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Introduction

This document aims to identify various State and Central Government Policies that can potentially be used for advocating the use of biochar as soil amendment. Policies on organic farming have been examined. Since biochar is useful both as a sustainable option for managing farm waste (which is otherwise burnt in many cases) and as a soil amendment, it can be incorporated into existing policies on organic farming. Policies have been examined to see how they can support different stages of biochar production and end-use such as:

- **Production of biochar**
  - scope for setting up of pyrolysers
  - feedstock management
- **Research and development:** much of the research on biochar is from western countries. Field research at different locations in India needs to be undertaken to understand the usefulness and risks of using biochar. There is also a need to research into the production of biochar to suit the local needs. Policies that have a scope for R&D have been identified.
- **Awareness and advocacy:** there is a need to build confidence for using biochar among the end-users, i.e., farmers. Most policies have an education/training component, which could be utilised for creating awareness about biochar.

Apart from this, policies or advocacy for biochar will also need to the following gaps:

- **Mitigating risks:** Unscrupulous use of biochar can potentially be risky. Policies need to address this. However, the existing policies do not have much scope for this and therefore there is need to address this gap by formulating policies specific to this need.
- **Developing standards for biochar production and use** as soil amendment for its various benefits. International standards exist but there is a need to develop standards at the State level depending on the local conditions and needs. For this, a consultation with farmers and experts and other stakeholders would be ideal.

In the following sections, various policies are examined to identify the scope of interventions of within their existing framework. There is also a need for comprehensive State and Central policies to be developed for judicious production and use of biochar. This could be done in consultation with farmers and experts in the field of agriculture, economics, soil sciences, social sciences, ecology and climate change.

Central Government Policies

1. Soil Health Mission under the National Mission for Sustainable Agriculture

According to the guidelines, Soil Health Mission (SHM) is one of the most important interventions under National Mission for Sustainable Agriculture (NMSA). The Mission is implemented by the State Governments, National Centre of Organic Farming (NCOF), Central Fertiliser Quality Control & Training Institute (CFQC&TI) and sanctioned by INM division.

The aim is to promote

> …location as well as crop specific sustainable soil health management, creating and linking soil fertility maps with macro- micro nutrient management, judicious application of fertilizers and organic farming practices.

Soil Health Mission is envisaged to be implemented under five schemes, of which there is scope for promoting biochar in the following schemes:

1.1. Soil Health Card

Under this scheme, farmers are provided with "Soil Health Cards" based on the soil fertility and appropriate recommendations for applying appropriate soil amendments, fertiliser dosage and integrated nutrient amendments are given.

There is also provision for financial assistance of ₹2,500/ha to farmers to apply the recommended integrated nutrient management practices as corrective measures for improving soil health.

However, the guidelines only mention application of appropriate fertilisers as corrective measures.

Since biochar is used as a soil amendment, it can introduced to farmers under this scheme, especially in acidic and saline soils and soils where water holding capacity needs to be improved. There is also scope to explore financial assistance for using biochar.

1.2. Soil Health

Under another component known as 'Soil Health', the focus is on strengthening Soil Testing Laboratories by either improving the existing ones or setting up new STLs, including mobile units. Other components include strengthening and/setting up new Fertiliser Quality Control Laboratories by State Governments; preparation of digital soil maps at the district level; and promoting and distributing micronutrients based on soil quality.

By consulting experts, the Central Government could issue specific guidelines on the types of soils that can improve with application of Biochar. There is scope for intervention in components such as 'Training Programme for Staff' and 'Training Programme for Farmers'. The educational and advocacy components for popularising biochar could be covered under these components.

There is also provision for 'Promotion and Distribution of Micronutrients' under which biochar can be directly promoted as there is scientific evidence to show that biochar increases the availability of nutrients. Application of fertilisers can decrease soil pH rendering the soil acidic. This effect can be countered by the application of biochar.

