

Turning Farm Residues into a Resource:

JWAS Promotes Biochar for Sustainable and Climate-Resilient Agriculture

Dhanusha, Nepal | 2026



What if agricultural residues that are often considered waste could instead become a valuable resource for healthier soils, resilient farming, and climate action?

This is the practical question being explored by farmers and field teams of **Janaki Women Awareness Society (JWAS)**, Dhanusha, through hands-on learning and experimentation on biochar production and its application in agriculture.

Learning by Doing through Farmer Field Schools

As part of the **Farmer Field School (FFS)** approach, a practical session was conducted with the **Farmer Groups** under **Civil Society for Nature based Local Agri food System (CS4FS)** project, where farmers learned about the preparation, importance, and potential benefits of biochar for sustainable agriculture and soil health.

During the session, the project field staff and Junior Technical Assistant (JTA) demonstrated the process of producing biochar using locally available biomass materials. The practical demonstration enabled farmers to gain hands-on knowledge and skills that they can apply at household and farm levels.

The session was not only about learning how to produce biochar—it was about helping farmers see agricultural residues differently: not simply as waste, but as a potential resource for improving soil and supporting more sustainable farming systems.



From Farm Residues to Biochar

Under its ongoing projects, JWAS is supporting farmers to explore biochar production using locally available agricultural and plant-based biomass residues.

These materials include:

- Rice husks and paddy straw
- Maize residues
- Sugarcane residues
- Pigeon pea stalks
- *Ipomoea carnea*
- *Calotropis gigantea*
- *Enlaliopsis binata*

Farmers are also collaborating with nearby community forests to collect **Lantana camara**, an invasive plant species, and utilize it as feedstock for biochar production. This approach creates an opportunity to address two challenges at the same time: better management of locally available biomass and improved soil management.

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Putting Biochar into Practice

The learning does not end with production. Farmers are applying locally produced biochar to their own farmland and conducting field-level trials to observe its potential contribution to:

- Soil health and soil structure
- Nutrient-use efficiency
- Water retention and water-use efficiency
- Crop growth and productivity
- Sustainable soil management
- Climate-resilient agricultural practices

Through Farmer Field Schools, farmers are able to observe, discuss, compare, and learn from their own field experiences.

Learning by doing is at the heart of the approach.

knowledge of biochar production and agricultural application.

To date, **more than 112 farmers have received training** on biochar production and its application in agriculture, while **more than 70 farmers are actively engaged in biochar production.**

Last year, approximately **5 metric tonnes of biochar-based organic fertilizer** were produced through this community-level initiative.

These experiences demonstrate the potential of locally driven solutions that make use of resources already available within farming communities.



Learning by doing.
Testing locally.
Building sustainable
farming systems—one
field at a time.

Building Local Knowledge and Capacity

The initiative is gradually creating a growing community of farmers with practical

Why Biochar Matters

Biochar is a carbon-rich material produced through the controlled heating of biomass under limited oxygen conditions. When

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appropriately produced and applied, it can contribute to soil improvement and nutrient management while also offering potential climate benefits through long-term carbon storage.

Global research provides encouraging evidence of its potential. A meta-analysis covering **381 datasets from 63 studies** found that biochar application increased, on average:



🌱 **Crop yield by 14.45%**

💧 **Water-use efficiency by 14.28%**

🌿 **Nitrogen-use efficiency by 13.97%**

These findings highlight why biochar is receiving increasing attention as one potential component of sustainable soil and climate-smart agricultural management.

Soil health is particularly important in the context of changing climate and increasing pressure on agricultural systems. Research also shows that soil acidification can negatively affect agricultural productivity, with one global meta-analysis associating soil

