



Technological innovation for growing paddy seedlings by using coco-peat, onion peels extract and groundnut shell powder.

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INTRODUCTION

My name is Pranav Suman and our group member is Sushant Kumar, from S.V.M. residential public school Rajeev Nagar Patna, Bihar.

Focal Theme of this year is '**UNDERSTANDING ECOSYSTEM FOR HEALTH AND WELL-BEING**' which is under sub- theme is **Ecosystem based approach (EBA) for self-reliance**. Title of the project is '**Growing paddy seedlings by using coco peat, Ground nut shell and onion peels extract for improving rice production**'.

Humans are fully dependent on Earth's ecosystems and the services that they provide, such as food,

clean water, disease regulation, climate regulation, spiritual fulfillment, and aesthetic enjoyment. The relationship between ecosystem services and human well-being is mediated by access to manufactured, human, and social capital. Human well-being depends on ecosystem services but also on the supply and quality of social capital, technology, and institutions. These factors mediate the relationship between ecosystem services and human



well-being in ways that remain contested and incompletely understood. Ecosystems underpin human well-being through supporting, provisioning, regulating, and cultural services. Well-being also depends on the supply and quality of human services, technology, and institutions. See also specific information for each main component: Basic material for a good life.

The purpose of Fostering Healthier Communities is to facilitate and encourage municipalities to plan for and create vibrant, active places through their built environments that encourage healthy lifestyles. How a community is designed has a direct effect on the health of its citizens. Land development patterns, zoning ordinances, and land use classifications impact walkability, access to services, and transportation options. Under this project we have grown paddy seedlings by using coconut coir, Ground nut powder and onion peels extract for self reliance.

The practice and general philosophy of ecological living closely follows the overall principles of sustainable development. We have prepared a project on wastes of Groundnut shell.

The use of organic waste in agriculture can reduce the need of chemical fertilizer and restore the organic carbon deficiency in the soil. As chemical fertilizers are causing ecological damage, an alternative method is required to replace the use of chemical fertilizers for the growth of vegetable plants. In this orientation, groundnut shells (230-300g/Kg) produced during processing are used as a natural fertilizer for the cultivation of vegetable plants to increase their yield and to reduce the environmental pollution. So, we conducted a pot experiment to analyze the possibility of using groundnut shell compost as an alternative to chemical fertilizer in the cultivation of vegetable plants

Objectives

1. We have to reuse the wastes of onion peels, coco-peat and Ground nut powder.



2. We have to grow the paddy seedlings in the medium of Ground nut powder, onion peels and coco-peat.

3. We have to compare the growth rate of paddy seedlings in different proportions of Ground nut powder and onion peels.

4. We have to observe the wastes conditions of coco-peat, onion peels and Ground nut powder.

HYPOTHESIS

As we know that plants need nitrogen, phosphorus and potassium for their growth and these nutrients are taken by plants from the soil. Soil provides nutrients and moisture for sustainable plants. Just like Groundnut shell powder and onion peel extract have a proper amount of N,P,K and other nutrients. It is also reported in literature along with coco-peat also. So we can apply this concept for plant growth.

Need statement

Currently, farmers are using 100% of the soil from the field and raise the seedlings which are not healthy during uprooting the paddy seedlings and takes longer time for them to get transplanted in the main field. Improving the rice production through innovative rice seedlings. The farmers in the rice production area across India are very much dejected over the condition of agriculture because of the issues like poor rainfall and labour availability.

So we have developed a new media of **40%** of coco-peat, **40%** of ground nut powder and **20%** of onion peel extract.

About Ground nut shell

We have seen in our locality that maximum people throw the Groundnut shell after use the Groundnut seeds. This problem is not only in our locality whereas we can see problems throwing the wastes of Groundnut shell in the train journey, bus journey and other public places too. Such places swiper (cleaning staff) throw the Groundnut shells into the garbage.

There is a significant amount of shell residual left after groundnut processing. Increased groundnut production leads to the accumulation of these groundnut shells which is not utilized, thus either burnt or buried. As Groundnut shells are rich in many functional compounds and composed of cellulose, hemicellulose and lignin, it can be utilized in multiple ways.

