Plants growing under the optimized LED lightning (ICARDA/Miguel Sanchez Garcia)

Speed Breeding Platform (ມໍລອກໂກ)

ຄຳອະທິບາຍ

Improving crop varieties is crucial for food security and climate resilience, but traditional methods are slow and expensive. The Speed Breeding Platform shortens breeding time substantially, enhances quality, and relies on strong partnerships between NARES and CGIAR centers.

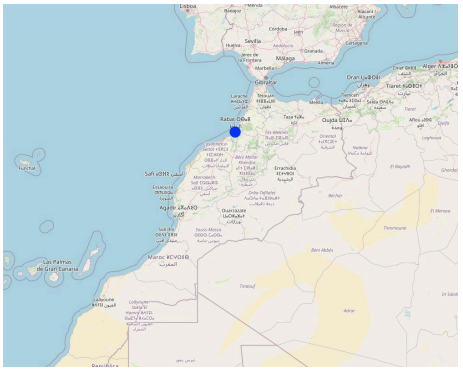
Climate change presents significant challenges for agriculture and crop production. One possible solution to enhance climate resilience is the development and adoption of improved, better adapted crop varieties. These varieties are specifically engineered to withstand specific threats, offering farmers a more reliable means of ensuring successful harvests despite the challenges posed by a changing climate. Improved varieties are thus crucial for achieving food security.
However, a major limitation of this solution is that researching and producing new crop varieties is a complex process that demands considerable time and resources. It involves cross design, segregating generation advancement and rigorous field testing to identify traits. The development of new varieties often spans several years, if not decades, before they are ready for widespread adoption by farmers. Sustained investment and collaboration across scientific organizations are thus crucial.

To accelerate the development of improved crop varieties, the International Center of Agricultural Research in Dry Areas (ICARDA), together with partners is implementing Speed Breeding as its main generation advancement method. Through the support of the Arab Fund for Economic and Social development (AFESD), the Templeton World Charity Foundation, Inc and the Crop Trust, protocols to accelerate the generation advancement of the main crops (wheat, barley, faba bean, lentil, grasspea and chickpea) have been developed and are available to NARES. ICARDA has also established the Speed Breeding Platform in Rabat, Morocco. Covering approximately 500 square meters, this facility comprises four buildings, including two greenhouses of 175 m2 and 185 m2 respectively, each housing five independently controlled growth chamber.i

The Speed Breeding method utilises LED lighting - originally invented by NASA to sustain astronauts during prolonged space missions to compensate for the absence of sunlight in space. By providing plants with approximately 22 hours of light per day, this accelerates their growth significantly. Cultivating crops in a controlled environment shields them from the unpredictable impacts of adverse weather conditions. The major advantage is thus its ability to accelerate the breeding process for improved crop varieties. For instance, while traditional methods may take between 6 and 12 years to breed a new grass pea (Lathyrus sativus) variety, utilizing the Speed Breeding Platform reduces this timeframe to approximately 5 years. The Speed Breeding Platform thus enhances efficiency and responsiveness in addressing agricultural challenges.

The Speed Breeding Platform has a capacity for advancing over 50,000 cereal and legume plants. This is done in close collaborations with fellow scientists from other CGIAR centers and National Agricultural Research and Extensions Services (NARES) centers. NARES centers

ສະຖານທີ



ສະຖານທີ: Rabat, ມໍລອກໂກ

ການຄັດເລືອກພື້ນທີ ທີ່ອີງໃສ່ຂໍ້ມູນທາງພູມີສາດ

- -6.85962, 33.98007

ວັນທີເລີ່ມຕົ້ນ: 2021

ປີຂອງການສິ້ນສຸດ: n.a.

ປະເພດຂອງແນວທາງ

- ພືນເມືອງ / ທ້ອງຖິ່ນ
- ການລິເລີ່ມ ພາຍໃນປະເທດ ທີ່ຜ່ານມາ / ນະວັດຕະກຳ
- ພາຍໃຕ້ໂຄງການ / ແຜນງານ

play an indispensable role in determining the traits and varieties to prioritize for advancement, using their direct engagement with farmers in field settings to assess their specific needs and challenges. The main advantages are:
- Varieties reach farmers faster by reducing the time from crossing to field testing;
- Testing during advancement increases the resilience of new varieties to pests and diseases i.e., higher quality of improved varieties;
- It can help coordinating breeding action between CGIAR and NARES by co-designing crosses and centralizing advancement i.e., higher resource efficiency.

