

**RRA NETWORK:****Soil Organic Inputs : Inception Note****Beyond Soil Conservation: Towards a national initiative for Enhancing Soil Productivity through addition of organic matter in Rainfed Areas****1. Thematic area:****Generic Context:**

There is a larger consensus on the deteriorating soil fertility resulting into 'soil fatigue'. The need for organic matter addition to soil is well recognized for the following reasons:

- Input response to chemical fertilisers is fast decelerating / decreasing i.e. reducing chemical use efficiency
- Increasing micro-nutrient depletion resulting into deficiencies
- Inevitable crisis in fossil fuels and increasing costs of chemical fertilizers
- Expansion of fertilizer use, declining chemical use efficiency and increasing costs have resulted in mounting fertilizer subsidies
- Increasing costs of production resulting into shortfall in agriculture incomes
- Negative impacts on climate change
- Disparities in the spread of subsidies across regions / crops / rainfed and irrigated areas / size class of farmers

The above factors have spurred a serious discussion in the mainstream. Besides these arguments, organic matter/ inputs for soils is necessary to improve soil biology and enhance soil moisture that are necessary factors for increasing use efficiency of external inputs, particularly in rainfed areas. The Steering Committee report for the 11<sup>th</sup> FYP – has made these points emphatically. The problem is much more serious in rainfed crops/ soils and in marginal crop systems, where addition of organic matter has drastically reduced over time.

**Specific Context of Rainfed Agriculture:**

The organic matter in the soil has three main functions:

1. Hydrological functions
2. Biological functions
3. Nutrient functions

Though interrelated, these three functions have their own distinct role. The soil fertility discussions/ investments, including bio-fertilisers, so far, have been focused on the nutrient functions. Hydrological functions of soil organic matter have greater significance in rainfed agriculture as it is crucial for soil moisture retention to tide over dry spells and for reducing

runoff. Soil moisture and organic matter is essential even for improving the efficiency of biofertilisers and chemical nutrients. The returns on investments on soil and moisture conservation in watershed development will be substantially improved with complementary investments on soil organic matter as the more moisture can be harvested and held in soil profile for a longer time.

It is ironical that in spite of wide recognition of the crisis and need, there are very little public investments on addition of organic inputs into soils.

It is in this context that RRA network has taken up the thematic area of enhanced organic matter application in rainfed agriculture for action research and advocacy as a matter of priority to revitalize rainfed agriculture.

## **2. Current status and outline of the thematic area / Pilot Program –**

***The main objective of the exercise is to evolve and advocate for a mainstream program on addition of organic inputs into soils in rainfed agriculture through a synthesis of substantial field experiences.***

### **PART A :**

#### **GAPS in UNDERSTANDING:**

Scouting for experiences and the cases discussed in the write-shop revealed a near absence of focus on organic matter inputs into rainfed lands as an important program in itself. Most of the experiences are located in the 'organic farming' programs and such movements. The initiatives are isolated and do not target the entire rainfed area in a given location. Vermicomposting dominates the effort. Even in such cases the programs are devoid of any structured public investments. In the experiences studied, the program investments / incentives are structured around the following:

- Built into the premium paid in organic produce
- Infrastructure (compost pits, vermiculture sheds etc.) as grant from projects or NREGS
- Integrating into tribal festivals in one case.
- Only in one case incentives for 'composting' (part subsidy for operational costs)
- Much of the experience is small and limited to extension through awareness generation.

***The main gaps in understanding are:***

1. The experiences are isolated in terms of the components and a comprehensive programmatic (scalable) experience on achieving constant addition of organic matter into soils in rainfed areas is not available.
2. The incentive structure (public investments) for soil organic inputs – the cost structure, quantification, measurement and payment systems are not yet properly conceptualized and tried ... (so that a mechanism for preparing schedule of rates can be evolved)
3. Liquid manures – gaining high popularity with farmers but the research system has been largely indifferent to it & there is 'no uptake' from the research or extension system. These have high potential for market driven approaches – but, needs standardization, quality control and marketing mechanisms.