About onion peels

Along with Every year tons of onion waste is produced worldwide. The dried outer onion skin contributed up to 70% of this waste. Onion (*Allium cepa* L) is one of the main ingredients used in Indian cooking. It also ranks as the second-most important horticultural crop after tomatoes (Celano et al., 2021). Onion in India is a vital export commodity that earns foreign exchange. Globally, the production of onion is increasing,

with China leading the charts, followed by India. According to FAOSTAT, in 2019, the global production of onion was 65,430,064 tonnes.

During harvesting, storage, processing, and consumption of the onion, a huge amount of onion peel is generated. Onion peels have high concentrations of bioactive components, such as polyphenols, flavonoids, tannins, and other secondary metabolites. Hence, valorization of onion waste by isolating bioactive compounds is one of the important steps toward improving the profitability of farmers along with processing industries.

we have seen in our locality there are maximum farmers have been doing practice of onion cultivation. After harvesting the onion, there are large amount of wastes generated after the harvesting the onions. These onions garbage have been thrown near by the road and these garabages finally emit foul smell and also pollute our ecosystem. So here there are needs to manage the garbage of onions and groundnut.

About coconut coir

Coco coir's superior moisture-holding capacity, aeration, and antifungal properties make the coconut byproduct an excellent choice for seed starting. With the proper additives to improve nutrition, coco coir can be the foundation for healthy seedlings.

The rice seedlings produced by this method (By mixture of coconut coir's, Ground nut extract and onion peels) gives all required nutrients for its growth.



WORK PLAN

Firstly we have made a team of two members (Pranav Suman & Sushant Kumar) and discussed with our guide teacher (Mr. Pankaj Kumar) about plan of the project.

PLAN RELATED TO DOING PROJECT

Team selection with the help of guide teacher



Preparation of questionnaires



Selection a media(coco coir's, Groundnut powder and onion peels in different proportions) for healthy production of Paddy seedlings.



Observatin and performing different experiments.



Collection and analysis of data



Result



Conclusion



Take the steps for solving the problems

Questionnaires

With the help of guide teacher, we have prepared a series of questionnaires as follows:-

- 1 .Do you use Groundnut shells?
2. Do you know about nutrients present in Groundnut shell?

3. Do you use chemical fertilizers for cropping?
4. Do you use manure for cropping?
5. Do you use vermi-compost for cropping?
6. Do you use onion peels extract ?
7. Have you used Groundnut shell powder in pots?
8. Have you used Coco-Peat ?
9. Would you use Groundnut shells powder as manure after knowing its nutrients?
10. Would you use Coconut coir as mulch after knowing its nutrients?
11. Do you know chemical fertilizers degrade the soil quality?
12. Do you know chemical fertilizers create toxicity into the soil?
13. Do you know manure upgrade the soil quality?
14. Do you know manure eliminate the toxicity from the soil?
15. Do you eat Groundnut during traveling?
16. Do you eat Groundnut at home?
17. In which season do you eat more Groundnut?
18. Do you eat Groundnut in summer?
19. Do you eat onion in rainy season?
20. Do you eat onion in winter season?
21. Do you eat Groundnut in college campus?
22. Do you eat Groundnut in school campus?
23. Do you eat Groundnut in Office campus?
24. Do you eat Groundnut in the theater hall?
25. Do you agree that Groundnuts are useful for us?
26. Do you agree that onion are wastes for us?
27. Have you used Groundnut shell powder some time?

28. Have you used vegetable peels as manure?

29. Have you used fruit peels as manure?

30. Have you used vermi-wash?

31. Have you used green manure?

32. Do you believe on chemical fertilizers?

33. Do you believe on organic fertilizers?

34. Do you know about Groundnut shell oil?

35. Have you used Groundnut shell oil?

36. Do you know any benefit of Groundnut shell oil?

37. Do you know any more benefits of Groundnuts shells?

38. Do you know nutrients present in Groundnut seeds?

39. Are you agree with our idea?

40. Do you think that Groundnut shell can improve the fertility of the soil?

41. Do you think that coco- peat improve moisture contains of the soil?

42. Do you think that onion improve the pH of the soil?

43. Do you think that Groundnut shell improve nitrogen contains of the soil?

44. Do you think that Groundnut shell improve phosphorus contains of the soil?

45. Do you think that onion improve potassium contains of the soil?

46. Do you think that coco-peat improve carbon contains of the soil?

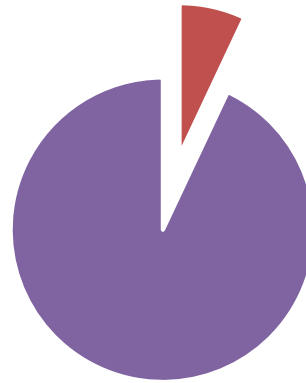
47. Is Coco-Peat is better than its Mulch?

