# From Lab to Land - Overcoming Challenges in Adoptation of Speed Breeding Technology

M. Lakshmanan[1]*, M. Vivek[2], A. Madhumathi[3]

[1] UG Scholor , B. Sc (Hons), Agriculture, School of Agricultural Sciences, Takshashila University, Tamil Nadu, India.
[2],[3]Assistant Professor, Department of Genetics and Plant Breeding, School of Agricultural Sciences, Takshashila University, Tamil Nadu, India.
*Corresponding author: lakshmanan2004lak@gmail.com

*Abstract— As the population of the world is increase day by day, By means adding of population the large failure can occurs in the world among the people's. We' had to break the food scarcity problem before attaining the failure by an system called Speed breeding. Speed breeding is an advanced technology. Introduced by University of Queensland in Australia and inspired by NASA in 2018 in wheat( Triticum aestivium, 2n=42) are grown Wheat on space under controlled environment. This system creates the resistance to biotic and abiotic stress and promote climate adoptability to converting the accelerating the rapid breeding cycle in crops in this technology, numerous kinds can be released in short duration for about 6- 7cycles/ year rather of 3- 4 cycles. Indeed though this veritably important full tool for crop enhancement several barriers are there to adaption this technology. So In my Research I've linked the major barriers which will be in adoptation of speed breeding system among growers, scholars, and agristokeholders. I've used surveying tools like google form and direct check to growers for analysing the data, about 160 samples of response where collected in 3 quarter of villupuram, namakal and chengalpettu among the agrarian collages, research institutions etc. Grounded on this data I've analysed and major barriers and gives the result in my Research. Challenges like high cost, lack of knowledge, limited funding and strategies for overcome from the situation like providing funding, training and workshops ect are discussed in my studied.*

*Keywords— Adoptation, barriers or challenges, rapid breeding cycle, Overcoming, Speed breeding.*

## I.  INTRODUCTION

1.1 Background of the study

As we know that numerous advanced technology and styles where used in advancement in Genetics and plant breeding and Biotechnology to accelerate the growth and development of growers and promotes there profitable position in the society By working these kind of problems faced by growers[5] (Jahhans et.al 2023) an new and advanced technology was surfaced in Genetics and plant breeder is called Speed breeding technology[1]. Speed breeding technology was an advanced technology which is used to accelerate the crops breeding cycle rapid than compared to normal breeding(Pasala et.al )[9] . The kinds which was released through speed breeding technology was

capability to resistance in biotic and abiotic stress, climate adoptability [2](Askar et.al)and high yield kinds and etc. In this system further than 6- 7 cycles/ time can be achieved compared to normal breeding cycle in crop enhancement[4] (Gautam et.al 2024)so it can give high productivity to growers[5](Begna et.al 2022). These system was performed in artificial growth chamber using high cost outfit setup like LED lights with different wavelength and temperature controller. Artificial Temperature, RH moisture and increase in $CO_2$ position in growth chambers [9].This Speed breeding technology was first introduced in Queensland University in Australia and it was inspired by NASA in 2018 and he'had espoused these technology and had a trail in wheat [13](schoen et. al 2023) crops in space station using a growth chambers in Artificial conditions and that

Research was successful for NASA and numerous exploration institutions and University has slightly adopt these in India and other countries. These was only practices in top Ranking and institutions in Lab and exploration purpose only, some varieties has been released using these method in wheat, rice as essential crops for growers . It'll helps growers to identify the suitable variety for timely sowing and resistance kinds and further cycles per time can be the product rate in world growers and promotes the income position in growers. But these styles has numerous barriers in adaptations of speed breeding technology indeed though it was introduced in 2018 By NASA. By several factors and [11](Samantara et.al 2022) walls. These barriers where blocked the pathways in adoption of speed breeding technology among Agriculture scholars, Farmers,

