternative forms of agriculture are gaining importance.

The quest for sustainable as well as environment friendly alternatives resulted in increased adoption of farming practices like biodynamic farming, ecofarming, Homafarming, no tillage farming, organic farming, permaculture, zero budget natural farming (ZBNF) etc. In India, such movements have historically been led and articulated by the Non - Governmental Organisation (NGO) and urban middle class activists rather than peasant movements (Brown, 2018). ZBNF is one such movement developed by Sri. Subhash Palekar an agriculturist from Maharashtra. It gained wide attention within a short span of time. Its popularity in states like Andhra Pradesh resulted in adoption of ZBNF in the state policy framework of Andhra Pradesh. Subsequently, the Economic Survey 2018-2019 and the Union Budget 2019 pitched for the adoption of ZBNF by farmers across the country in order to double their income and arrest agrarian distress.



ZBNF is an ecological farming approach that advocates crop production in harmony with nature. The cow is central to ZBNF. The four wheels of ZBNF are Jivamrita, Bijamrita, Acchadana, Whapasa. A survey among farmers of Karnataka, (Khadse *et al.*, 2017) claimed 85% increase in income and 78% increase in yield by adoption of ZBNF. While there are claims stating the benefits over conventional agriculture, such claims are not backed by scientific evidence. In Karnataka, Sarada and Kumar (2018) reported that 53.33% disagree about ZBNF being relatively advantageous over conventional agriculture.

Sri. Palekar is facing wide criticisms from scientific community. Activists have expressed concern that state led efforts to scale up ZBNF will help only the international financial institutions with potentially contradictory interests (Saldanha,2018). This is where the need for critically evaluating ZBNF arises. As questions and discussions still remain, it is important to bring these debates into the agricultural community which include farmers, scientists and students, so that evergreen revolution can be attained without compromising food production.

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