48. Is Groundnut Mulch is better than its shell powder?

49. Will you use groundnut compost in the future?

50. Will you use the Groundnut mulch in the future?

Have you used Ground nut powder as compost



■ Answer in yes ■ Answer in No

SURVEY DATA

Data- I

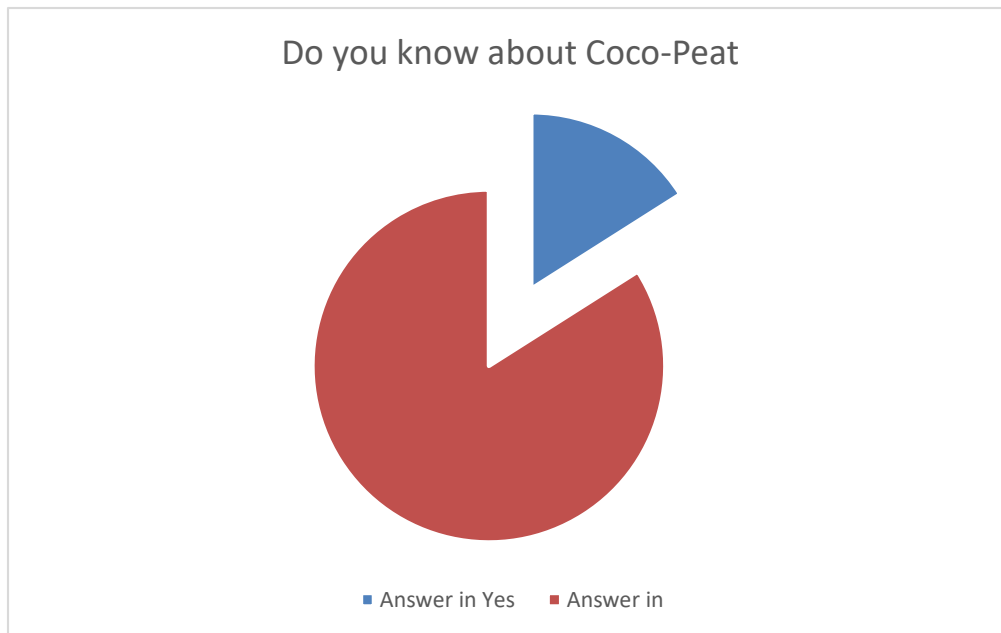
Do you know about onion peels extract



■ Answer in yes ■ Answer in No

Data-2

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Data-3**Data-4**

Firstly we have taken six rectangular trays of same size (27cm×. 22 cm×5 cm) .Out of these trays, we have taken only Coco-Peat and made control of the first tray then we have taken Groundnut shell powder and Coco-peat in second tray, Coco-peat and onion peels extract in third tray, mixture of Coco-Peat and onion extract (1:1) on the bed of coco-peat in fourth tray, onion peels extract and Ground nut powder(1:2) on Coco-Peat bed in fifth tray and Ground nut powder and onion peels extract (2:1) on Coco-Peat bed in sixth tray.

After that we have 20 grams of seeds in each tray and we have been observing, condition of seed germination, plant conditions, soil parameters like pH, presence of air, presence of moisture and carbon contents in the soil 3 weeks

So methodology of performing different experiments for testing of components of the all trays as follows:-

Firstly we have taken 10 g of sample randomly to each pot and made as sample A, B, C, D, E and F of 1st,2nd, 3rd,4th,5th and 6th tray simultaneously.

After the study with grown paddy seedlings in different trays, we have also grown paddy seedlings in the soil medium in the tray. We have transferred all the paddy seeds of both types of media(soil as well as Coco-Peat) in soil culture and have been observing rate of growth continuously 2 weeks. After 2 weeks we have observed that roots condition of the paddy seedlings. So we have found that about 65% present of roots had destroyed but the media of Coco peat conserve roots and roots hair of the paddy seedlings during transfer.