### **Gaps in Data:**

The following are the data gaps

1. Quantification of biomass requirement for enhancing soil productivity in a block of area and the feasibility and cost of raising such biomass, its conversion into quality manure / *in situ* application.
2. The hydrological impacts of addition of organic matter into soils. It has larger implications for management of drought spells in rainfed agriculture. But there is no clear articulation on this angle.
3. Though there are studies, no macro analysis is available on the possible impact of organic matter addition on increasing the efficiency of chemical fertilisers.

### **Existing Opportunities within policy:**

No policy or legal changes are required for this agenda. But it needs substantial allocation of financial resources- mainly on labour. NREGS comes handy on this but has a major limitation in terms of definition of asset. As much of the organic matter is in a way consumed annually (no trace – therefore verifiability is a problem). But on the other hand constant addition for a period of 4 to 5 years substantially the quality and productivity of the land and result in asset building.

There are opportunities to build the pilot initiative into:

- a) MGNREGS with state level discussion and establishing a proof of concept
- b) Can be integrated into watershed development programs (which so far have not considered investments in terms of incentives on building soil organic matter. The watershed programs of NABARD offer much larger scope as a central discussion and policy inclusion can be possible.
- c) Can target as a special program under RKVY / BRGF – exploring local possibilities within the district.

## **Advocacy:**

### **What we need to Target?**

1. Goal : A national soil productivity enhancement program rainfed areas– in the 12<sup>th</sup> five year plan
2. Interim : A decentralized program under NREGS / RKVY
3. Integrating into existing watershed development programs

Though a larger advocacy goal could be making incentives available on a regular basis for rainfed farmers in rainfed areas to apply substantial quantities of organic matter into soils till the time the cost of such application substantially comes down or the farm-profitability increases substantially so that farmers can afford such costs. Part re-allocation of fertilizer subsidies may be a target for advocacy in this sense.

But as a more short-term objective, a specific program on addition of soil organic matter for rainfed areas can be targeted. Considering soil productivity enhancement as a matter of ‘asset building’, working out technicalities, measurement and payment systems and sizeable demonstration can aid in such a policy articulation.

Building a clear macro-economic rationale (both on technical and economic aspects) for a national program on soil health/ promoting organic inputs in rainfed agriculture is a requirement for advocacy. Such a case need to bring out the hydrological functions of soil organic matter in addition to others. Such an exercise will also give proper direction to the national discourse on ‘soils’.

The following strategic areas identified for action

1. Understanding and (some what) standardizing the various location/ context specific technical options of organic matter addition.
2. Evolving an actionable program that can be implemented by the mainstream from out of learning from various grass-roots experiences
3. Evolving implementation modalities for such a program – packaging of measures, institutional mechanisms of implementation, assessing funding requirements, convergence of programs etc.
4. Evolve a clear strategy and road map for policy advocacy.

## **PART B : STRUCTURING OF PILOT INITIATIVES:**

The pilot program on the subject shall have three parts or sub-projects:

**Part 1: Promoting a discussion within mainstream agriculture sciences** that leads to a clear technically articulated proposition and need for investment on soil organic matter.

A technical proposition prepared by a group of scientists from mainstream is most important for advocacy. The subject has been thus far confined to introductory remarks in several policy documents. At present there is no clearly articulated technical case for making substantial public investments in soil productivity / soil organic inputs. The discourse must set priority for bulk organic inputs vis-à-vis biofertilisers or micro-nutrients.