agristokeholders and educational institutions and University in Adoptation. Numerous exploration has only done in Lab side only of adoption of the technology not in the external area where people's can borrow these technology. In my exploration study I've Analysed an crucial walls in adoption of these technology using an check grounded Research for 30 days in colorful sections like Chengalpettu, villupuram, Namakal and etc. In this sections colorful exploration instructions, kvk, and agrarian instructions and University has been shared in these Research study in these check numerous growers and agristokeholders and factory breeders, Experimenters and scholars where shared for chancing the crucial challenges in adoption of speed parentage technology through direct check and google form response are used for this research.
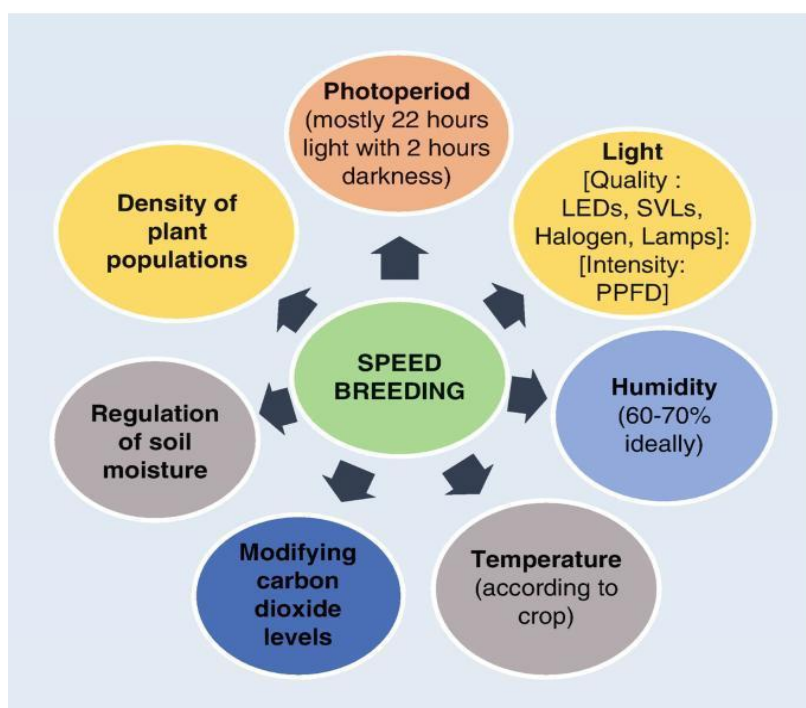


*Fig 1. Way involved in speed parentage technology (Rai, N. K et. al 2023)*

### 1.2 Problems statement

At presently lot of arising technologies where introducing each over the world for giving for easy access to people's especially in agrarian field. In this field lot of new technology and chemical and organic way of results is given by numerous agrarian scientists and experimenters every time. From though it was only in the Lab and Not in the Land, growers and agrarian scholars and institutions where not aware of the technologies and method which was introduced in current problems and issues. Numerous barriers and challenges where impact the technology like infrastructure, mindfulness among individualities, restrictions by the agencies are some of important barriers

in adoption of arising new trend technologies [10](Reddy et. **al**) .

### 1.3 Main objects of the study

The main objects of the exploration study is to breaks the challenges by which they are n't creating the pathway for adoption of speed breeding technology among growers, agrarian scholars, agristokeholders and setup in the agrarian collages, university and other agrarian institutions. These study was substantially concentrate on giving the right results in current situation and mind- set where it can be attainable recommended to the Agrarian platforms.