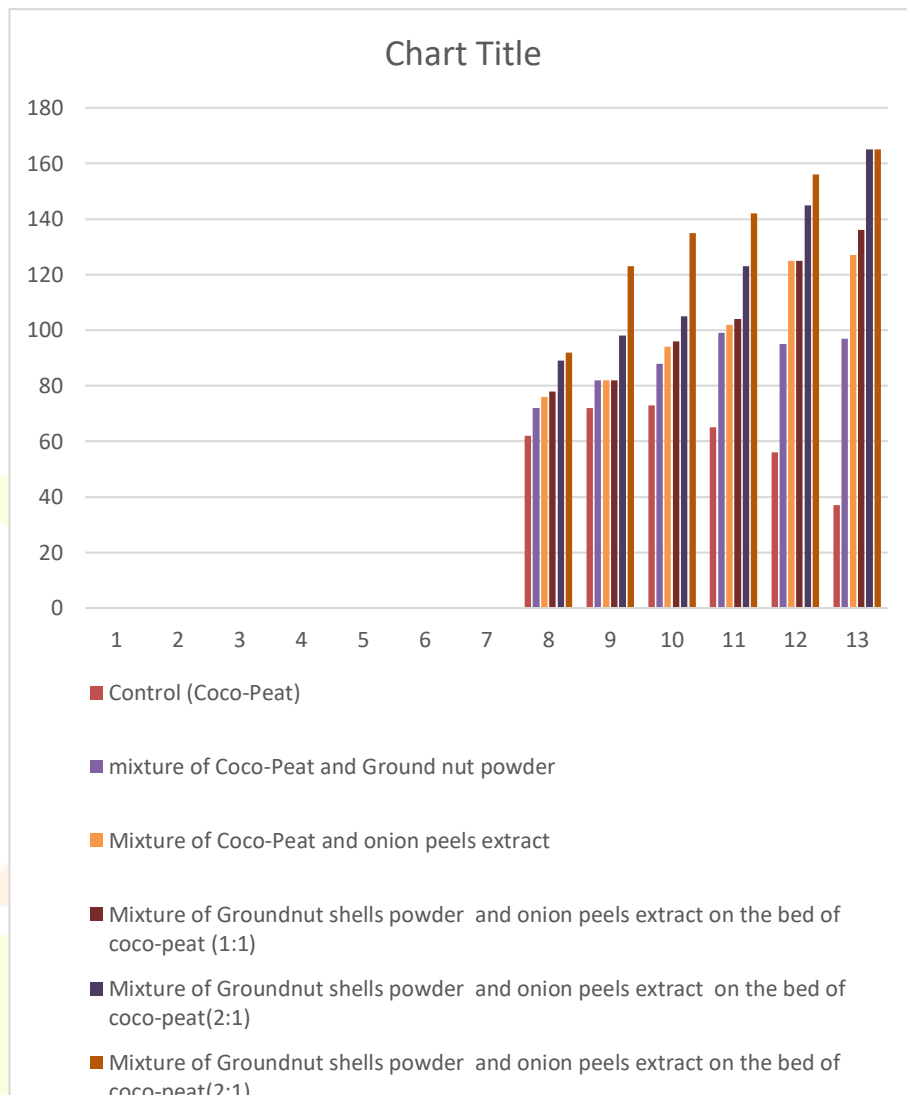
Conclusion

On the basis of performing experiments and survey we have concluded as following:-

- 1.Composition of Groundnut shell and onion peels extract (2:1) is the best for growing plants.
- 2.There is a very few present of people were aware about composting of Groundnut shell, Coco-Peat and onion peels extract.
- 3.Groundnut shell and Coco peat have increased moisture, carbon contents and growth of plants.
4. Mixture of Groundnut powder, Coco-Peat and onion peels extract save 100% of roots during uprooting.
5. About 2/3 rd part of roots are destroyed during uprooting from the soil.

Analysis of data

Condition of growth of paddy seedlings in six weeks



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SOLUTION TO THE PROBLEM

Groundnut shell and onion peels extract are generally considered as agro-industrial waste and every year million tons of its quantity is left in environment. Rich in lignin, these shells undergo slow degradation in natural environment. However, groundnut shell biomass has wide range of applications. This waste can be converted to a valuable bio-product in order to achieve zero waste production. The present review highlights results of several scientific studies illustrating potential industrial applications of groundnut shells. Through simple bio chemical treatments, this can be transformed into a large number of bio-products having commercial applications such as biofuels, building material, paper production, heavy metal adsorption, dye degradation etc. A more environmental friendly approach and concerted efforts are needed to implement this habit of converting this waste into useful product.

