A Study on Awareness of Nanotechnology in Agribusiness Management Graduates of Pune, Maharashtra

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Abstract: **In Maharashtra state the agriculture education is in high demand as it is one of the emerging career options with sustainable growth. The students of agribusiness management learn various new techniques introduced in the field of agriculture to enhance the production as the population is increasing year by year and to tackle with this problem new technology are taking place in the agricultural market. In the agribusiness education the students are learning such new things to develop themselves to face the future challenges. Among the new techniques Nanotechnology is the emerging tool to drive the economy of agriculture field. Nanotechnology tool is offering new solutions to the various agriculture problems to increase the crop productivity and decrease the massive use of agrochemicals.**

Nanotechnology offers many benefits like food quality enhancement, minimization of agriculture inputs, and increase in the absorption of nanoscale nutrients from soil and many more. The nanomaterials reduce the amount of chemicals spreading, loss of nutrients in fertilization and maximize the crop yield through nutrient and pest management. Applications like Nanofertlizers and Nanopesticides enhance the products and nutrient level to increase the productivity without diminishing the soil, water and even protection against pest and diseases. This nanotechnology tool maintains the overall health of the agriculture plants by acting as sensor for monitoring the quality of soil. In this research the major focus on the awareness of nanotechnology and its applications to handle the challenges like security of food and climate change among the students of agribusiness management of pune.

Keywords: **Nanotechnology, Agribusiness, climate change, food security.**

1. Introduction

Among all the various sectors agriculture is the sector which is a very growing sector and provides the raw material to every kind of industry. Almost 60 percent of the population is dependent on agriculture and at the same time this sector is facing many challenges as the population is one factor and climate change is another major factor.

Nanotechnology is working with the smallest possible particles which increase hopes for improving agricultural productivity through encountering problems unsolved conventionally, the nanotechnology applications have the potential to change agricultural production by allowing better management and conservation of inputs of plant and animal production. Nanotechnology provide a great scope of novel applications in the plant nutrition fields to achieve the future request of the rising population because nanoparticles have exclusive physicochemical characters i.e. high surface area, high reactivity, and tunable pore size.
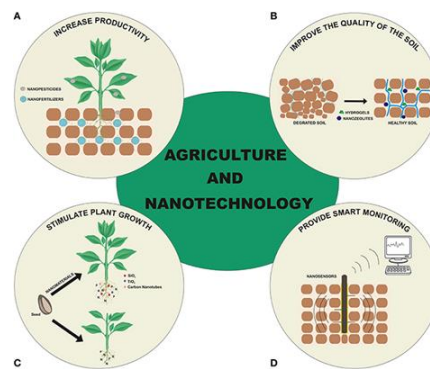
Nanomaterials often have chemical, physical, or biological properties that are different from those of their larger counterparts and due to their different properties, nanomaterial may pose different safety issues than their larger counterparts. There has been main attention in using nanotechnology in agriculture and the food system due to great potential as it can improve the quality of different products, also, with the rapid advancement of nanotechnology since the last decade of last century, controlled preparation of Nanomaterials with desired morphology and size, and newly established concepts and methodology have underpinned the solid bases to solve the unsolved questions in nutrient uptake.

2. Review of Literature

Agriculture is considered the backbone of most developing

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countries, with more than 60% of the population dependent on it for their livelihood. In the same times there are many challenges facing agriculture sector, like climate change, non-reasonable use of resources and usage too much chemical fertilizer [1].

This study addresses current social and ethical concerns as well as the public's perception of research and development in nanotechnology. Significant efforts have to be made to increase public awareness of this new field in order to avoid unexpected and/or unwarranted backlash. Results from a survey on nanotechnology awareness are presented, showing that only 17% of the respondents were able to identify what nanotechnology is, with 76% of the respondents being men [2].

The findings indicate that the current awareness of nanotechnology applications in the agri-food sector on the IoI is low and respondents are neither positive nor negative towards agri-food applications of nanotechnology. Safer food, reduced waste and increased product shelf life were considered to be the most important benefits to the agri-food industry. Knowledge of practical examples of agri-food applications is limited however opportunities were identified in precision farming techniques, innovative packaging, functional ingredients and nutrition of foods, processing equipment, and safety testing. Perceived impediments to nanotechnology adoption were potential unknown human health and environmental impacts, consumer acceptance and media framing [3].

Nanotechnology is a new discipline and to revolutionize the food and agriculture industry it has developed various tools through diagnosis and treatment of diseases, increasing the capability of plants to absorb nutrients, combat microbial and pest infections, increase the efficiency of biocides, cleanup of existing pollutants and reduce the overall pollution [4].

Nano-fertilizers are increasingly been used as alternates to bulk fertilizers and reduce pollution of soil and water by different agrochemicals. Nano-fertilizers facilitate the slow and steady release of nutrients and thereby reduce the loss of nutrients and enhance the nutrient use efficiency [5].

3. Research Methodology

The research is conducted in agribusiness management institutes of Pune Maharashtra. The sample size for this research purpose is 200 and the sampling method is random sampling. There are two types of data collected for this research is primary data and secondary data. The primary data is collected through direct meeting with the students of agribusiness management and the secondary data is collected from various sources of nanotechnology articles and journals.

