

Jaivik Chhabutra:
Revival of Soil Health Quality & Sustainability in Agricultural Productivity

Jagat Singh*, Vinod Beniwal**, A.K. Yadav***, N. K. Pruthi**** and Satpal Azad*****

Regional Centre for Organic Farming, Hisar*

All India Organic Farming Society, Hisar**

National Centre for Organic Farming, Ghaziabad***

CCS College, Muzaffarnagar****

NABARD, DDM, Hisar*****

Jsinghrcof2009@gmail.com*

01662-242709, 09992999890*

Abstract:

Health of citizens is of prime importance in the overall development of the nation which is achievable only with nutritive food. The nutritive and healthy food can be produced from healthy soil. So, buildup of soil health is the crucial need to save the nation.

No doubt, Green Revolution has given rich dividends and has shifted Indian agriculture from a step of food deficiency to food sufficiency, but high and injudicious use of chemicals, fertilizers, pesticides resulted in serious pest problems i.e. water holding capacity (WHC) of soil, soil fertility column, moreover all these problems have resulted in nutritional deficiency in the food although production is in bulk.

The concept of Jaivik Chhabutra originated by Sh. Jagat Singh of Regional Centre for Organic Farming (RCOF) Hisar and implemented during the RIF project of NABARD in Hisar district by the agency i.e. All India Organic Farmers' Society. Jaivik Chhabutra is a low cost sustainable agriculture input production platform. It uses locally and easily available natural resources for agriculture inputs. It is a platform above ground level with approximate size of 20 x 15 x 1.5 ft. It can be established in open or in shade according to availability of space.

Although this concept is just three-seasons old in 27 villages in 09 Blocks of Hisar district with 675 farmers but the result has astonished by the other farmers and Agriculture Officers, who during the Organic Farming Training Course organized by RCOF, Hisar centre, visited some villages where this programme is functioning were so satisfied with the performance and practicability of **Jaivik Chhabutra** performances on Organic Farming and other agriculture practices through **Jaivik Chhabutra**.

Important inputs procured at farm these are Punchghavya, Enrich Punchghavya, Jeevamrit, Beejamrit, Fresh and Old Lassi, Biosols, Biodynamic Compost, Cow Pat Pit, Vermicompost, Vermiwash, Sanjivak, Amrit Pani, Amrit Tika, Banyan Tree Soil and Cow Urine etc. Complete workable model of Jaivik Chhabutra finalized it cover 40 different parameters on different aspects of agriculture and found good water holding capacity, early emergence, good

germination, better soil organic carbon buildup, fast crop residue decomposition, comparable productivity to conventional production system, reduced wilting problem in cotton compared to conventional crop, food quality and nutrient contents based on test weight was better, cost of production reduced due to minimum purchased of inputs from market. It is a philosophical novel and innovative concept.

Key Words: *Jaivik Chhabutra, Punchghavya, Enrich, Punchghavya, Jeevamrit, Beejamrit, Fresh and Old Lassi, Biosols, Biodyanamic Compost, Cow Pat Pit, Compost Tea, Vermicompost, Vermiwash, Sanjivak, Amrit Pani, Amrit Tika, Banyan Tree Soil and Cow Urine*

Introduction:

Organic farming system which has environmental sustainability at its core is gradually becoming mainstream in agriculture all over the world (Yadav, 2008^[6]). The nutrient need of organic agriculture mainly depends on on-farm inputs which are safe and locally available. In this regard, crop residue plays a critical role in nutrient transformation, soil health and for sustaining the productivity of soils (Gaur, 1984^[2]; Dwivedi *et al.*, 2001^[1]; Paul *et al.*, 2002^[3]).

Environment in the largest sense is the complex network of Physical, Chemical, Biological and Ecological components that make up the natural world. Human activities commonly affect the distribution, quantity and quality of every environmental aspect be it:

SOILAIR.....WATER

Socio-economic revolutions lead to industrialization and in order to cope up with increasing demand of food and products, man created high yielding variety of foodgrains which are highly responsive to chemical/fertilizer and water, with lesser nutritive values which leads to weaker state to health and mind.

Technology although have provided better medicinal and transport facilities alongwith Information Technology (IT) in order to make human life easy to “Live and Entertain”.

“The second face is the harmful effect along with depletion of our Mother Earth in every aspect.”

Approach:

The idea of Jaivik Chhabutra has been conceptualized by Sh. Jagat Singh of National Centre for Organic Farming (NCOF), Ghaziabad. He studied and resulted that there are different, effective and scattered formulation in agriculture and are although available throughout the country and these formulations are adopted by progressive, innovative and organic farmers in different situations but there is no model which overcome all the problems of agriculture on a single platform. He churns out all the possible Formulations, Tactics, Sanskars etc. and resulted in a new innovative concept of Jaivik Chhabutra, which (if applied properly) may have the capacity to fulfill all the needs of soil, plant and nutrition management at a single platform for every farmer.