For solving the problem we have developed the media of Groundnut shell powder, Coco-Peat and onion peels extract also implemented in our project. We have tried to solve the problem by doing activity on pot system and also popularized it to the people by using social media. After doing this we have given a message to the society that don't throw the groundswell to the dustbin. It is useful for us if we use it as a manure. After this practice our environment will be clean.

FOLLOW UP ACTION

We have popularized our project among our neighbors and friends. We have also popularized it with the help of social media. So maximum people have encouraged us for doing this project.

FUTURE PLAN

We have done our project in pots system but in the future we will enhance the project in field system in our house garden. We wish to make its compost with more concentration of N,P,K. If Government or non-government agency will provide proper laboratory then we will perform proper experiments for enhance the project.

ACKNOWLEDGEMENTS

We are Thankful to our school (S.V.M residential public school, Patna) that they have given opportunity for doing this valuable project. We would give the thanks to our teacher Mrs.Pankaj kumar. We wish to special thanks to students and teachers of our school they have given contributions for popularization of our project.

In the last special Thanks to Science for society and National children science congress committee.

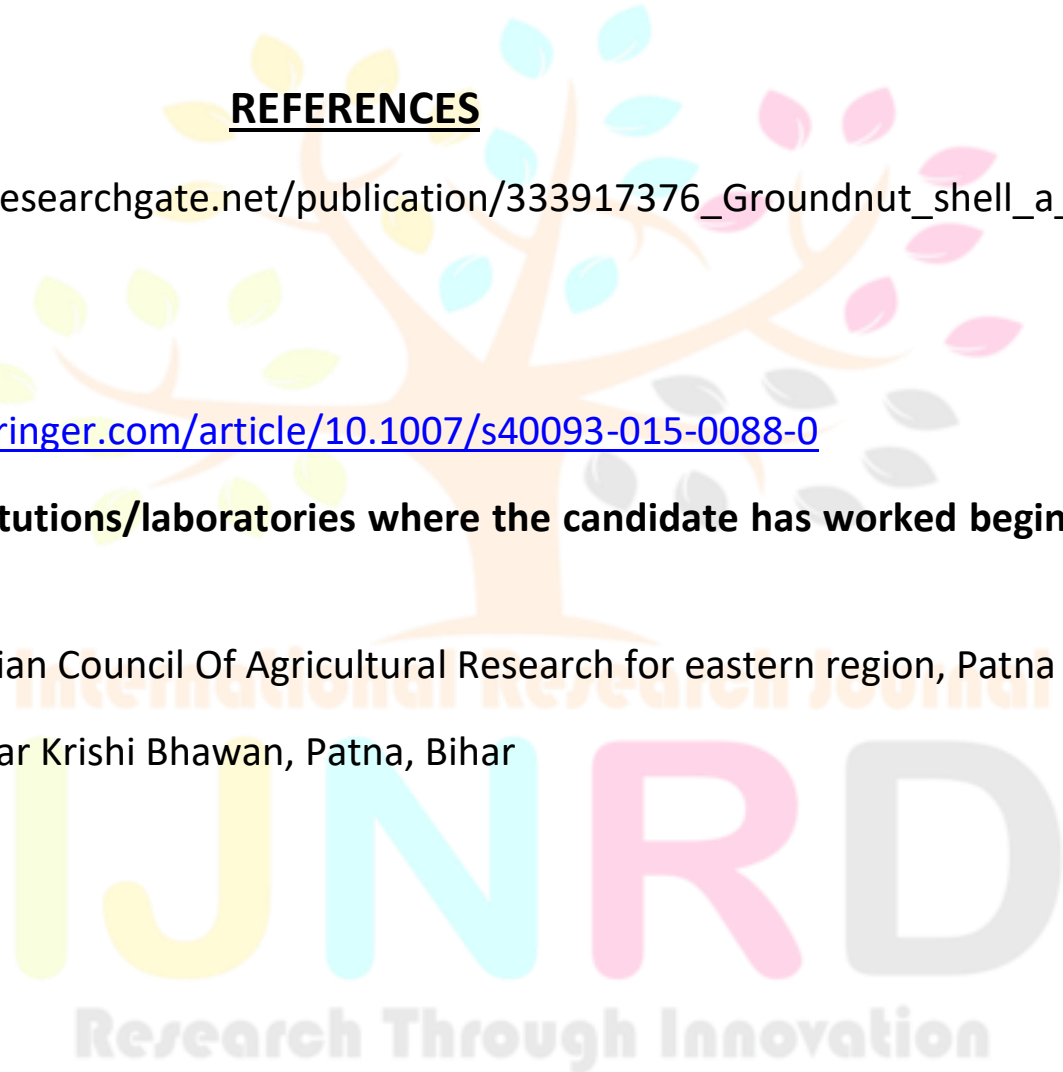
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<https://link.springer.com/article/10.1007/s40093-015-0088-0>