Data Analysis and Interpretation:

The various questions asked to 200 respondents for understanding the awareness of nanotechnology along with the impact of nanotechnology tools on agriculture and various applications of nanotechnology on agriculture.

*Do you know about nanotechnology?*

The various respondents given the yes and no answer about

this technology, 65% of the respondents know about nanotechnology.
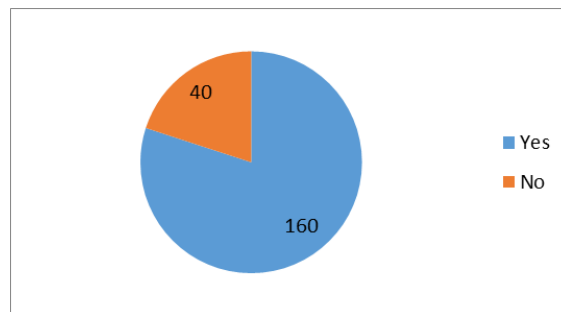
Does Nanotechnology is beneficial for agriculture sector?

The respondents are aware about the features and advantages offered by nanotechnology for agriculture sector. Out of 160 respondents who know about nanotechnology 60% of the respondents know that nanotechnology is beneficial for agriculture sector.
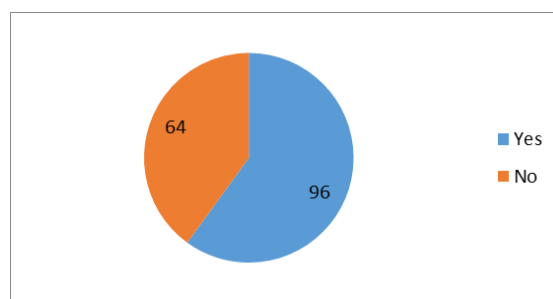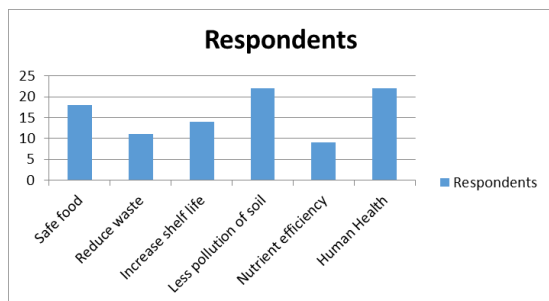

What benefits the nanotechnology offers in agriculture sector?

The respondents who agreed to the statement that nanotechnology is beneficial to agriculture sector further asked the various benefits of nanotechnology so the responses are as shown in column chart.
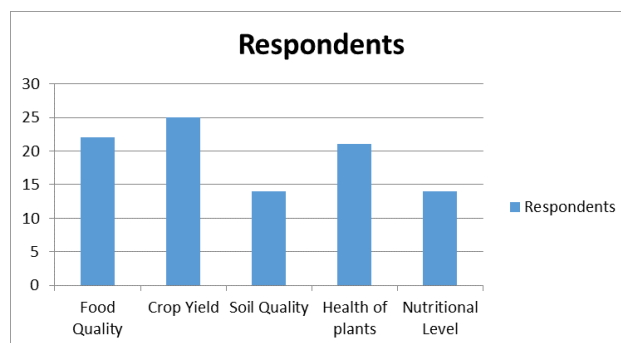

What are the application of the nanotechnology in agriculture sector?

There are various application of nanotechnology in agriculture sector so these applications are discussed and the responses are taken on the various application mentioned in the chart.

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What you think that nanotechnology is going to make difference in future as the climate change and food security is the major challenges in agriculture sector?

As the agriculture sector is facing a huge climate change challenge and food security is the big issue as far as huge population is concern. The majority of respondents are agreeing that due to nanotechnology these challenges can be overcome in near future.
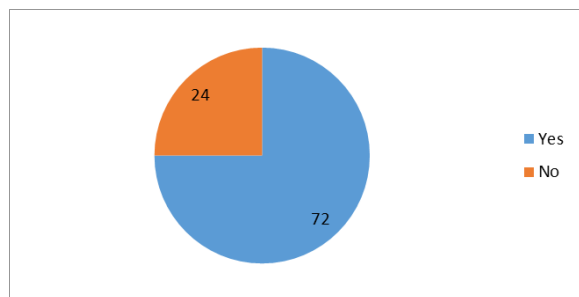
4. Conclusion

In agriculture sector as we have seen the education is in high demand among the student's community and various new techniques are coming in this sector to face the challenges like food security and climate change. To overcome such challenges nanotechnology is playing important role as this technology is having various benefits and having various applications to enhance the food security. Due to nanotechnology there is improvement in the food quality, crop yield, soil quality, nutritional level and overall health of agriculture plants.

Nanotechnology is having various applications in terms of getting safer food, reduce waste, increase shelf life of the produce, less pollution of the soil, efficiency in nutrients and ultimately human health is important if all things are achieved successfully. In this survey of awareness of nanotechnology, it is found that the majority of the respondents are aware about this technology and also aware about the various benefits and applications of this technology in agriculture sector. But still there is scope for awareness as this study is conducted with the respondents of pune based agribusiness management institutes so next study we can conduct in rural area of Maharashtra state to know the awareness of nanotechnology in rural Maharashtra.

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