1.3. Integrated Nutrient Management and Organic Component

Another component under SHM is called the Integrated Nutrient Management and Organic Component that will be implemented by NABARD and the State Governments. NABARD will set up mechanised Fruit/Vegetable Market/Agro Waste Compost production unit and State of the art liquid/carrier based Bio-fertiliser/Biopesticide Production Units. While the State Governments too will be involved in this, they are additionally responsible for

- Setting up and strengthening of Biofertiliser and Organic Fertiliser Testing/Quality Control Laboratories;
- Supporting R&D of organic practices specific to each state and cropping system
- Promote the application of organic inputs such as manure, vermicompost, bio-fertilisers, etc.

There are several provisions under this component which can be used to promote biochar.

- Some of the funds for setting up mechanised agro-waste compost production unit can be directed to the setting up of biochar production units.
- Similarly, a portion of the funds allocated for setting up of "state of the art liquid/ carrier based Biofertiliser/ Biopesticide units" could also be used for setting up of biochar production units.
- R&D and promotion of organic practices can include application of biochar and explore similar traditional practices that have existed in India. Similarly, there is an urgent need to step up research on biochar application for different soil types, which could be taken up under this component.

(The guidelines have itemised specific equipments that can be procured or supported)

1.4. Paramparagat Krishi Vikas Yojana (PKVY)

PKVY "aims at supporting and promoting organic farming, in turn resulting in improvement of soil health." The approach is to consolidate 50-acre cluster of farms and convert it into "model organic farms" or "model organic cluster demonstrations" within a time frame of three years. These farms will further adopt the 'Participatory Guarantee System (PGS)' of certification, a free organic certification developed by Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) through National Centre of Organic Farming (NCOF). PGS certification is expected to help farmers certify their produce as organic and market them domestically. Training of farmers and marketing of produce are also supported under this scheme.

Once the cluster of 50-acre farms is identified, ₹75,000 has been earmarked for each cluster for setting up of organic input production units. Biochar production units that double up as agro-waste processing units as well as provide organic soil amendments can be considered under this scheme. Apart from this, ₹3.25 lakh is set aside in the first years and ₹50,000 in the second years for 'Integrated Manure Management'. Biochar can be an integral part of this process.

The Participatory Guarantee Scheme is a significant aspect PKVY. Since it is a certification process, it can also be used for setting standards for Biochar production and utilisation along the lines of International Biochar Initiative standards and European Biochar Certificate.

1.4.1. Bhartiya Prakritik Krishi Paddhati (BPKP)

BPKP is a sub-scheme to promote traditional practices under PKVY. Under this scheme, on-farm biomass recycling is encouraged. Preference is given to small and marginal farmers and for agriculture in drylands, rain-fed areas and tribal areas.

Plant-based preparations for soil aeration is also encouraged. Farmers are entitled to receive ₹2,000/ha for 3 years for inputs. There is also a provision for ₹10lakh/Ha for three years for capacity building. Apart from this, there are also various provisions for training and capacity building by external resource persons.

These provisions can be explored for training and capacity building of biochar production, methods of applying and its various benefits.

2. Mission Organic Value Chain Development for North Eastern Regions, 2018

In 2018, the Central Government, with a view of exploiting the potential of organic production in North Eastern States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, introduced this scheme. The aim is to convert subsistence mode of production in these states into commercial certified organic production in a value chain mode.

For farmers registered under this scheme, there is scope for one-time assistance of ₹3750 per ha (up to a maximum of ₹7500 for 2 ha per beneficiary) is available for creation of *on-farm* input production infrastructure such as liquid manure tanks, NADEP compost tanks, etc. Apart from this, farmers under this scheme can also avail an additional ₹3750 per ha (up to a maximum of ₹7500 for 2 ha per beneficiary) for procuring *off-farm* inputs such as biofertilisers, biopesticides, neem cake etc.

Biochar can be promoted as one of the farm inputs that farmers can produce on the farm or procure under this scheme.

There is scope for post-harvest infrastructure for grading, sorting, storage, processing, transport etc. However, there is no mention of organic waste handling facilities. Biochar can provide a safe and sustainable means for handling of organic waste generated post harvest and post processing.

