Need of Ecofriendly and Healthy Intensive Farming Along with other Crops Growing Techniques in Order to Solve Food vs. Fuel Problem

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Abstract—*In recent years there has been a trend towards the use of various renewable sources which basically emerges from the burning of fossil fuels that results in global warming and climate change.The solution to energy problem lies in searching and developing alternative energy sources and biofuels basically derived from the food crops such as corn, sugarcane, rice etc… is one of the most attention drawing energy solution present in front of the world.*
This research paper basically tries to solve the food vs. fuel problem which basically arises as we discuss about the production of biofuels. This research paper describes the need of intensive farming and basically emphasizes on various methods and proposed innovative techniques for doing the intensive farming in a very eco-friendly way. As the land is a fixed asset and the population growth is at a very rapid pace so the need of intensive farming is relly a call of time now. The present research paper will enable to understand the need of intensive farming for curbing the food vs. fuel problem and helps in solving the energy problem and contributes to the growth of the nature and mankind in a more sustainable way.

1. INTRODUCTION

As the need of the time is the alternative sources of energy which are renewable and ecofriendly and biofuels are somehow seems to be a good option for fulfillment of this need. See for biofuel and especially for bioethanol basically the crops like corn, sugarcane and jathropa are taken into consideration and use very much because of their good property showing bioethanols. See, as the demand for the bifuel rises, there is a increase in plantation occurs for crops which also emerges a new problems of food scarcity and land problems. As the scope for biofuel is spreading very fastly, crop plantations occurs in more of the lands not only to meet the feedstock for bioethanol production but more importantly to meet the fooding needs of the mankind.

So, because of these reasons today the need of intensive farming arises but within a ecofriendly ways that basically includes ways like-

1. Crop rotation
2. Nutrient audits
3. Weed control
4. Terrace farming

alongwith some other options especially-

1. Hydroponics
2. By exploring more waste lands.
3. By using genetically modified seeds.

Intensive farming practices produce more and cheaper food per acre and animal, which has helped feed a booming human population and may prevent surrounding land from being converted into agricultural land. Intensive agriculture is an agricultural production system characterized by the high inputs of capital, labour. Modern day forms of intensive crop based agriculture involve the use of mechanical ploughing, chemical fertilizers, plant growth regulators and pesticides which are more disadvantageous in nature.

2. WHAT ARE BIOFUELS?

Biofuels are fuels that is produced from organic matter(living or once living material) in a short period of time-days, weeks, or even months, is considered as biofuel.

What is a bioethanol?

Bioethanol is a biofuel and alcohol that is made by fermenting any biomass that is rich in carbohydrates, such as starches and sugars. It is also called as first generation biofuel or conventional biofuel.

What is intensive farming?

Intensive farming is an agricultural intensification and mechanization system that aims to maximize yields from available land through various means, such as heavy use of pesticides and chemical fertilizers.

3. PRODUCTION OF BIOFUEL IN INDIA

Presently seven states in India are producing biofuel which includes Chattisgarh, Andhra Pradesh, Karnataka, Tamil Nadu, Rajasthan, Maharashtra, Orissa and Jharkhand.

Biofuels production in India centers mainly around the cultivation and processing of Jathropa plant seeds which are very rich in oil(40%). The drivers of this are historic, functional, economical, environmental, moral and political.

4. WHY TO DO INTENSIVE FARMING IN AN ECOFRIENDLY WAY?

1. It requires large amount energy input to produce, transport and apply chemical fertilizers/pesticides.
2. Pesticides generally kill useful insects as well as those that destroy crops.
3. This may result in desertification, or land that is so poisonous and eroded that that nothing else will grow there.
4. Use of fertilizers can alter the biology of rivers and lakes.
5. The chemicals used may leave the field as runoff eventually ending up in rivers and lakes or may drain into groundwater aquifiers.
6. Limits or destroys the natural habitat of most wild creatures, and leads to soil erosion.
7. It alters the environment in many ways.
8. Use of pesticides have numerous negative health effects also.
9. Animal farms with overpopulated conditions and pollution lead to animal sickness and diseases.
10. Cancer, Alzheimer's and other major illnesses are on the rise and said to be linked to the chemicals absorbed into our bodies due to the consumption of the food grown through intensive farming.