## II.    METHODOLOGY

The method which Used in these study was Survey grounded exploration method with an sample size of 160 samples response which was collected during the 30 days survey period numerous feedbacks, and opinions where sheared by the growers, scholars of agrarian collage, University and other research stations and agri officers as well as extension officers, these check was carried out in 2 ways one is direct check to cultivators and another form of system is through google form for collecting the data from farmers sections and far down people's. This check was conducted in platform in agrarian like scholars, Farmers, Scientists in plant breeding and genetics and Experimenters in this field and professor in agrarian university and agrarian institutions. An by using these sample of 160. I've find an crucial challenges in espousing the technology in agrarian institutions and university by the scholars and professor and other stockholders and etc. in table 1

*Table.1: value of no. of participants, category of participants in these speed breeding studies.*

| Serial no | Participants category | Number of participants | Percentage % |
|---|---|---|---|
| 1 | Farmers | 65 | 40.63 |
| 2 | Professor and assistant professor | 19 | 11.88 |
| 3 | Scientists and plant breeders | 10 | 6.25 |
| 4 | Students in agri field | 56 | 35.00 |
| 5 | Extension officer, Ao and agri stockholders | 10 | 6.25 |

### 2.1. Research area

These exploration where conducted in sections includes Chengalpettu, Villupuram, Namakal in Tamilnadu states for about 4 weeks The fields includes Agrarian scholars in institutions and university in these sections and growers, agro clinic shop holders, Extension officers, Agrarian officers, Experimenters in kvk and research stations( plant breeders) and scientists in Genetics and plant breeding and Biotechnology departments. In Agrarian institutions( Professor and Assistant Professor) of the Genetics and plant breeding , Seed science and Technology, Extensions and Agricultural Economic departments are substantially concentrated for these study for collection of precious data among these people's for futher analysis.

### 2.2. Data analysis

The collected data of 160 samples are divided into 2ways direct and google form check to growers and 65 response in direct check to growers and 10 from experimenters and plant breeders, 15 from agrarian stockholders 10 from extension officers, and reaming are 56 response in scholars and 19 from professor in agrarian institutions and university through Google form, these data are analysis by value of total samples and probabilities of actors in the check in groups like( scholars, plant breeders etc). And these can be represented in pie map and Tabular from. These are the data analysis styles followed in the exploration check.

### 2.3. Research quaternaries

1. Did you ever heard about Speed breeding technology?

2. If Yes means in which crops?

3. what did you know about effective benefits of speed breeding technology?

4. What are challenges or crucial barriers in adoptation of speed breeding technology in real world operation?

5. your opinion on strategies in adoptation of speed breeding technology as arising trends in breeding field?

These are the Research quaternaries which was used in both direct and google form check in these 4 weeks exploration.

## III.    RESULTS AND DISCUSSION

crucial barriers in adoptation and it's strategies to overcome from the barriers

There are several barriers and challenges are linked in my study and I've only sorted the crucial barriers grounded on the people's opinion and my analysis, I've list out the crucial barriers and their perfecting strategies.

### 3.1.Awareness level in people's

First and foremost barriers is awareness position in adoptation of new and arising technologies. Day by day lot of new technologies and methods where arrived for perfecting the growers , but people's does not known that technologies due to low mindfulness situations in speed breeding adoptation only15. 6 has apprehensive of this technology rest of 84.6 is not apprehensive in my study. So people's has to ameliorate the aware and understand the current arising technologies in the world. [8,7].