State Policies

1. Sikkim Organic Policy, 2004

In 2016, Sikkim was formally declared a '100 percent organic' state, a distinction of being the first and so far the only state to go fully organic. However, this process started in 2003 with measures such as discouraging chemical fertilisers by reducing subsidies, promoting vermi-compost, etc. With the setting up of the Sikkim Organic Mission in 2010, this process of converting to organic cultivation was fast tracked and finally in 2016, all the farms in the state were certified organic. There is much to emulate from this policy which was carefully planned and executed over the years.

The policy document lists out several 'policy-strategies' for each step of production and sale of organic produce in the state. Policy strategies have been spelt out for Internal Control System[1] (ICS) development and organic certification; for farm production of inputs & eradication of chemicals; for processing of organic products and value-addition; for marketing and for research. This policy document addresses some of the finer aspects of implementation. Some, such as the ones listed below, can also be used for implementing a biochar-advocacy programme:

- Local Self Help Groups and NGOs having experience should also be involved in the process of ICS development so that at later stage locals should be able to take over the job.
- Local educated unemployed youths should be trained by creating livelihood schools and generate employment in the process of ICS development.
- Proper orientation and trainings should be conducted to bring awareness among the farming community with regard to the benefits of going into organic and to seek support of the farmers.
- Strengthening of soil-testing laboratories by establishing district-wise laboratories supported by two mobile units.
- Creation of research facilities to address any issues that farmers encounter.
- Training and capacity building of farmers as well as officials.

The following provisions in the policy-strategy provide a window of opportunity to advocate for the production and usage of biochar:

- Promote on-farm production of inputs by providing subsidies for infrastructures like Rural compost and Vermicompost units.
- Other sources of plant nutrients like bio-fertilisers, green manuring, untreated bone-meals, fish meals, rock-phosphates and soil amendments like dolomite should be used.

The following points on management of organic waste detailed in this policy also provide an opportunity for setting up of biochar production facilities:

- Solid waste management system should be linked with production of organic manure.
- Discourage burning of organic materials, biodegradable organic wastes and encourage conversion of such materials into organic manure.
- Encourage the production of various types of compost in the farm itself, including vermi-composting and biogas slurry.

[1] According to the Sikkim Organic Policy document, ICS development is a step-by-step process undertaken by service providers in field prior to inspection and certification.

- Formulate special programmes for increasing the biomass and organic manures, especially in rain-fed cultivation areas where soil depletion is high, so as to drought proof the farm.
- Establish a decentralised system to produce organic manure from biodegradable organic waste segregated at source.
- Ensure the quality of the organic manure and establish a centralised testing laboratory to monitor the same.

This policy, despite being bold and ambitious, is far from ideal. For instance, several farmers in Sikkim have reported a decline in yields due to high levels of pest attack and not receiving the necessary support for converting to organic. Consequently, their incomes too have plummeted due to other added factors. In developing a policy or action plan for advocating the use of biochar, an in-depth analysis of the success and failures of this policy would help in formulating a policy that is grounded in reality, practical in its approach and implementation, and inclusive in incorporating the needs and concerns of farmers.

2. Kerala State Organic Farming Policy, Strategy and Action Plan, 2010

The State Department of Agriculture started promoting organic agriculture in 2002-03. The following year, it set up a cell for 'Promotion of Sustainable Agriculture and Organic Farming'. Two brands 'Kerala Organic' and 'Kerala Naturals' were launched to market organic farm produce.

In the year 2010, Kerala released the Organic Farming Policy, Strategy and Action Plan. It is a well-rounded and comprehensive policy that pays attention to details such as seed sovereignty, revival of traditional agriculture and even recognises the damage brought about by Green Revolution and usage of chemical fertilisers and pesticides.

The policy document states

> *The mission to convert Kerala into an organic State is to be achieved focusing on potential crops and areas in a **phased and compact manner** with the aim of converting **a minimum of 10% of the cultivable land into entirely organic every year** and thus achieving the target within five to ten years. On completion of the third year of implementation of the organic farming policy, a Committee of experts comprising representatives of farmers and scientists should make a **comprehensive assessment of the farmer's well being, economy and environment** and, only after rectifying the drawbacks, if any, can the policy be implemented in rest of the areas.*

Of the eleven objectives, the following are relevant for advocating biochar:

- Make farming sustainable, remunerative, and respectable
- Enhance natural soil fertility and productivity
- Ensure soil and water conservation
- Avoid the use of agrochemicals and other hazardous material and, ensure chemical-free water, soil, air and food.
- Ensure quality control in organic inputs and agricultural produce
- Conservation and extension of traditional knowledge related to agriculture.