Research institutions/laboratories where the candidate has worked beginning with the latest.

1. Indian Council Of Agricultural Research for eastern region, Patna
2. Bihar Krishi Bhawan, Patna, Bihar



An account of research carried out so far (including doctoral thesis) highlighting its impact and/or its applications.

Introduction:

Agriculture, particularly rice production, is a crucial sector in India, providing sustenance to millions of people. However, challenges such as poor rainfall and labor availability have led to decreased rice yields and economic distress among farmers. To address these issues, a comprehensive research effort was undertaken, culminating in a doctoral thesis titled "Innovative Rice Seedling Media for Enhanced Production." This research aimed to develop a novel seedling media formula to improve rice seedling health, reduce uprooting difficulties, and enhance overall production.

Research Approach:

The research began with a thorough investigation of the existing seedling media and the challenges faced during rice cultivation. The primary focus was on developing a seedling media that would provide adequate nutrients, aeration, and moisture retention, while also minimizing the shock of uprooting during transplantation. After extensive experimentation, a new seedling media formula was formulated, comprising 40% coconut coir, 40% groundnut powder, and 20% onion peel extract.

Composition and Benefits:

The chosen components of the seedling media were not only readily available but also exhibited distinct advantages. Coconut coir provided excellent moisture retention and aeration properties, vital for healthy root development. Groundnut powder, rich in organic matter, contributed essential nutrients and promoted beneficial microbial activity in the root zone. Onion peel extract, containing bioactive compounds, acted as a natural growth stimulant and enhanced resistance to stressors.

Impact and Applications:

The application of the innovative rice seedling media has yielded remarkable results in addressing the identified challenges. The research's impact can be summarized as follows:

Improved Seedling Health: Seedlings raised in this new media exhibited enhanced vigor, with well-developed root systems and robust growth. This ensured a higher survival rate during transplantation, minimizing the setbacks caused by unhealthy seedlings.

Ease of Transplantation: The unique composition of the media reduced the shock experienced by seedlings during uprooting and transplantation. This led to a smoother transplantation process and ultimately saved valuable time and labor.

Enhanced Rice Production: Field trials conducted across various rice-producing regions indicated a significant increase in yield. The healthy seedlings, nurtured by the innovative media, translated into higher grain production per hectare.

Sustainable Agriculture: The utilization of organic materials like coconut coir, groundnut powder, and onion peel extract aligned with the principles of sustainable agriculture. Reduced reliance on synthetic fertilizers and improved soil health contributed to long-term ecological benefits.

Conclusion:

The research journey that began with the identification of pressing agricultural issues culminated in the development of an innovative rice seedling media. This breakthrough has brought new hope to farmers across India by addressing challenges related to poor rainfall and labor scarcity. The new media's success in improving seedling health, easing transplantation, and enhancing rice production demonstrates its potential to revolutionize the way rice is cultivated. As the findings from the doctoral thesis continue to be disseminated and adopted, the innovative seedling media is poised to play a pivotal role in uplifting the agricultural landscape and ensuring food security in the face of challenging conditions.

Recognition's/ awards from State/ Central Government/ reputed Institutions/ International organizations for work done so far:

1. Child scientist by National council of science and technology communication, DST, Govt. of India
2. Nirman Bal Puruskar by Nirman, Social welfare society, Bihar
3. Young scientist by Science, Technology and Technical Education department, DST, Govt. of India.
4. Junior scientist by Indian Council Of Agricultural Research for Eastern Region, India.