## Awareness on speed breeding technology
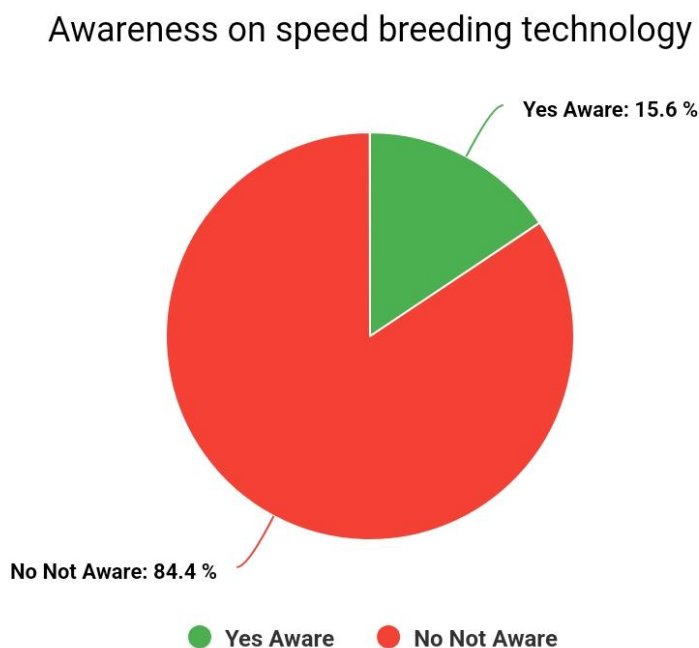


*Fig.2:Awarenes level in speed parentage technology*

3.2 High cost outfit( Led light, growth chambers etc.)

This technology was only followed only in Lab and not in land so the the cost of outfit is veritably high and regular maintaince is demanded for outfit around 50 % of the barrier is high cost outfit for setups[15](wanga et.al) . So the government has to feeds the new schemes for setting the chamber setup in university and other agrarian institutions or association for installing of speed breeding technology.

3.3.Limited funding for the research or systems

The limited funding [13] (Sharma et.al) for research participations has to increase for further funding has to given by the central government to the research stations, university and NGO for setting speed breeding technology set up in there area or position and starts there's research in speed breeding.

3.4. Lack of professed breeders

further plant breeders has to trained for speed breeding technology to conduct an research and release of kinds as faster for attains an good profitable position to growers [9] (pasala et. Al 2024)

3.5.other Satergies for overcome from the barriers

For scholars should also has to have an knowledge about speed breeding technology as an advanced technology for crop enhancement, so the government from state and central and top ranking institutions and University has to conduct Hand on Training and shops for Agrarian scholars for perfecting their academic as well as practical knowledge in Genetics and plant breeders field [1]( Abbdal et al). And for the growers mindfulness lot in every townlets and sections has to conducted on speed breeding technology for understanding of how speed breeding technology has created impact kinds release as faster in short time of period for better yield.