The policy document lists out 24 strategies for implementing the mission covering a wide variety of subjects.

Of these, the strategy to '***Strengthen soil and ensure water conservation measures***' is useful to implement a biochar advocacy plan. Even though the emphasis is largely on water conservation, the following action points are particular useful:

- Establish testing facilities for soil, water, micronutrients and microorganisms at least at the block and introduce the system of providing Soil Health Cards.

- Promote bio-fencing and thus help ensure soil and water conservation and availability of green manure and green leaf manure
- Conduct training programmes for resource persons at the Local Self Government Institution level on soil and water conservation measures

Strategy to ***Ensure availability of quality organic manure to the farmers*** lists the following action points, among others, which are useful for biochar advocacy, especially for biochar production and for feedstock management:

- Encourage, with adequate support, the availability of biomass in the organic farm itself, through programmes such as crop rotation, tree crops, cover crops, leguminous crops, green manure and green leaf manure.
- Encourage the production of various types of compost in the farm itself, including vermi-composting and biogas.
- Formulate special programmes for increasing the biomass and organic manures, especially in rain-fed cultivation areas where soil depletion is high, so as to drought proof the farm.
- Establish a decentralised system to produce organic manure from biodegradable organic waste segregated at source.
- Ensure the quality of the organic manure and establish centralised testing laboratory to monitor the same.
- Discourage burning of all organic materials in the field, which could be utilised as manure.

The following action points listed under the Strategy to ***Ensure farm inputs for organic farming*** would be useful, for outreach and training, financial and other logistical support.

- Link organic municipal solid waste segregated at source, especially from markets, hostels, densely populated areas and other institutions including night soils to farms through such means as simple and cost-effective decentralised composting, biogasification and vermi-composting and thus ensure organic matter recycling. Organic waste treatment plant should be made compulsory for the flats.
- Conduct training programmes for local resource persons for producing good quality input, quality testing and for such related aspects at the Local Self Government Institution level.
- Formulate legislative measures to empower the Local Self Government Institutions, reputed NGO's for ensuring quality of inputs, including necessary rules, guidelines, standards, monitoring and testing procedures and establishment of laboratories.
- Establish special financial assistance schemes, and/or link existing support schemes to groups to start production facilities for farm inputs.
- Develop local linkages for low cost input materials to farmers and ensure markets for good quality input materials at reasonable price
- Prepare a database on the organic content of the soil in different zones of Kerala.

Even though the details are not spelt out, the policy has a strategy to ***Provide financial incentives for promoting organic farming***

- Provide interest-free loans to organic farmers, especially small and marginal farmers. Credits linked to banks shall be subsidised through Central/State Governments.
- Set in place production linked incentive system support.
- Promote revolving fund system
- Provide assistance during conversion period; two years for annual crops and three years for perennials.
- Introduce a Stated led insurance scheme for small and marginal organic farmers
- Introduce pension for organic farmers.

Under the Strategy ***Reorient Research, Education and Extension***, there is provision for establishing model demonstration farms.

- The KAU shall develop package of practices and model demonstration farms for organic farming in different agro-ecological zones.

However, after 12 years of releasing this policy, the status of implementation is unclear. Despite that, the comprehensive nature of this policy distinguishes it and also serves as a template for advocating not only biochar but any sustainable farming practice.

3. Madhya Pradesh Organic Farming Policy, 2010

As of 2019, with about 0.76 million ha accounting for 27% of the country's total organic cultivation area, Madhya Pradesh had the highest acreage under organic cultivation in India. However, unlike Sikkim which is 100% organic, only 4.9% of MP's net sown area is organic.

Madhya Pradesh's organic farming Policy was formulated in 2010. It seems largely market-driven focussing on certification, marketing and even on tapping into the carbon markets. There is a mention of 'soil health' in the vision statement but not much has been followed in terms of action.