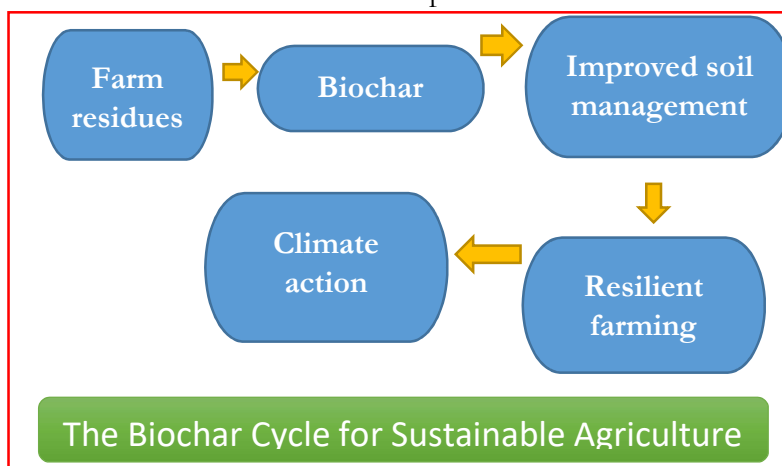
acidification with a **13.7% reduction in crop yield and a 25.4% reduction in root length**.

While results can vary depending on soil type, feedstock, biochar quality, crop, and application method, these findings reinforce the importance of locally testing and learning about soil-improving practices.

Linking Local Action with Climate Action

Under the **Civil Society for Nature-based Local Agri-Food Systems (CS4FS) Project**, supported by **Welthungerhilfe (WHH)** and implemented in partnership with **Aasaman Nepal, Janaki Women Awareness Society (JWAS), and Public Awareness Campaign Nepal (PAC Nepal)**, farmers are exploring biochar through hands-on Farmer Field School learning.

The approach connects several important areas of sustainable development:



Rather than treating agricultural residues as a disposal problem, the initiative encourages communities to explore how locally available biomass can be converted into a useful agricultural resource.

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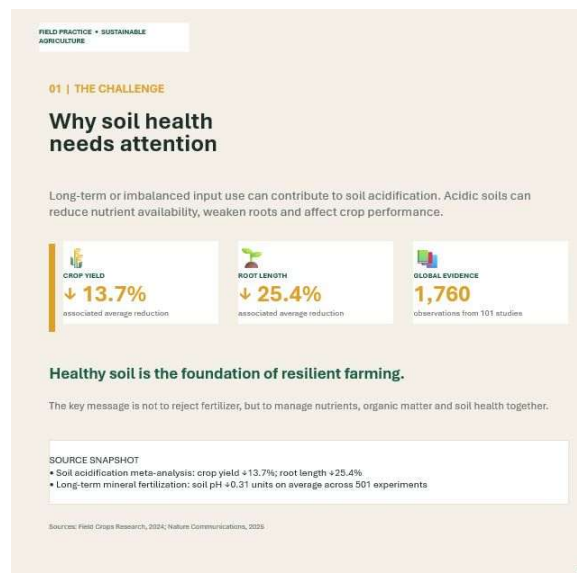
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Looking Ahead: From Community Practice to Carbon Removal

Building on this practical and locally driven experience, JWAS aims to explore the development and scaling-up of a **community-based biochar and carbon-removal initiative**.

The proposed approach would bring together:

-  **Sustainable management and utilization of agricultural and plant residues**
-  **Improved soil health and sustainable agricultural practices**
-  **Climate-smart and regenerative agriculture**
-  **Local livelihood and enterprise opportunities**
-  **Better management of invasive and unused plant biomass**
-  **Measurable and verifiable carbon-removal benefits**



Such an initiative could create a bridge between **local agricultural practice and emerging climate-finance and carbon-removal opportunities**, while ensuring that benefits remain connected to farming communities.

Small Steps, Local Solutions, Bigger Possibilities

The experience of farmers working with biochar demonstrates an important principle: sustainable solutions do not always need to start with sophisticated technologies. They can begin with **local resources, practical knowledge, farmer experimentation, and community action**.

By transforming farm residues into a potentially valuable soil amendment, farmers are exploring new ways to improve their production systems while contributing to more sustainable management of natural resources.

JWAS will continue to facilitate learning, field experimentation, documentation, and collaboration with farmers, local governments, community institutions, and technical partners to strengthen evidence around biochar and its potential contribution to resilient agri-food systems.

Farm residues → Biochar → Healthier soils → More resilient farming.

JWAS recognizes that biochar performance varies according to feedstock, production process, soil conditions, crop type, and application rate. Local field testing and evidence-based recommendations therefore remain central to the approach.