5. PREVIOUS RESEARCHES & REPORTS IN THE DEVELOPMENT OF BIOFUELS WITHIN FEW YEARS

1. On march 31, 2014 Olli ernvall of VTT technical research centre of finland presented a report on the use of algae as a potential source of biofuels and biochemicals even in cool climate.
2. On february 17, 2014 healther lammers of NREL presented a report on how the supercomputer exposes the biofuel enzyme secrets.
3. On november 25, 2013 lauren quinn of university of illionis presented a report on the harvesting of invasive plants for use as biofuels.
4. On july 31, 2013 bill scanion of NREL presented a report on how the wood-boring gribbles intrigue biofuels researchers.
5. On june 3, 2013 Prof. Robert mach of Vienna university of technology presented a report on how lignocellulosic waste such as sawdust or straw can be used to produce biofuels.
6. On may 27, 2013 svein tonseth of SINTEF presented a report on the generation of first class biofuels from the depths of the forest.
7. On February 20, 2013 anne trafton of MIT presented a report on using energy cells for more efficient biofuel production.
8. On October 24, 2012 ysabel yates presented a report on using engineering microbes for sustainable manufacturing and better biofuels.
9. On july 9, 2012 ysabel yates presented a report on how a illuminated bacteria can enlighten biofuel production.
10. On may 15, 2012 chris emery of Saik Institute presented a report on the discovery of plant proteins which may boost agricultural yields and biofuel production.
11. On November 9, 2011 jennifer beal of Wiley Blackwell presented a article on generating ethanol from lignocellulose possible.
12. On march 7, 2011 robert sanders of UC, Berkeley presented a report on how chemists have engineered bacteria to churn out a gasoline like biofuel at about 10 times the rate of competing microbes, a breakthrough that could provide an affordable and green transportation fuel.
13. On February 22, 2011 susan Gawlowicz of Rochester Institute of Technology presented a report on the doubly green project in which algae will clean wastewater and later on serves as a stock for biodiesel.
14. On December 29, 2010 jennifer shike of university of illionis presented a report related to the discovery of new miscanthus hybrid in japan that could open doors for biofuel industry.
15. On December 15, 2010 karen mcnulty walsh of Brookhaven National Laboratory presented a report on unraveling plant cell wall constructions for biofuels research.
16. On December 6, 2010 christine zeindler of Concordia University presented a research on how engineered bugs like bacterium lactococcus lactis can transform plant material into biofuels or other chemicals.
17. On January 28, 2010 lynn yarris of Lawrence Berkley National Lab presented a report related to production of biofuels directly from biomass through microbes.
18. On December 9, 2009 f.m.epplin of Oklahoma State University presented a article on efficient production of biomass from switchgrass.
19. On july 23, 2009 The American Chemical Society presented a report on how scientists in Nevada are working on producing biodiesel from "chicken feather meal".
20. On may 11, 2009 The American Chemical Society presented a report on advances toward producing cellulosic biofuels.

Major crops for producing bioehanol in India

1. Sugarcane
2. Potato
3. Jathropa
4. Corn

6. WAYS TO DO INTENSIVE FARMING IN AN ECOFRIENDLY WAY

[1] **Crop Rotation**- Growing of set of crops in a regular succession over a same piece of land (field with) in a specific period of time. In crop rotation soil improving crops should be rotated in time over the entire farm in a regular sequence as permissible by soil, climatic and economic factors. In general cropping intensity in dryland is only 100 per cent. At few places on partial lands occasionally two crops are taken in favorable season (Monoculture is the rule in dryland agriculture) Increasing the cropping intensity is one of the methods for increasing crop production. Cropping intensity is increased by sequence cropping and double cropping but intercropping may also prove effective measure for increasing production per unit area.

Factors to be considered for planning of crop rotation

1. Soil type crop and its duration.
2. Livestock on the farm
3. Occurrence of pests and diseases
4. Price and availability of Agricultural produce
5. Cost of labour.

Advantages of crop rotation

1. Crop rotation maintains and improves soil fertility.
2. Prevent - build up of pests, weeds & soil diseases.
3. Control of soil erosion.
4. Ensures balanced programme of work through out the year.
5. Prevent or limit periods of peak (requirements of irrigation water)

[2] **Nutrient audits-**Better nutrient audits allow farmers to spend less money on nutrients and to create less pollution. As less nutrient is added to the soil, there is less run off to pollute.