The 'short term' policy goal mentions

> …creating suitable infrastructures, assuring quality input supplies necessary for organic production processes, harnessing in situ biodegradable resources…

The long term policy goals has been stated as,

> Attaining environmental sustainability through agro – eco – systems management strategies *leading to improved soil health measured by increased sequestered Soil Organic Carbon (SOC) stocks*, exterminate ground water contaminations especially of heavy metals and anthropotoxic chemicals and increased biomass unit area through inherently conserved biodiversity

Tapping into Carbon Markets

The policy also mentions,

> The new policy envisions to tap this vast potential for carbon sink may provide opportunities to sequester 0.3 – 0.6 t C ha^{-1} Y^{-1} and may develop a framework for converting this in to CER[2]s.

There is also mention of generating a carbon fund that would finance the organic farming sector without state aid and this model has been envisaged as a viable option "for earning higher returns from the hitherto low paying activity."

Biochar, with its ability to lock stable form carbon into the soil for several years, has been listed by IPCC as one of the Negative Emission Technologies that can sequester carbon. Two voluntary carbon markets have listed biochar. Therefor, states that are interested in tapping into the carbon markets may give special attention to using biochar as soil amendment.

Organic Inputs

Recognising the crucial role of "appropriate quality with assured supply and rationalised price" of 'organic inputs' the policy states,

> The quality control, quality assurance, packaging, pricing and delivery mechanism are some of the key issues that requires state interventions through quasi – legal and statutory provisions. The current legal provisions do not suffice the purpose hence the new policy shall postulate a new set of guidelines and control orders for the organic inputs.

[2] Certified Emission Reduction

The section also mentions tapping the commercial potential of using biodegradable waste generated in urban areas for organic agriculture, especially in the peri-urban areas under the “Public Private Community Partnership model”.
It is not clear if a separate policy has been drafted for organic inputs. Biochar can be introduced in this policy as it serves the dual purpose of converting organic waste and act as a soil amendment. However, given the risk of contamination in using urban organic waste, there needs to be stringent measures and quality control mechanisms in place before if it can to be used as feedstock.

Financial aid

The policy identifies funds from Rashtiya Krishi Vikas Yojna, National Rainfed Area Authority, National Mission on sustainable Agriculture and state sponsored schemes to support that technologies for production, processing, storage, documentation, testing, traceability, impact assessment of the organic farming.

Funds required for setting up biochar production units and for promotion and research can also be funded from the same sources.

4. Gujarat Organic Farming Policy, 2015

According to the policy document, the aim of the policy is to

> *…to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of natural resources in favour of organic agriculture.*

The goal is to convert 10 times more area into organic compared to the baseline (not mentioned). Several objectives have been listed out of which the following are of interest for promoting biochar

- Maintenance of soil fertility by encouraging and enhancing the biological cycle within farming systems involving micro-organisms, soil flora and fauna, plants and animals
- Assurance of production and supply of quality organic input
- Creation of awareness among farmers towards organic agriculture
- Development of regulatory mechanism for various organic input and organic produce

The policy identifies several “Thrust Areas” for intervention of which the following are of use:

- **Soil and Nutrient Management**
  The policy encourages recycling of crop residues and conversion of organic waste from urban areas into methane. A much more practical approach would be to convert this waste into biochar, which completes the cycle and returns carbon into the soil.
- **Inputs for Organic farming**
  Recognising inputs such as soil and plant nutrient supplements, organic pesticides, and seed and crop varieties, the policy recommends as assured supply of these inputs at an affordable price to ensure growth of organic farming.
- **Bio-nutrients**
  Improving of soil health using both traditional methods (panchagavya, jeevamrit, etc) and other proven methods such as green manuring, mixed cropping, intercropping is encouraged.
- **Plant Health and Weed Management**
  The policy identifies improving soil health and farm ecology for improved better plant health. Non-chemical methods have been recommend to improve soil condition. Biochar can be an excellent solution for this.
- **Rural Employment Generation**
  Local enterprises provide employment and income to rural youth, women’s groups, and other SHGs. The policy rightly identifies that local production of necessary inputs also helps in doing away with unnecessary transport and packaging and is this more sustainable. The policy also says

that local farmer groups can also help in countering monopolies and increasing farm incomes. MNREGA funds have been identified to support establishment of composting units. The same funds can also be routed for pyrolysers.