The main disadvantage is the high costs associated with building and operating the facilities of the Platform. In addition, it requires expertise to operate. However, NARES personnel are currently being trained and educated in breeding and using the Speed Breeding Platform.

In conclusion, while improved crop varieties hold immense potential for climate resilience in agriculture and ensuring food security, their development remains a complex, time-consuming and resource-intensive process. The approach of the Speed Breeding Platform represents a promising step forward, by faster and more efficient crop breeding, facilitating a prompter solution.

Acknowledgement: the pilot facilities used to set up the ICARDA Speed Breeding Platform were funded by a project from the Third Call for Proposals under the Benefit-sharing Fund of the International Plant Treat for Plant Genetic Resources for Food and Agriculture entitled "Addressing the challenges of climate change for sustainable food security in Turkey, Iran and Morocco, through the creation and dissemination of an international database to promote the use of wheat genetic resources and increase genetic gains." CFP 2014/2015-W3B-PR-18-Turkey. The final facilities were funded by a project from the Arab Fund for Economic and Social Development (AFESD) entitled "Modernization of ICARDA Breeding Programs".


Plants grown in the Speed Breeding Platform (ICARDA/Miguel Sanchez Garcia)


One of the greenhouses of the Speed Breeding Platform (ICARDA/Miguel Sanchez Garcia)

ເປົ້າ□ າຍຂອງແນວທາງແລະ ການປົກປັກຮັກສາສິ່ງແວດລ້ອມ

ເປົ້າໝາຍ / ຈຸດປະສົງຫຼັກໃນການຈັດຕັ້ງປະຕິບັດແນວທາງ

The objective of the new Speed Breeding Platform is to provide the tools to CGIAR and NARES breeding programs to develop better varieties faster and shorten the time needed to reach farmer's fields. The access to this technology also helps responding to new threats hindering productivity in a faster and more effective way.

ເງື່ອນໄຂທີ່ສະໜັບສະໜູນໃຫ້ການຈັດຕັ້ງປະຕິບັດເຕັກໂນໂລຢີ ບົນພື້ນຖານແນວທາງ

- **ການກໍ່ຕັ້ງສະຖາບັນ**: The leading institution, in this case ICARDA, realized the potential for impact of this technology for the region and initiated the fund raising to make it happen.
- **ການຮ່ວມມື / ການປະສານງານຂອງຜູ້ກ່ຽວຂ້ອງ**: The use of this technology will involve the coordination between ICARDA Speed Breeding Platform personnel, ICARDA breeders and NARES breeders to decide the best approach to have a collaborative use of the facilities.

ເງື່ອນໄຂທີ່ເຊື່ອງຊ້ອນໃຫ້ການຈັດຕັ້ງປະຕິບັດເຕັກໂນໂລຢີ ບົນພື້ນຖານແນວທາງ

- **ມີຄວາມສາມາດ / ເຂົ້າເຖິງຊັບພະຍາກອນດ້ານການເງິນ ແລະ ການບໍລິການ**: Developing this type of facilities require an important initial investment and more importantly a considerable running cost.
- **ຄວາມຮູ້ກ່ຽວກັບການຄຸ້ມຄອງ ທີ່ດິນແບບຍືນຍົງ, ການເຂົ້າເຖິງການສະໜັບສະໜູນ ທາງດ້ານວິຊາການ**: This technology requires not only the adequate facilities but also the know-how. ICARDA has developed a Standard Operations Procedure that summarizes the know-how and it is freely available as international public good.
- **ວຽກ, ມີກໍາລັງຄົນ**: The use of the technology requires well trained manpower to effectively achieve a high number of generations per year.

ການມີສ່ວນຮ່ວມ ແລະ ບົດບາດຂອງພາກສ່ວນທີ່ກ່ຽວຂ້ອງທີ່ມີສ່ວນຮ່ວມ

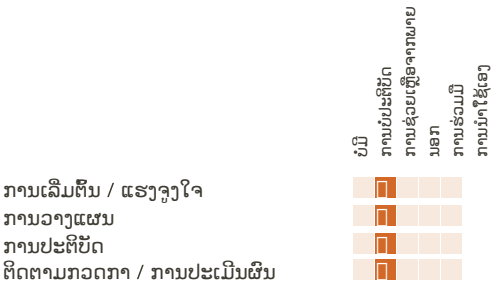
ພາລະບົດບາດຂອງພາກສ່ວນທີ່ກ່ຽວຂ້ອງ ທີ່ມີສ່ວນຮ່ວມໃນການຈັດຕັ້ງປະຕິບັດແນວທາງ

