



## Review on Reduction of GHG Emissions and Carbon Footprints by Up-Cycling the Food Wastage with Compound Cattle Feed in India

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**Received:** February 05, 2019; **Published:** April 18, 2019

### Abstract

Now-a-days, food wastage is a major issue in India which accounts for around ¼ of the emission of the green-house gases. Food production including growing, farming, transporting, cooking, and disposing it. The supply chain which deals the packaging of products and reaching the consumer where the greater wastage of perishable produces occurs leading to the emission of GHG. To get rid of this environmental degradation proper wastage management is appropriate. The solution for the above is given by an innovative idea by a company named Cattle Mettle, where the food and agricultural wastages are converted to nutritious and safe feed for the cattle as compound feed.

**Keywords:** Food Waste Up-Cycling; Compound Cattle Feed; Carbon Footprints; GHG Emissions

### Introduction

India is an agrarian country where around 60% of the population thrives on agriculture and its allied sectors. India has a wide range of agro-climatic conditions where diverse cultivation of various crops have been cultivated. After the green revolution in India in 1960's, the agriculture production has gone higher and along with the production the agricultural wastes has also increased and ended up with emission of increased GHG and carbon footprint. The dumping of crop and food wastes is the major cause for the production of methane and nitrous oxide which accounts for the environmental risk in India. So, to eliminate this risk, alternatives for up-cycling the agricultural and food wastes should get promoted

which is being initiated by a company named "Cattle Mettle" to ensure the reduction of GHG emissions and carbon footprint in India.

### Materials and Methods

A secondary research was carried out to spot the availability of various agricultural wastes prevailing in India and the utilization of the same for cattle as compound feed.

### Results and Discussion

The major findings in this research are the major crops cultivated in India and their availability of wastes in various seasons which can be utilized for the manufacturing of compound feed for cattle [1-4].

Crop	Waste	Location	Season
<b>Cereals</b>			
Rice	Straw, Leaves, Bran	TN, WB, AP, Bihar, Chattisgarh, Odisha	Nov – May
Wheat	Straw, Leaves, Bran	UP, MP, Punjab, Haryana	Mar – May
Barley	Straw, Leaves, Bran	Rajasthan	Mar – Apr
Maize	Straw, Leaves, Bran	KA, AP, MH, MP, UP, Bihar	Sep (Kharif), Feb – May (Rabi)
Bajra	Straw, Leaves, Bran	TN, Rajasthan, MH, Haryana	Sep – Nov
Barley	Straw, Leaves, Bran	Rajasthan, UP, Haryana, Punjab	Mar – May
Kodo Millet	Straw, Leaves, Bran	KL, TN, Rajasthan, UP, WB	Sep – Dec
Finger Millet	Straw, Leaves, Bran	Rjasthan, KA, AP, TN, Orissa, MH, Uttarakhand (Kumaon region)	Sep – Dec
Jowar	Straw, Leaves, Bran	MH, KA, MP, AP, UP, TN	Sep – Dec
Sugarcane	Molasses	MH, UP, TN	Oct – Mar
Cotton	Seed	Gujarat, AP, MP, MH, KA	Oct – Nov
<b>Pulses</b>			
Black Gram	Pods	AP, MH, MP	Oct – Dec (Kharif), Nov – Apr (Rabi)
Red Gram	Pods	MH, UP, KA, MP, Gujarat	Oct – Dec (Kharif), Nov – Apr (Rabi)
Green Gram	Pods	MH, KA, AP, Bihar, Rajasthan, TN	Oct – Dec (Kharif), Nov – Apr (Rabi)
Soybean	Pods	MP, MH, Rajasthan	Sep – Oct
Horse Gram	Pods	KA, Odisha, AP, MH, TN	Oct – Dec (Kharif), Nov – Apr (Rabi)
Bengal Gram	Pods	MP, UP, Rajasthan	Mar – Apr
<b>Oilseeds</b>			
Gingelly	Oil Cake	MH, Rajasthan, WB, AP, Gujarat, TN, MP, Telangana	Aug – Sep
Mustard	Oil Cake	Rajasthan, Gujarat, UP, WB, Haryana, WP, Assam	Mar – Apr
Castor	Oil Cake	Gujarat, Rajasthan, AP	Sep – Feb
Coconut	Oil Cake	KL, TN, Odisha, WB, KA, MH, Pondicherry	Throughout the year
Sunflower	Oil Cake	KA, AP, MH, Bihar, Orissa, TN	Sep – Dec
Groundnut	Oil Cake	AP, TN, KA, UP, MH, Rajasthan, Orissa, MP, WB	Sep – Dec
<b>Fruits</b>			
Banana	Fruits, Stem, Leaves	TN, MH, KA, Gujarat, AP, Assam, MP	Sep – Apr
Mango	Fruits	MH, Jharkhand, WB, Orissa, TN, AP, KA	Apr – May
Pomegranate	Fruits and Seeds	MH, KA, AP, Gujarat, TN	Throughout the year (MH and Gujarat)
Guava	Fruits	UP, MH, MP, WB, Bihar, Punjab, Gujarat, AP	Throughout the year (except May and June)
Papaya	Fruits	AP, Assam, Odisha, MH, Gujarat, KA, WB, MP	Throughout the year (AP, Assam, Arunachal Pradesh, Gujarat, KA, KL, MH, Orissa, WB)

Vegetables			
Tomato	Fruits	AP, KA, Orissa, MH, WB	Nov – Feb
Brinjal	Fruits	AP, MH, KA, Orissa, MP, WB	Throughout the year (AP, MH, Orissa, UP, WB)
Okra	Pods	UP, Bihar, Orissa, WB, AP, KA	Throughout the year (Gujarat, Orissa, WB)
Onion	Bulbs, Stalk	MH, KA, Gujarat, Bihar, MP, AP	Throughout the year
Potato	Tubers, Stalk	UP, WB, Bihar, Gujarat, MP, Punjab, Assam, KA, Haryana, Jharkhand	Throughout the year (Gujarat, Orissa, WB)
Carrot	Toppings	Haryana, AP, UP, Assam, KA, Punjab, TN	September
Drumstick	Leaves	AP, KA, TN	Throughout the year
Curry leaves	Leaves	TN, KL, KA	Throughout the year
Coriander	Seeds, leaves	Rajasthan, Gujarat	Throughout the year
Peas	Pods	KA, MP, Rajasthan, WB, Punjab	Dec – Feb
Beans	Pods	AP, KA, KL, TN	Dec – Feb
Pumpkin	Fruits	Orissa, UP, MP, Chattisgarh	Dec - Feb
Watermelon	Fruits	AP, MH, Gujarat, TN	Dec – Feb

Table 1

## Conclusion

Most of the agricultural and horticultural crops are prone to lot of post-harvest losses where horticultural crops alone accounts for 30-40% losses before it reaches the table of consumers. These wastes further leads to the emission of GHG such as methane and nitrous oxide which has the major role in environmental degradation and increasing the carbon footprint. There are many alternatives involved in the management of wastes produced by the agriculture such as composting. But an alternative of utilizing those wastes in a combined form can be an effective way to reduce the GHG emission and carbon footprint.

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**Volume 3 Issue 5 May 2019**

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