[3] **Weed Control-**Weed control is the botanical component of pest control, which attempts to stop weeds, especially noxious or injurious weeds, from competing with domesticated plants and livestock. Many strategies have been developed in order to contain these plants.

The original strategy was manual removal including ploughing, which can cut the roots of weeds. More recent approaches include herbicides (chemical weed killers) and reducing stocks by burning and/or pulverizing seeds.

A plant is often termed a "weed" when it has one or more of the following characteristics:

- Little or no value (as in medicinal, material, nutritional or energy)
- Rapid growth and/or ease of germination
- Competitive with crops for space, light, water and nutrients

Solution strategies involved in weed control

1. Ploughing
2. Manual removal
3. Using a different herbicide
4. Using locally adapted seeds that resists
5. Using genetically altered crop to be herbicide resistant.

[4].**Terrace Farming-** In agriculture, a terrace is a leveled section of a hilly cultivated area, designed as a method of soil conservation. It is done to slow or prevent the rapid surface runoff or irrigation water.Often such land is formed into multiple terraces, giving a stepped appearance. This method is very effective in rice plantation.

7. SOME OTHER OPTIONS TO GROW CROPS IN ORDER TO SAVE LAND AND TO SOLVE FOOD VS. FUEL PROBLEM ALSO

[1] **Hydroponics-** Hydroponics is the science of growing plants without the use of soil. It is also known as soilless culture. The term hydroponics comes from two Greek terms; hydros means water and ponos means work.

In traditional agriculture where plants are grown in soil, nutrients and water exist randomly, and often plants expend a great deal of energy in growing roots and searching for water and nutrients. By expending this energy, plants do not grow as fast as they could. However, because the nutrients are delivered directly to the roots in a hydroponic system, a plant doesn't have to use any excess energy growing long roots in search of water and nutrients. This enables plants to grow much faster and results in more frequent harvests. In addition, growing plants in hydroponics requires less water, less space, and pests and diseases are more easily controlled and prevented.

It may sound like a science fiction film from the future, but hydroponics is a technological reality that produces high quality, fresh, affordable food. Almost any plant will grow in a hydroponic system and it is important to note that plants grown via hydroponics are no different to plants grown in soil.

Hydroponic farming facts

- Uses 78% less water
- Less fertilizers
- Controls diseases
- Less pesticides
- Rapid growing cycle
- 30% more nutrients than traditional agriculture
- 30 days from seed to a full size iceberg lettuce

- Yields 1000% more produce from the same amount of land as traditional agriculture
- Locally produced
- Locally distributed
- Low labor costs
- Low water usage

[2] By exploring more waste lands-In order to save land, it is beneficial to use more and more waste land for crop production like jatropha which is capable of growing in harsh environment.It is also required to always be in searching for more waste lands.

[3] By using genetically modified seeds-In order to produce more crops in less land, it is better to use genetically modified seeds for crop development.

How to get bioethanol from these crops?

Basically, all the selective crops have to go through these processes in stepwise manner-

1. Milling – The mechanical crushing of the raw materials.
2. Heating and addition of water and enzymes(might be cellulase and xylamase may be used) for conversion into fermentable sugar. Addition of fresh water is applied because sugar is build up in the water.
3. Fermentation of the mash using yeast(ex- sachromysis cerevisiae), whereby the sugar is is converted into bioethanol and carbon dioxide.
4. Distillation and rectification.
5. Drying of the bioethanol.

8. CONCLUSION

In the short term, First generation biofuels represent the best and most realistic partial alternative to oil as transport fuel; in the medium to long term there exist various other alternatives offered by the second generation and third generation, biofuels, bioelectricity, hydrogen, and so forth. The same applies with bioenergy used to generate power and heat when substituting coal. Despite some negative effects of biomass energy it is well established that, on balance, the positive factors far outwait the negative ones.

Biomass energy is both “part of the problem and part of the solution”. This paper has argued for a holistic approach. A new paradigm is required to take full account of its complexity given the technical, economic, social, and political ramifications, particularly for agriculture. Biomass for energy in all its forms, particularly biofuels, is intrinsically linked to a modern and dynamic agricultural sector. Food security and biomass for energy can be complementary rather than exclusive.

Biomass can make a large contribution to the world’s future energy requirements; this is a resource we cannot ignore. The challenge is to harness it on an environmentally and economically manner and without compromising food security.

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