ແມ່ນໃຜ / ພາກສ່ວນໃດ ທີ່ເປັນເຈົ້າການ ໃນການຈັດຕັ້ງປະຕິບັດ ວິທີການ?	ລະບຸ ພາກສ່ວນທີ່ກ່ຽວຂ້ອງ	ພັນລະນາ ບົດບາດ ໜ້າທີ ຂອງພາກສ່ວນທີ່ກ່ຽວຂ້ອງ
ນັກຄົ້ນຄວ້າ	CGIAR, ICARDA, and NARES breeders	They decide the plant populations to be advanced and the type of testing involved.
ອົງການຈັດຕັ້ງ ສາກົນ	AFESD and FAO	The Benefit Sharing fund of the ITPGR (FAO) funded the growth chamber that was later used as pilot chamber to adapt and test the technology. Then, AFESD through the Breeding Modernization of ICARDA Breeding Programs provided the funds to build the new facilities.

ອົງການທີ່ເປັນຕົວແທນໃນການຈັດຕັ້ງປະຕິບັດ

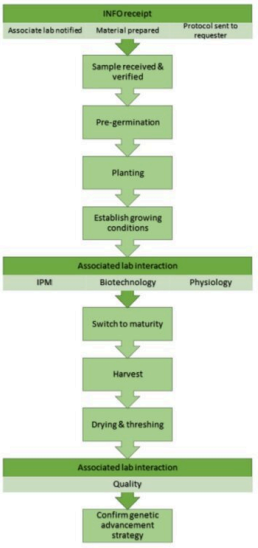
ICARDA

ການລວບລວມເອົາຜູ້ນຳໃຊ້ທີ່ດິນໃນທ້ອງຖິ່ນ/ຊຸມຊົນທ້ອງຖິ່ນ ໃນການຈັດຕັ້ງປະຕິບັດແນວທາງ ແຕ່ລະໄລຍະ



ແຜ່ນວາດສະແດງ

1: Receive information from requester (including material description, advancing strategy, traits, germplasm)
2: Receive and check samples: ICARDA Speed Breeding Platform staff inspect the samples prior to placing them in ICARDA Speed Breeding Platform Store 1 to identify and
address potential pests and other problems. Then, the samples are kept at -20°C for 24h to eliminate potential insect pests in the seeds.
3: Pre-germination: seeds are placed on the trays with systematic labeling. The results of pre-germination process are reported to the requester.
4: Growing conditions: The establishment of the growing conditions will depend on the crop and type of selection strategy applied.
5: Planting and transfer to growth room: Once the scientist confirms the planting list, the staff start planting on cones following the agreed protocol.
6: Trait collection: the facility manager will notify one week in advance the concerned labs when the plants are reaching the key growing stage set in the Project Protocol for trait recording or leaf sampling. Before maturity, the relevant disciplines are IPM, physiology and biotechnology. For traceability and data safety, data are recorded via Fieldbook Android Application, to be imported to BMS via BrApi.
7: Switch to maturity mode : After flowering the plants will enter the accelerated maturity process as per the protocols. Thus, the irrigation is stopped to force plant maturity. The requester will be notified of the entries with missing spikes or pods. At this stage, the FM will inform the quality lab to prepare for the reception of samples if established in the Project Protocol.
8. Harvest: The ICARDA Speed Breeding Platform staff harvest the plants following the requester selection (if any). The harvested spikes/pods are put in labeled bags showing: Crop, trial name, harvesting date, entry code and the barcode.
9. Drying and threshing: The harvested plants are placed in ovens for 2 days at 45°C, then threshed. If the Project Protocol includes it, the seeds are sent to the quality lab for end-use quality analysis. Otherwise, the seeds are kept in Store 1 for short term storage. The facility manager communicates the seed number of each entry to the requester, together with all recorded data.
10. Generation advancement strategy: Based on the data collected during the experiment, the requester confirms the next step of the genetic advancement strategy. In case a selection is made, the requester provides the required information by adding the information to the request form and send it to the RS to generate a new Project Protocol.