**Methodology:**

**Researchers' network on enhancing soil productivity** through 'organic matter addition' in rainfed areas (ICAR/ SAU and economists) (anchored by Dr. J.Venkateswarlu and Dr.K.L.Sharma/ CRIDA)

- A three stage workshops leading to a national workshop on 'soils in rainfed lands'
- Collaborative research on compiling a status paper on soils in rainfed areas and the technical recommendation for 'organic matter' addition - numerically capturing hydrological, biological and nutrition benefits of soil organic matter addition and its implications for crops, climate change, droughts etc.
- A paper on possible economic impacts of organic matter addition in the dryland situation.
- Involving the subject in the curriculum of trainings in CRIDA
- Developing a comprehensive manual on 'organic matter' that can be used for various purposes.
- National workshop on "Soils in Rainfed Areas"

A statement commonly endorsed by scientists and practitioners can be a result of this national workshop. Collaboration with ICAR can be sought for this initiative.

**Time frame:** One year ending August, 2011.

**Part 2: Pilot initiative on a Developing a Comprehensive Program for Soil Productivity Enhancement**

The pilot is NOT trying to

- demonstrate any technological innovation on soil productivity enhancement
- not trying to improve soils of any disadvantaged community/location
- → it also does not include dealing with problem soils such as salinity, sodicity, acidity, etc.
- Assess the impact of application of organic manure on crop growth – as such studies are mostly available. It is an implicit assumption that organic matter addition will improve soils and contribute to productivity.

It is rather meant for

- *establishing a process* of selection of a basket of location specific options for improving soil productivity
- *analyse the operational feasibility* of addition of substantial organic inputs through soil productivity improvement program on a saturation basis in varied agro-climatic regions within the rainfed areas
- *establish the cost structure, measurement, payment and monitoring systems* for constant edition of organic matter into soil
- arriving at the programmatic steps, institutional requirements, budgets, capacity building needs of taking up a program to improve soil productivity.

Preferably, the program envisages demonstrating such experience in collaboration with mainstream programs. It will try out various incentive structures that enable farmers to apply organic matter.

#### **Methodology:**

6 partner locations will be selected across the country in various agro-ecological regions viz., Maharashtra, MP, Orissa, Jharkhand, AP, Himalayan region.

The process will be anchored in a Gram Panchayat with mechanisms established within the farmers. In each location 100 ha of a contiguous and predominantly rainfed block is taken. The mechanisms evolved over the initial meetings on the purpose, will be established in this block in intense consultations with the farmers.

A detailed methodology and process steps will be evolved in the preparatory workshop once the locations and partners are identified.

#### **Components of the action program:**

Situation analysis, understanding the existing practices, computation of organic matter addition (sources, quantities, mechanisms etc.) over time and understanding the trends and reasons. Evolve the processes to increase biomass, establish mechanisms of *in situ* and *ex situ* biomass collection, conversion (into manure, if needed) and addition to soils. This involves various methods such as improving farm yard manure (quality and quantity), increasing biomass, incorporation of crop residues, green manure (leaf and crop) various methods of bulk composting, measures like animal penning etc.). The efforts also include establishing mechanisms of sourcing and application of water, crucial for several purposes like raising biomass and composting. An initial target of 2 tons per acre per year will be taken to set the program processes into motion; this can be revisited with the progress in work.

#### **Partnerships:**

Partners implementing watershed programs /NREGS who can dialogue with the administration (district / state) to have this dialogue and mobilize investments can take up the field testing. Scientists from ICAR (CRIDA, CAZRI, Indian Institute of Soil Sciences, Bhopal) and state agriculture universities may be involved in the program in operational design, field assessment and research monitoring/ validation.

**Resources required:**

A block of 100 ha will be taken up as a core of the activity and efforts will be made to mobilize local resources so that a saturation at a Gram Panchayat level can be achieved.

A budget of Rs.5 lakhs will be allocated per site from RRA –this is meant for initiating the work in 100 ha and also to explore convergence with government programs to mobilize resources to saturate a Gram Panchayat. The budget from RRA is a supplementary resource.

The pilot needs to be integrated into an on going program – either MGNREGS or a Watershed development program so that only additional resources need to be mobilized.