During his joining at the RCOF in Hisar, a NABARD – SDC project under “Rural Innovation Fund” (RIF) Scheme, whose implementing agency i.e. All India Organic Farmers Society (AIOFS), a pioneer in organic farming (practices and promotion) approached RCOF for technical guidance and requested him to be a torch bearer and policy maker for the above said project. Sh. Jagat Singh from RCOF, Hisar, an always ready person for farmers’ help instantly and joyfully agreed for his all help in the project.

He would be a vital force in implementing this project also.

AIOFS has no words to appreciate Sh. Jagat Singh’s contribution in this project of Organic Farming and during the project period, he participated at all fronts and delivered the practical implementation of his idea of Jaivik Chhabutra, which has now become a household term, system of input production with locally available resources with no cost and at farmers’ field itself, who are opting for organic farming practices or Integrated Nutrition Management (INM) and Integrated Pest Management (IPM) etc. Till date the concept of Jaivik Chhabutra has been adopted and practiced by more than 360 farmers in fourteen villages with overwhelming response and the results so obtained are so much satisfying that we at AIOFS are planning to make a model Jaivik Chhabutra in every village of Hisar district in the first phase.

Material and Method:

The microbial load and nutrient status present in panchagavya, beejamrutha, jeevamrutha and bidigester are given in Table Nos. 1 and 2, respectively. The data indicates the presence of microflora especially nitrogen fixers and P-solubilizers (Table-1) in all the organic liquid manures in addition both major and micro nutrients (Table-2). Presence of naturally occurring beneficial micro-organisms predominantly bacteria, yeast, actinomycetes, photosynthetic bacteria and certain fungi were detected in organic liquid manures (Swaminathan, 2005^[5]). Papen *et al.*, 2002^[6] reported that panchagavya contains Azotobacter, Azospirillum and phosphobacteria.

Sr. No.	Material required
(a)	Earthen platform 15 x 20 x 1.5 ft.
(b)	Two No. of Plastic drums (Capacity 200 liter)
(c)	Two No. of Plastic/ Cemented/ drums (Capacity 100 liter)
(d)	Four No. of Plastic Buckets (Capacity 50 liter)
(e)	Four No. of Earthen pots (Capacity 25 liter)
(f)	Vermi bed of Size 8x3x1 ft (Civil Works) (500 bricks)
(g)	10 Kg. Verms for Vermi Bed (Composting & Vermi Wash)
(h)	Vermi-wash model one capacity 2 liter per day

(i)	Cow Pat Pit of Size 1.5x1.5x1.5 ft.
(j)	One Copper Pyramid
(k)	One Moon base agriculture calendar
(l)	NADEP Compost unit (Civil Works) (1000 bricks)
(m)	Skilled Labour Charges
(n)	Brick Blast (Jaivic Chhabutra boundary/ labour/ cement)
(o)	Raw Material (Milk, Curd, Buckwheat Flour, Mustard Oil, Mustard Cake etc.)

Table-1: Microbial load in different organic liquid manures

Organisms	Colony count (cfu/ml)			
	Panchagavya	Beejamrutha	Jeevamrutha	Biodigester
Bacteria	26.1 x 10 ⁵	15.4 x 10 ⁵	20.4 x 10 ⁵	12.9 x 10 ⁵
Fungi	18.0 x 10 ³	10.5 x 10 ³	13.8 x 10 ³	9.2 x 10 ³
Actinomycetes	4.20 x 10 ³	6.8 x 10 ³	3.6 x 10 ³	3.0 x 10 ³
Phosphate solubilising organisms	5.70 x 10 ²	2.7 x 10 ²	4.5 x 10 ²	1.0 x 10 ²
Free living N ₂ -fixers	2.70 x 10 ²	3.1 x 10 ²	5.0 x 10 ²	2.1 x 10 ²

Table-2: Nutrient status of different organic liquid manures

Parameter	Panchagavya	Beejamrutha	Jeevamrutha	Biodigester
pH	6.82	8.2	7.07	7.29
Soluble Salt (EC)	1.88 dSm ⁻¹	5.5 dSm ⁻¹	3.40 dSm ⁻¹	1.09 dSm ⁻¹
Total Nitrogen	0.10 per cent	40 ppm	770 ppm	255 ppm
Total Phosphorus	175.4 ppm	155.4 ppm	166 ppm	79 ppm
Total Potassium	194.1 ppm	252.0 ppm	126 ppm	42 ppm
Total Zinc	1.27 ppm	2.96 ppm	4.29 ppm	0.52 ppm
Total Copper	0.38 ppm	0.52 ppm	1.58 ppm	1.24 ppm
Total Iron	29.71 ppm	15.35 ppm	282 ppm	9.60 ppm
Total Manganese	1.84 ppm	3.32 ppm	10.7 ppm	8.30 ppm

PROCUREMENT OF INPUTS

I. For Seed Treatment

Few of such innovative seed treating formulations, which would be covered during this concept are as follows:

- Butter milk (Lassi fresh) seed treatment 50 ml per kg seed
- Cow milk+ honey for seed treatment 50 ml per kg seed
- Cow urine or cow urine-termite mound soil paste
- Bargad Tree Soil 100 gram per kg seed etc.