ຊື່ຂຽນ: ICARDA Cereals and Legumes Speed Breeding Platform (https://hdl.handle.net/20.500.11766/67537)

ການຕັດສິນໃຈໃນການເລືອກເຕັກໂນໂລຢີ ການຄຸ້ມຄອງທີ່ດິນແບບຍືນຍົງ

ການຕັດສິນໃຈໂດຍ

- ☐ ຜູ້ນຳໃຊ້ດິນຜູ້ດຽວ (ການລິເລີ່ມດ້ວຍຕົນເອງ)
- ☐ ຜູ້ນຳໃຊ້ທີ່ດິນຫຼັກ, ການສະ□ ຶບສະ□ ຸນໂດຍຜູ້ຊ່ຽວຊານ ການນຳໃຊ້ທີ່ດິນແບບຍືນຍົງ
- ☐ ພາກສ່ວນກ່ຽວຂ້ອງທັ□ ດ, ເປັນສ່ວນ□ ຶ ຂອງວິທີທາງແບບມີສ່ວນຮ່ວມ
- ☐ ຜູ້ຊ່ຽວຊານ ຫຼັກດ້ານການຄຸ້ມຄອງ ທີ່ດິນແບບຍືນຍົງ, ມີການຕິດຕາມປຶກສາຫາລືກັບ ຜູ້ນຳໃຊ້ທີ່ດິນ
- ☑ ຊ່ຽວຊານ ສະເພາະດ້ານການຄຸ້ມຄອງ ດິນແບບຍືນຍົງ**ຜູ້ດຽວ**
- ☐ ນິ**ກ**ານເມືອງ / ຜູ້ນຳ

ການຕັດສິນໃຈບົນພື້ນຖານ

- ☐ ປະເມີນເອກກະສານ ຄວາມຮູ້ກ່ຽວກັບ ການຄຸ້ມຄອງ ທີ່ດິນແບບຍືນຍົງ (ຫຼັ**ກ**ຖານທີ່ຊ່ວຍໃນການຕັດສິນໃຈ)
- ☑ **ຜົນທີ່ໄ**ດ້**ຮັ**ບ ຈ**າ**ກການ**ຄົ**ນຄວ້າ
- ☐ ປະ**ສົ**ບການ**ສ**ວນ**ບຸ**ກຄົນ ແລະ ຄວາມ**ຄິ**ດ**ເຫັ**ນ (ທີ**ບ**ໍ**ເ**ປ**ັ**ນ**ເ**ອ**ກ**ກ**ະ**ສ**ານ)

ການສະ□ ຶບສະ□ ຸນ**ເ**ຕ**ັ**ກ**ໂ**ນ**ໂ**ລ**ຍ**ີ, ການ**ສ**້**າ**ງ**ຄ**ວາ**ມ**ອ**າ**ດ**ສ**າ**ມ**າ**ດ ແ**ລ**ະ ການ**ຄຸ**້ມ**ຄ**ອ**ງ**ຄ**ວ**າ**ມ**ຮ**ູ**້

ກິ**ດ**ຈ**ະ**ກ**ໍ**າ ດ**ັ**ງ**ລຸ**ມ**ນ**ີ ແ**ມ**ນ**ເ**ປ**ັ**ນ**ພ**າ**ກ**ໜ**ຶ**ງ**ຂ**ອ**ງ**ແ**ນ**ວ**ທ**າ**ງ

- ☑ ການ**ສ**້**າ**ງ**ຄ**ວາ**ມ**ສ**າ**ມ**າ**ດ / ການ**ຝ**ຶ**ກ**ອ**ບ**ຮ**ົ**ມ
- ☑ ການ**ບ**ໍ**ລ**ິ**ກ**ານ**ໃ**ຫ**້**ຄ**ໍ**າ**ປ**ຶ**ກ**ສ**າ
- ☑ **ສ**ະ**ຖ**າ**ບ**ັ**ນ**ການ**ສ**້**າ**ງ**ຄ**ວາ**ມ**ເ**ຂ**ັ**ມ**ແ**ຂ**ງ (ການ**ພ**ັ**ດ**ທ**ະ**ນ**າ**ອ**ົ**ງ**ກ**ານ**ຈ**ັ**ດ**ຕ**ັ**ງ)
- ☐ ຕິ**ດ**ຕ**າ**ມ**ກ**ວ**ດ**ກ**າ ແ**ລ**ະ ປ**ະ**ເ**ມ**ີ**ນ**ຜ**ົ**ນ
- ☑ ການ**ຄົ**ນ**ຄ**ວ**້**າ

ການ**ສ**້**າ**ງ**ຄ**ວາ**ມ**ອ**າ**ດ**ສ**າ**ມ**າ**ດ / **ຝ**ຶ**ກ**ອ**ບ**ຮ**ົ**ມ

ໄດ**້ສ**ະ**ໜ**ັ**ບ**ສ**ະ**ໜ**ຸ**ນ**ຝ**ຶ**ກ**ອ**ບ**ຮ**ົ**ມ**ໃ**ຫ**້**ແ**ກ**່**ພ**າ**ກ**ສ**ວ**ນ**ກ**່**ຽ**ວ**ຂ**ອ**ງ**ດ**ັ**ງ**ລຸ**ມ**ນ**ີ