**Time Frame:** two years

The purpose is not to complete the pilot initiative in its totality, which needs a longer time frame. It would suffice, to start with, if farmers in the selected area start the process and go through two rounds of application of organic matter. This will give the necessary standardization of processes, measurements, cost structure etc.

**How the pilot experience feeds into advocacy:**

The advocacy initiative go parallel to the pilot program. It generates the required numbers/ data – i.e. arriving at the incentives (quantum and structure), feasibility of integrating into the mainstream programs (what changes need to be made) and provides a basic proof of concept on ground.

**PART 3:**

The third part of the pilot initiative is to promote liquid manures and other techniques that can be promoted through market. Standardisation of processes, establishing quality parameters of these formulations (such as Panchakavya, vermin-wash etc.) and quality control mechanisms and marketing approaches.

**Partnerships:** It is identified in the write-shop that IDE(India) having substantial experience in marketing such products can work with support from CIKS on the scientific side on this initiative. While the methodology may emerge from their discussion the operationalisation of the program can be integrated into the overall soil productivity pilots being taken up across the country.

**Budget**

Approximately three lakh rupees for the cost of two organizations, while promotional cost in the field can be integrated into the soil productivity pilot initiatives.

**Time frame:**

Six months for the two organizations to develop a field tested methodology and about one and half years for field level integration into the soil productivity pilots.

The three parts of the program together can constitute the larger pilot initiative.

#### **COLLABORATION WITH SCIENTIFIC ORGANISATIONS:**

ICAR institutes: CRIDA, CAZRI, Indian Institute of Soil Sciences

State Agriculture Universities : at respective sites.

CIKS, IDE (india),

Partner organizations : partly funded by RRA (5 to 6 organisations), voluntarily joining the pilot (own budgets) – Cetna Organic.

Advocacy partners: CBGA and others need to be identified

Media : CSE (need to explore)

#### **ROLE OF RRA-ECONOMICS UNIT:**

1. Furthering the work done by Green Pease on fertilizer subsidies (subsidizing food crisis)
  - a. Evolve the patterns and level s of consumption of fertilizers across rainfed districts and the related distribution of subsidies between rainfed and irrigated areas/ crops etc. This may result into computation of per ha investment levels on soil nutrition across the country.
  - b. Simulation on the productivity impact of application of organic matter in terms of chemical use efficiency and its resultant macro-economic benefits. (part of this will be carried out by the researchers' network led by CRIDA)
  - c. Potential impact of application of soil organic matter on the rainfed crops in relation to climate change (will have to be carried out by CRIDA)
2. EPW articles on soil crisis in rainfed areas

#### **ANCHOR OF THE PILOT:**

The pilot program can be anchored by Chetna Organic with support from WASSAN. Chetna works in three states (Maharashtra, Orissa and Andhra Pradesh). They have agreed to contribute part of the time of a senior resource person for the pilot program. Dr.N.K.Sanghi from WASSAN will further the initiative on the engagement with the research system. If required, a full-time coordinator for the pilot program can be hired by the network.

**TOTAL BUDGET REQUIREMENT:**

S.NO.	Sub-Theme	Amount (Rs. In lakhs)
Part 1	Researchers' network and arriving at technical recommendation	3.0
Part 2	Pilot initiative on soil productivity enhancement through organic matter application	15.0
Part 3	Promoting markets for liquid and other manures	3.0
	Strategy development workshop	1.5
	Three meetings of the teams (monitoring and development)	2.0
	Visit of the monitoring / coordinators	1.9
	Total	26.4

**NEXT STEPS:**

1. Clearance to the proposal from the network and the core group
2. Identifying the partners across various locations in the country
3. MOUs with the respective organizations
4. Nomination of the team by the partner organizations
5. Initial orientation and strategy development workshop
6. Discussion with NABARD centrally on possibilities of funding.
7. Each partner identifying local partnerships and mobilizing resources
8. Grounding the program

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