II. For Soil Enrichment and Plant Growth Promotion

Enriched Panchgavya

- Fresh cow dung 1 Kg

- Cow Urine 3 lit
 - Cow milk 2 lit
 - Curd 2 lit
 - Cow desi ghee 1 kg
 - Sugarcane juice 3 lit
 - Coconut water 3 lit
 - Banana paste of 12 fruits
- Method of application same as Panchgavya above.

Sanjivak

Used for enriching the soil with microorganisms and quick residue decomposition.

- Mix 100-200 Kg cow dung, 100 Lit cow urine and 500 gm jaggery in 300 lit of water in a 500-lit closed drum.
- Ferment for 10 days
- Dilute with 20 times water and sprinkle in one acre either as soil spray or along with irrigation water.
- Used as soil application either by sprinkling or by applying through irrigation water. Three applications are needed one before sowing, second after twenty days of sowing and third after 45 days of sowing.

Bijamrut

Mix cow dung 5 kg, cow urine 5 lit and cow milk 1 lit with 250 gm lime in a drum with 100 lit of water. Keep the solution overnight. Sprinkle this solution over seeds for treatment. Dry the seeds and sow.

Jivamrut

- Take 100 litre water in barrel and add 10 kg cow dung plus 10 lit in cow urine.
- Mix well with the help of wooden stick add two kg jaggery and two kg gram or any pulse flour mix this solution well with wooden stick.
- Keep this solution for fermentation for 5 to 7 days. Shake the solution regularly three times a day.
- Used as soil application either by sprinkling or by applying through irrigation water. Three applications are needed. One before sowing second after twenty days of sowing and third after 45 days of sowing.

Amrit Pani

- Mix ten kg cow dung with 500 gm honey and mix thoroughly to form a creamy paste.
- Add 250 gm of cow desi ghee and mix at high speed. Dilute with 200-lit water.

- Sprinkle this suspension in one acre over soil or with irrigation water.
- After thirty days apply second dose in between the rows of plant or through irrigation water.

Banyan Tree Soil

Shady soil of wild old Banyan tree (Bargad) with natural habitat of enormous birds and animals has the special quality for improving the agricultural soils due to having heavy microbial biomass. Where they release the excreta and soil is undisturbed. This Soil contains huge amount of microbes i.e. bacteria, fungus, molds, protozoa and algae etc. All these microorganisms liberate no. of minerals, production of antibiotic substrate, synthesis Plant Growth Promoter Regulator, cellulose decomposer and other pathogenic management causes and drives congenial environment to soil. Application of 20 kg/acre shady soil incubated with vermin-compost for three days. After this the incubated soil applied as a fertilizer on Berseem and other fodder crops. After 35 days the growth of biomass of fodder is excellent. Biomass and dry matter is found 1.5 times then conventional practices.

Cow Urine

Cow urine alone is also a good liquid fertilizer and can be used directly for spraying the crop. Dilute 1 lit of cow urine with 100 lit of water and use it as foliar spray. For one acre of crop 200 lit of such dilute suspension will be sufficient. This can be used in any crop in all the seasons.

Vermiwash as Growth Promoter

Vermiwash alone or mix with cow urine is also an excellent growth promoter. Dilute one liter of vermiwash or 0.5 lit of vermiwash + 0.5 lit of cow urine in 20 lit of water and use as foliar spray. Three to four applications are needed for excellent results.

III. FOR PLANT PROTECTION

Cow urine: Old Cow urine diluted with water in ratio of 1: 20 and used as foliar spray is not only effective in the management of pathogens & insects, but also acts as effective growth promoter for the crop.

Fermented curd water: In some parts of Central India fermented curd water (butter milk or *Chaach*) is also being used for the management of white fly, jassids aphids etc.

