

# Converting Crop Residue to Revenue at the Farm



- Crop residues are the major post-harvest leftovers of agricultural farms.
- 2445.2 million tons of crop residues are produced annually.

- Approximately 70-80% of the total crop residues are burned leading to plenty of ecological effects on soil and plant biodiversity, soil health, and overall environmental and human health.

Awareness on  
ecological  
effects of crop  
residue burning

Training farmers  
on management  
strategies

Training farmers  
on dairy-waste  
management



# Demonstration of Biochar production

1. Making Earthen kon-tiki field-pit



2. Putting crop residues in pit



3. Pyrolysis process



4. Quenching with water



5. Biochar produced



6. Mixing of Biochar with manure



7. Mixed Biochar + farm manure: an organic fertilizer





# Examples of educational content used in workshops developed in multiple languages



## فصل کی باقیات مت جلائیں بائیوچار بنائیں

فصل کی باقیات کو جلا کر ماحولیاتی آلودگی اور انسانی صحت کی خرابی کا باعث بنتا ہے


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## Carbon Fertilizers for Reducing Greenhouse Gas Emissions and Improving Food Security

Convert crop residues to revenue at your farm

1. Avoid open crop residues, Agri-Industry waste and city green waste burning!

2. Converting organic waste to biochar (a stable carbon) is an IPCC suggested negative carbon emission technology

3. Biochar carbon can sustain in soil for millions of year and help to improve soil health and crop productivity

4. Biochar based carbon fertilizers are sustainable options to revive depleted soil carbon

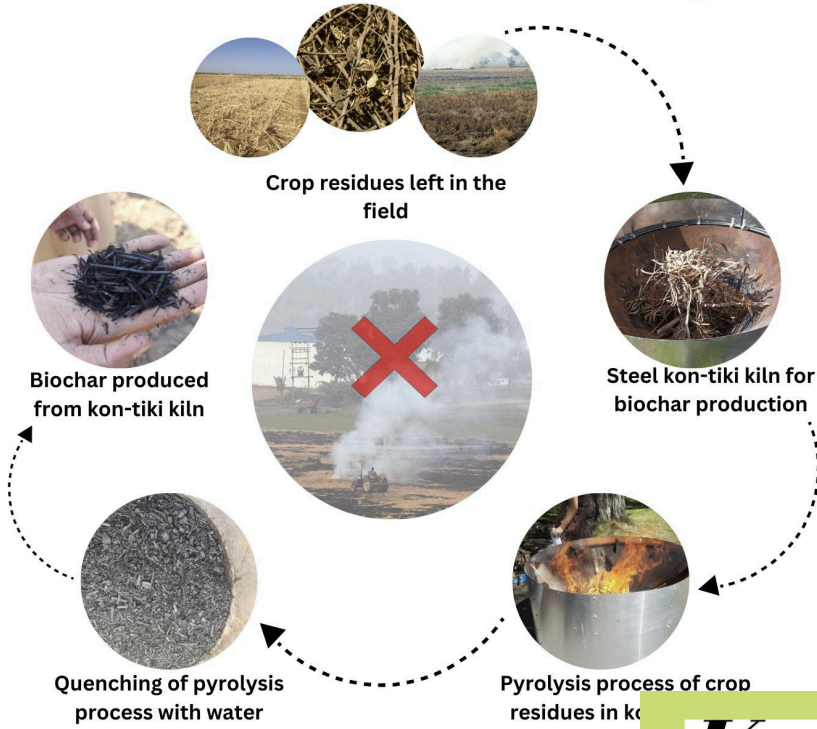
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## Stop crop residue burning: Convert your crop residue to revenue at your farm

Biochar as a sustainable solution for residue management



Biochar production process in kon-tiki kiln

## فصلوں کی باقیات کو جلانے کی بجائے اپنے فارم کی آمدنی میں تبدیل کریں

ہائیو چار فصلوں کی باقیات کا انتظام کرنے کا ایک پائیدار حل



کون ٹکی کلن سے ہائیو چار بنانے کا عمل



## Stop crop residue burning: Convert your crop residue to revenue at your farm



### Background

Global warming, climate change, and atmospheric pollution due to the release of global warming gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) and environmental pollutants such as SO<sub>x</sub>, NO<sub>x</sub>, NH<sub>3</sub> are consistent issues being faced by Pakistan and around the world. Seasonal on-farm residue burning is one of the several contributing factors to such challenges. Proper crop residue management strategies are lacking in present day agriculture.



### Types of crop residues and their associated challenges

- Different crops like rice, wheat, maize, cotton, sugarcane etc. produce a huge volume of residues on annual basis.
- Unfortunately, a huge volume of crop residues is burned on site which results in multiple challenges for society.
- For example, among the crop residue burnt, rice contributes a maximum of 43%, then wheat at 21%, followed by sugarcane at 19%, and oilseeds at 5%.
- Burning of only one tonne of residues releases 1460 kg carbon dioxide, 199 kg ash, 60 kg carbon monoxide, 3 kg particulate matter, and 2 kg sulfur dioxide.
- The removal of only a partial amount (30-40%) of crop residue from the land can intensify soil erosion hazard, deplete the SOC pool, accentuate emission of CO<sub>2</sub> and other GHGs from soil to the atmosphere, and exacerbate the risks of global climate change and is also the major cause of air pollution which is the largest environmental hazard and is a contributor of more than 4 million deaths per year globally.



### Burning of crop residues cause nutrient losses

- About 90 - 100% loss of N, 25% loss of P, 5 - 60% loss of S, 20% loss of K is caused due to crop residue burning.
- It also hinders soil carbon storage and destroys soil structure, strength, bulk density, and organic matter.
- In general, each ton of rice straw contains approximately 400 kg of carbon, 50-70% of micro-nutrients, 5.5 kg nitrogen, 2.3 kg phosphorus, 25 kg potassium, and 1.2 kg sulfur, that are taken up by rice crops. Thus, the burning of residue will result in the loss of these nutrients into the ecosystem.