- **Research, Database and Documentation**
  There is scope for research, creation of database relevant for organic farming such as production & export data, bio-input producers & dealers, voluntary and non-govt. organisations, etc. Documentation of traditional methods of agriculture, useful technologies, experiences of farmers too are encouraged. These different thrust areas provide comprehensive knowledge about existing knowledge, practices, and soil and other conditions which are necessary to develop a holistic understanding of the farming sector. For advocating biochar use, importance of such a knowledge-base is irrefutable.
- **Education, Capacity-building, Awareness, Hand-holding**
  The policy has outlined important components around capacity-building and creating awareness about organic farming. Biochar can be an integral part of these components.
- **Financial Incentives**
  Apart from the Thrust Areas, the policy also identifies financial incentives such as 'tax moratoriums' and 'interest subsidies' for producers, producer organisations and organic processing units. Such incentives can also be extended to individuals or organisations engaged in the production of biochar.

The policy has identified various organisations responsible for implementing each of the components. However, there is neither a budget, nor any specific funds earmarked for implementation.

The Gujarat policy recognises that nearly 68.5% of land in the state is undergoing desertification and soil salinity is one of the major causes. Yet, there is nothing specific is mentioned in the policy document to address this grave issue. Biochar has proven to be very useful in remedying decertification by helping to significantly reduce soil salinity.

After 12 years of rolling out this policy, it is not clear how much has been implemented.

5. Karnataka: Organic Farming Policy, 2017

Formulated in 2017, the Organic Policy of Karnataka has a special focus on millets. Unlike the Sikkim Organic Policy, there is neither a focussed approach towards phasing out of chemicals, nor much emphasis on soil health or organic inputs. The overall goal is to convert only about 10% of the agricultural land into organic farming by 2022. However, the document mentions that a few taluks/districts in the Western Ghats region would be identified as fully organic. The focus of this policy gravitates towards supporting private players to provide 'necessary supply chain and infrastructure facilities to process and market' organic produce and millets and in building customer confidence through transparent, traceable and reliable regulatory measures in production, handling and marketing of organic produce. Some opportunities for intervention are discussed below:

One of the objectives of the policy is 'to enable farmers to mitigate and adapt to the climate change and drought situations effectively'. Biochar, has been recognised as one of the most efficient ways of capturing carbon in a stable form and storing in soil for the foreseeable future. It is thus considered a practical measure for mitigating climate change. Because of various benefits in improving soil quality and increasing crop yields, it can also help in adaptation.

The following implementation strategies could also be points of intervention for advocating the use of biochar:

- Integrating all land-based activities viz., crop husbandry, dry land horticulture, dairy, poultry, piggery, fisheries, sericulture, permaculture, beekeeping, social forestry for maximising farm production
- Formulating special programmes such as crop rotation, tree crops, cover crops, leguminous crops, bio-fencing, etc. to ensure enough biomass and organic manures in the dry land areas
- Promoting on-farm production of inputs viz., green manures, compost, vermicompost, any other bio-nutrients and bio-control agents thereby reducing the burden of purchasing external inputs
- Educating and supporting farmers to ensure soil and water conservation including ground water recharging and rain water harvesting.

Some regions of Karnataka have a traditional practice of applying ——, a biochar-like product. Since the policy specifically spells out "Scientific validation and documentation of ancient wisdom, knowledge and existing practices of successful organic farmers" as one of the strategies, documentation and validation of —— and other similar practices, if any, can be undertaken.

6. Tamil Nadu Organic Farming (Draft) Policy, 2012[3]

The organic farming policy of Tamil Nadu recognises that improving soil health is crucial for organic farming. This is evident also from the objectives which lay emphasis on improving soil fertility and productivity; enhance biological cycles involving soil microorganisms; to encourage the use of local resources without relying on external supply of inputs. One of the objectives that is specifically useful to advocate the use of biochar states:

- To improve the depleted soils of rain ecosystem by addition of suitable organic manures to make them input responsive and better performing even user drought conditions.

