



## Terms of Reference

### Introduction

#### Agro-Waste Community Enterprise for Provision of Alternate Energy for Households and Small-Businesses (AWARE)

In order to encourage a switch to 100% renewable energy and away from fossil fuels; the AWARE project initiated by WWF-Pakistan's Sustainable Agriculture & Food Programme, aims at promoting eco-friendly alternate energy sources among rural households and small businesses through training, awareness raising and dissemination of gasifiers using agro-waste as fuel; a low cost, simple, user friendly yet clean source of energy for cooking with a great potential for wider dissemination among rural communities where different agro-waste are available in abundant form. Through this project 525 Rural/farming families, small culinary businesses and 20 local vendors/technicians including their workers are being facilitated. The project is being carried out through multiple field activities in Central Punjab, South Punjab and Khyber Pakhtunkhwa to provide alternate means of energy through capacity building workshops, on-site demonstration of agro-waste gasifier and distribution of gasifier units among rural families and small-businesses.

#### Consultancy Objective:

Development of semi-commercial gasifier using different agro-wastes as fuel to fulfil the cooking needs of small culinary businesses.

#### Specific tasks:

- Develop a semi-commercial size customized design of gasifier or stove to fulfill the needs of small culinary businesses in rural and semi-urban areas.
- Fabricate low-cost, eco-friendly, technologically simple and user-friendly prototype of designed semi-commercial gasifier/stove.
- Use different available agro-wastes or pellets as fuel in designed prototype to assess its efficiency and make necessary structural modifications for improvement of semi-commercial gasifier/stove.
- Develop and share technical drawings of prototype along with other relevant information/data.
- Conduct heating efficiency tests of locally available agro-waste pellets and share list of possible vendors.

#### Deliverables:

- Share the technical consultancy in accordance with above mentioned timeline.
- Prepare and submit comprehensive report including all relevant data.
- Provide prototypes of semi-commercial gasifier.
- Share technical specification and drawings of developed prototype.
- Share analyzed results of agro-waste pellets and list of vendors with contact detail.
- Develop descriptive manual on operating procedure of semi-commercial gasifier.

Required Qualifications/Skills of Consultant:

- Preferably Ph.D. in Chemical Engineering
- Must have substantial prior experience of using agricultural waste for gasification.

Timeline:

Start date: 1<sup>st</sup> January, 2018

End date: 30<sup>th</sup> March, 2018