3.6.Benefits of speed breeding technology in crop enhancement

As we knows speed breeding is an advance molecular genetics tool for perfecting the food security in our world, speed breeding has to extensively use for the rapid-fire increase in global population before it attains shortage for food[14] (Watson and Hickey et. al 2021) speed breeding technology release the variety faster, Climate adoptability of crops, creates resistance to biotic and abiotic factors and high genetics effectiveness are the crucial benefits of speed breeding technology are the effective benefits of speed breeding technology . [2]Al-Askar (et.al).
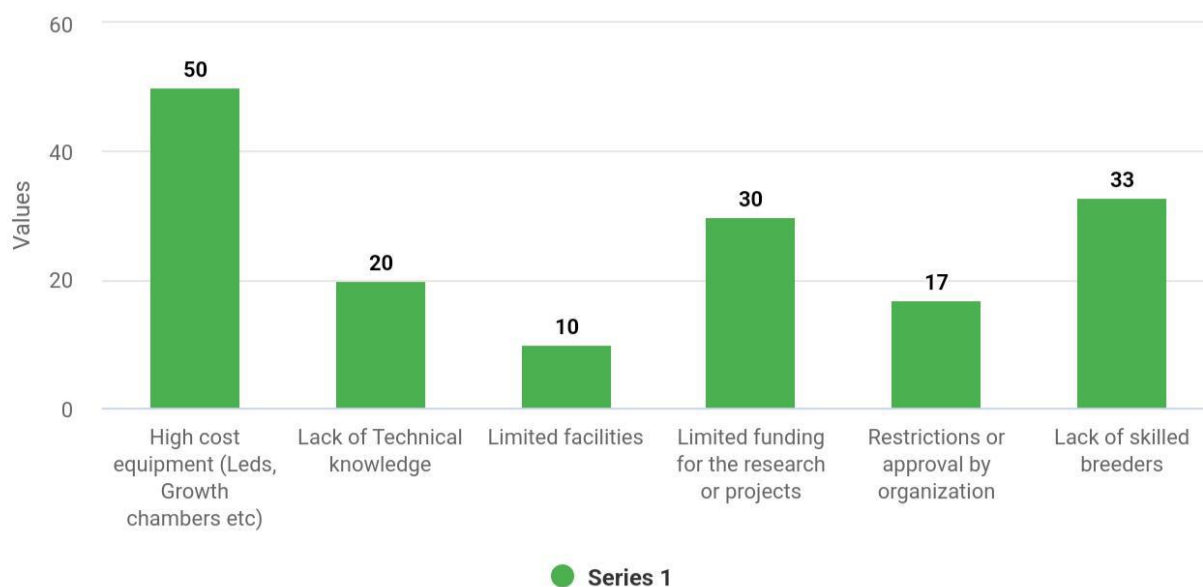
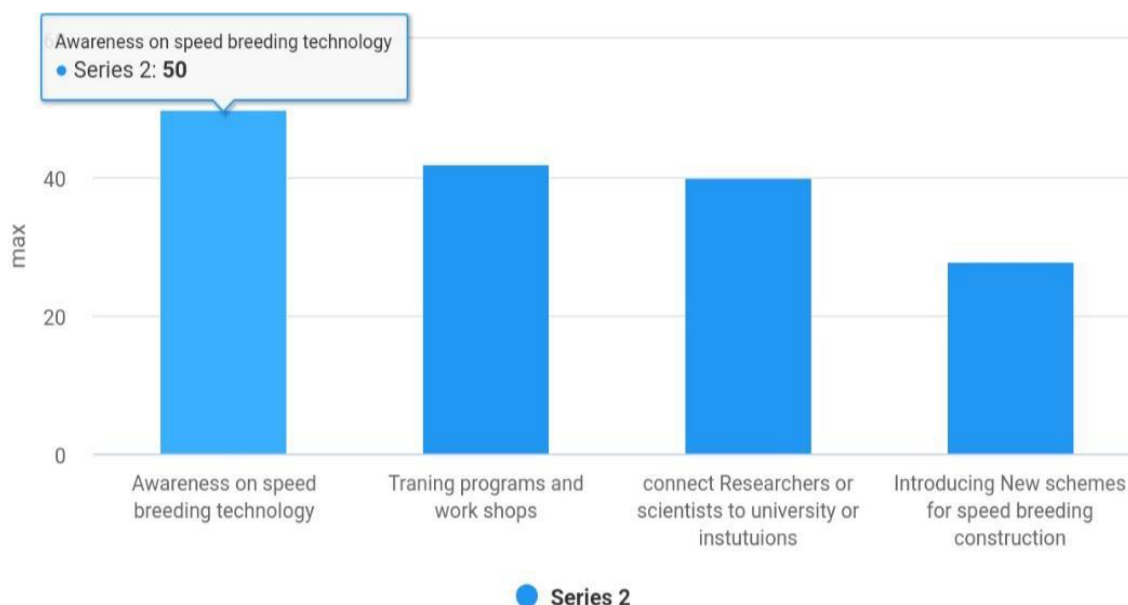*Fig.3.Data analysis on walls on adoption of speed breeding technology.*



*Fig.4:data analysis on strategies in adoptation of speed breeding technology among agrarian field.*

## IV.    CONCLUSION

 From the above exploration that we had concluded that the speed breeding is advance molecular tools for accelerating for crop enhancement[6]( jighly et al 2019). From these technology we can release further kinds in a short period of time, it has several benefits like rapid release of kinds to growers, climate adoptability, resistance. Indeed though it has further more obstacles for adoption like Lack of awareness, financial support, restrictions, high cost of outfit for setups and lack of professed breeders are the obstacles faced in adoptation of these technology. From prostrating from these challenges is demands like furnishing hand on training to scholars, awareness camp for growers and furnishing funding for structure setup, Addressing these is pivotal for unleashing the pathway for adoption for sustainable development in agriculture.

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