Dashparni extract

Crush following plant parts in a 500-lit drum

• Neem Leaves	5 Kg	
• Vitex negundo leaves		2 Kg
• Aristolochia Leaves	2 Kg	
• Papaya (Carica Papaya)	2 Kg	
• Tinospora cordifolia leaves	2 Kg	
• Annona squamosa (Custard apple) leaves	2 Kg	
• Pongamia pinnata (Karanja) leaves	2 Kg	
• Ticinus communis (Castor) leaves	2 Kg	
• Nerium indicum	2 Kg	
• Calotropis procera leaves	2 Kg	
• Green chilly paste	2 Kg	
• Garlic paste	250 gm	
• Cow dung	3 Kg	
• Cow Urine	5 lit	
• Water	200 lit	

Crush all the ingredients and ferment for one month. Keep the drum in shade and covered with gunny bag. Shake regularly three times a day. Extract after crushing and filtering. The extract can be stored up to 6 months and is sufficient for one acre.

Some Broad Spectrum Botanical Pesticides

Neemastra

- Crush 5 kg neem leaves in water
- Add 5 lit cow urine and 2 kg cow dung
- Ferment for 24 hrs with intermittent stirring
- Filter squeeze the extract and dilute to 100 lit
- Use as foliar spray over one acre
- Useful against sucking pests and mealy bugs

Brahmastra

- Crush 3 kg neem leaves in 10 lit cow urine
- Crush 2 kg custard apple leaf, 2 kg papaya leaf, 2 kg pomegranate leaves, 2 kg guava leaves in water.
- Mix the two and boil 5 times at some interval till it becomes half
- Keep for 24 hrs, then filter squeeze the extract. This can be stored in bottles for 6 months
- Useful against sucking pests, pod/fruit borers.
- Dilute 2-2.5 lit of this extract to 100 lit for 1 acre.

SWOT Analysis of Jaivik Chhabutra

Strength:

- ❖ Easy to operate
- ❖ Cost effective
- ❖ Self sustainable
- ❖ Practical
- ❖ Fast result
- ❖ Utilization of locally available resources
- ❖ Reduces drudgery

Weakness:

- ❖ Farmers adhered to routine agricultural activities may find it cumbersome at first instance
- ❖ Negative attitude towards new concept
- ❖ It needs revalidation and standardization

Opportunities:

- ❖ Proper use of this concept would lead farmers to stop dependence upon market-oriented inputs for seed treatment, pest management and plant nutrition etc.
- ❖ It will act as a energy-store house of field where all needy inputs will be prepared with easily available resources at no cost
- ❖ It will lead to better, more and nutritive yield which would fetch premium price in the market
- ❖ Water holding capacity (WHC), soil microbial load, soil health would result in better environmental and living conditions for human and other living organisms

Threats:

- ❖ Improper and injudicious use of formulations may lead to less or no result which would make farmers negative towards the concept
- ❖ Lack of related literature and lack of reading habit may result in preparation of ineffective formulation which may lead to negative word of mouth

Conclusion:

Jaivik Chhabutra can help in conservation and enhancing of carbon in the soil with increase in water holding capacity and organic carbon and hence resulting in no residue left of predecessor crop rather providing a nutritive humic and ionic composition ready to be assimilated through sustained release for nourishment of successor crop. This would result in increasing the soil column, hence making the root to reach new depths and thereby procuring the needed nourishment by plants which otherwise was neither available nor reachable.

Thus, it will act as an effective tool in carbon credit earning as Jaivik Chhabutra will help ending up the burning of crop residue (after the combine harvesting of paddy and wheat).

It has been observed by the farmers that Jaivik Chhabutra's application for three seasons has resulted in better water holding capacity, fast crop residues decomposition, better crop health and lesser plant diseases infestation.

Jaivik Chhabutra has emerged as a torch-bearer for the farmers who have loosened their faith in the practices of agriculture and who have prepared themselves to abandon the rural area due to excess expenditure on the inputs purchased from the market.

Jaivik Chhabutra has become a role-model for revival of health (i.e. soil, plant, animal, human) in 27 villages of Hisar district covering more than 1500 farmer families covering nine blocks.

According to farmers and observers saying:

❖ *Is Jaivik Chhabutra Ne To Bacha Liya (Jaivik Chhabutra has saved us)*

[Suraj Mal Punia, Bayana Khera, Hisar]

❖ *Jaivik Chhabutra To Kamaal Ka Hai (Jaivik Chhabutra is wonderful)*

[Abhey Ram, Village Sarhera, Hisar]

❖ *Jaivik Chhabutra Se Hogi Sahi Kheti (Jaivik Chhabutra is the right approach for sustainable agriculture)*

[Shamsher Arya, Go-Hitkari Publishers]

❖ *Gau Maata Hai Jaivik Chhabutra Ka Aadhar (Holy cow is the base of agriculture through Jaivik Chhabutra)*
[Prof. Z.S. Rana, Department of Animal Genetics and Breeding, CCS HAU, Hisar]

❖ *Carbon Credit Ke Liye Jaivik Chhabutra Karega Kaam (Jaivik Chhabutra will earn carbon credits earnings)*
[Dr. D.K. Sharma, College of Agricultural Engineering & Technology, CCS HAU]

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