The policy further lists 18 strategies for implementation. The following are useful for biochar advocacy:

- **Scientific validation of production technologies including organic inputs**
  The document states, "the use of external inputs from industrially produced organic inputs have to be minimised to reduce cost of production of organic produce and instead encourage utilisation of farm waste / crop residues, etc to grow organic crops."

- **Ensuring good quality organic inputs including seeds, planting materials and other bio-inputs**
  Under this strategy, a long list of bio-inputs including biofertilisers, biopesticides, organic manures, biocontrol agents and botanical formulations have been recommended. There is a recommendation to encourage farmers to produce compost from farm waste. Financial assistance for production of organic compost in rural areas has been suggested. Further, the policy states that "standardisation of bioinputs is very important to safeguard the interest of organic farmers. Production of specialised bioinputs by private companies has to be monitored The government, NGOs and organic farming groups should be given the role of monitoring standardisation of bioinputs." Biochar can be considered a bioinput.

- **Role of Agricultural Engineering Department in Soil and Water Conservation Practices**
  This strategy recognises the importance of conserving water and soil moisture. It says, "Soil moisture helps in higher microbial activity, which in turn helps in building ip of organic carbon in soil." Biochar plays an important role in retaining soil moisture and building soil carbon and

[3] Not sure this policy has been approved. See: https://www.newindianexpress.com/specials/2018/may/02/tamil-nadu-a-forerunner-in-organic-farming-yet-lacking-in-policy-feel-experts%E2%80%8B-1808992.html. However, there are several "Policy Notes" available on https://www.tnhorticulture.tn.gov.in/organic

therefore can be promoted. The role of the Agri http://www.90di.com/travel/ cultural Engineering Department has not clearly been specified.

- **Community Supported organic agriculture**
  Here too, the policy speaks of financial assistance for soil and water conservation. Production of compost and manure on the farm is encouraged. In situ management of crop residue either by mulching or "slashing and using of microbial strain" to *increase organic soil carbon* is mentioned. Soil carbon is envisioned to generate revenue through carbon credit system. Using biochar would be a more efficient method for tapping into the carbon markets.
- **Providing financial assistance to organic growers**
  Credit facility through NABARD, Nationalised banks, Rural Co-operative banks, and other commercial institutions; government subsidies; tax exemptions have been recommended. Financial support for composting under different schemes, and incentives and concessions for development of infrastructure facilities have been emphasised. All these resources can easily be tapped into for setting up biochar pyrolysers.
- **Organisational set-up**
  The policy envisages setting up of 'Directorate of Organic Farming' for coordinating different actives necessary for promoting organic farming and 'Organic Farming Research Centre' for carrying out research, education and extension systems to support the Organic Farming Policy.
- Apart from the above mentioned strategies, there is also some for training, awareness and capacity building; and for documentation of scientific validation of farming practices.
- **Recent developments**
  - In 2013, under the Directorate of Crop Management in Tamil Nadu Agricultural University[4], a 'Department of Sustainable Organic Agriculture' was set up with the mandate of undertaking "…research, teaching and extension activities on sustainable organic agriculture through interdisciplinary approach and to involve in production and quality assessment of bio inputs and organic products". In April 2022, the Nammazhvar Organic Farming Research Centre was inaugurated[5].
  - In 2007, Tamil Nadu Organic Certification Department (TNOCD)[6] was set up with the Directorate in Coimbatore.
    Promoting biochar through these organisations may be considered.
  - In March 2022, the Government of Tamil Nadu rolled our the Tamil Nadu Organic Farming Mission under the Central Government's PKVY scheme. Financial assistance of ₹1 lakh per group to 100 producer organisations for production and organic inputs has been announced[7]. However, there is no publicly available document on this Mission.

[4] https://tnau.ac.in/directorate-cm/sustainable-organic-agriculture-about-department/
[5] https://www.thehindu.com/news/cities/Coimbatore/organic-farming-research-centre-inaugurated-at-tnau/article65367354.ece
[6] https://www.tnocd.net/
[7] https://www.newindianexpress.com/states/tamil-nadu/2022/mar/20/complete-support-system-for-organic-farmers-in-state-2432127.html