

# 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  
بائیو چار بنائیں**

فصل کی باقیات کو جلانا ہو یا تی آؤ دگی  
اور انسانی صحت کی غرائب کا باعث بتاتے ہے

فصل کی باقیات کو استعمال کر کے  
بائیو چار بنایا جاسکتا ہے

بائیو چار زمین کی زرنیزی بڑھاتا ہے  
جس سے آمدنی میں اضافہ ممکن ہے

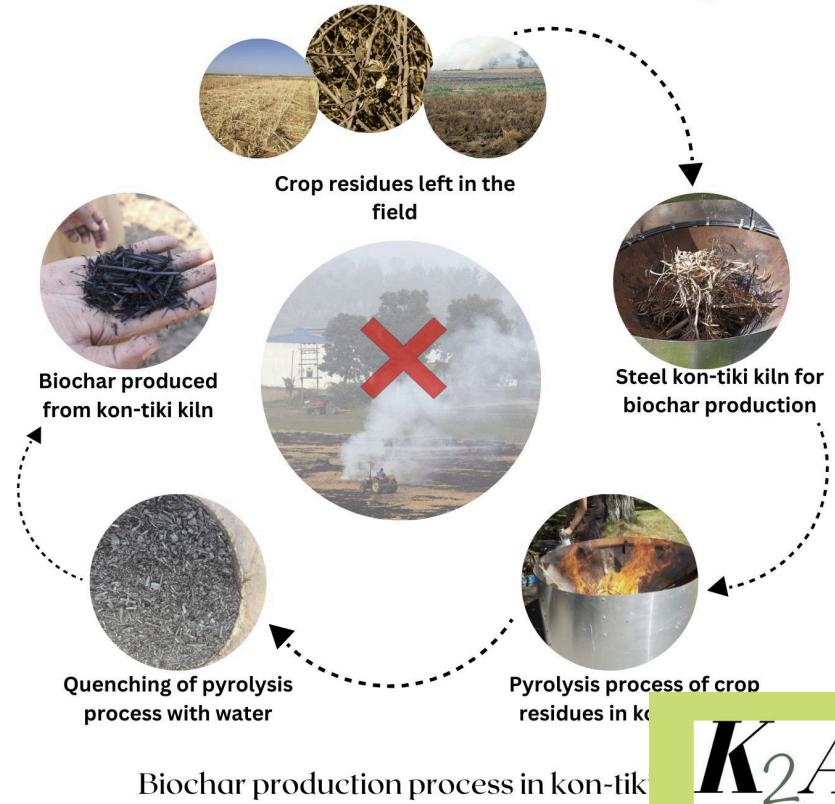
بائیو چار فصلوں کی مختلف قسم کی بیماریوں  
کے خلاف مدافعت بڑھاتا ہے

**Funded By**  
**Knowledge2Action South Asia**

**Principal Investigator**  
Dr. Ghulam Haider, Associate Professor,  
ASAB NUST, Islamabad, Pakistan  
Email: [ghulam.haider@asab.nust.edu.pk](mailto:ghulam.haider@asab.nust.edu.pk)

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

Biochar as a sustainable solution for residue management



فصلوں کی باقیات کو جلانے کی بجائے اپنے فارم کی آمدنی میں تبدیل کریں  
بائیو چار فصلوں کی باقیات کا انتظام کرنے کا ایک پائیدار حل



کون ٹکی کلن سے بائیو 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.



**"Convert your crop residues to revenue at your farm"**

For details visit : <https://asab.nust.edu.pk/>