- ☐ ຜູ້ນຳໃຊ້ດິນ
- ☐ ພະນັ**ກ**ງານ**ພ**າ**ກ**ສ**ະ□ າ**ນ**/ ທີ**ປ**ຶ**ກ**ສ**າ
- ☑ Researchers and breeders

ຮູ**ບ**ແ**ບ**ບ**ກ**ານ**ຝ**ຶ**ກ**ອ**ບ**ຮ**ົ**ມ

- ☑ ການ**ເ**ຮ**ັ**ດ**ຕ**ົ**ວ**ຈ**ິ**ງ
- ☐ ຕ**ົ**ວ**ຕ**ໍ**ຕ**ົ**ວ
- ☐ ເ**ມ**ືອ**ທ**ີ**ສ**ວ**ນ**ທ**ົ**ດ**ລ**ອ**ງ
- ☐ ກ**ອ**ງ**ປ**ະ**ຊ**ຸ**ມ**
- ☑ **ຫ**ຼັ**ກ**ສ**ູ**ດ

ກວ**ມ**ເ**ອ**ົ**າ**ຫ**ົ**ວ**ຂ**ໍ**

Breeding

ການ**ບ**ໍ**ລ**ິ**ກ**ານ**ທ**າ**ງ**ດ**້**ານ**ກ**ານ**ໃ**ຫ**້**ຄ**ໍ**າ**ປ**ຶ**ກ**ສ**າ

ໄດ**້ຮ**ັ**ບ**ການ**ບ**ໍ**ລ**ິ**ກ**ານ**ທ**າ**ງ**ດ**້**ານ**ກ**ານ**ໃ**ຫ**້**ຄ**ໍ**າ**ປ**ຶ**ກ**ສ**າ

- ☑ ໃ**ນ**ພ**ື**ມ**ທ**ີ**ຂ**ອ**ງ**ຜ**ູ**້**ນ**ໍ**າ**ໃ**ຊ**້**ດ**ິ**ນ
- ☑ ສ**ູ**ນ**ຄ**ົ**ນ**ຄ**ວ**້**າ

ຄ**ວ**າ**ມ**ເ**ຂ**ັ**ມ**ແ**ຂ**ງ**ຂ**ອ**ງ**ສ**ະ**ຖ**າ**ບ**ັ**ນ

ສະ**ຖ**າ**ບ**ັ**ນ ໄ**ດ**້ຮ**ັ**ບ**ການ**ສ**້**າ**ງ**ຄ**ວາ**ມ**ເ**ຂ**ັ**ມ**ແ**ຂ**ງ

- ☐ ບ**ໍ**ມ**ີ**
- ☑ ມ**ີ**, ☐ **ອ**ຍ**ໍ**ງ
- ☐ ມ**ີ**, ພ**ໍ**ສ**ົ**ມ**ຄ**ວ**ນ**
- ☐ ມ**ີ**, ຫ**ຼ**າ**ຍ**

ໃນ**ລ**ະ**ດ**ັ**ບ**ດ**ັ**ງ**ລຸ**ມ**ນ**ີ

- ☐ ທ**ົ**ອ**ງ**ຖ**ິ**ນ
- ☐ ລ**ະ**ດ**ັ**ບ**ພ**າ**ກ**ພ**ື**ນ
- ☑ ແ**ຫ**່**ງ**ຊ**າ**ດ

ອະ**ທ**ິ**ບ**າ**ຍ**ສ**ະ**ຖ**າ**ບ**ັ**ນ, **ພ**າ**ລ**ະ**ບ**ົ**ດ**ບ**າ**ດ**ແ**ລ**ະ**ຄ**ວ**າ**ມ**ຮ**ັ**ບ**ຜ**ິ**ດ**ຊ**ອ**ບ, **ສ**ະ**ມ**າ**ຊ**ິ**ກ, **ແ**ລ**ະ**ອ**ື**ນ**ໆ**.

ຮູ**ບ**ແ**ບ**ບ**ກ**ານ**ສ**ະ**ໜ**ັ**ບ**ສ**ະ**ໜ**ຸ**ນ

- ☐ ທ**າ**ງ**ດ**້**ານ**ກ**ານ**ເ**ງ**ິ**ນ
- ☑ ການ**ສ**້**າ**ງ**ຄ**ວາ**ມ**ອ**າ**ດ**ສ**າ**ມ**າ**ດ / ການ**ຝ**ຶ**ກ**ອ**ບ**ຮ**ົ**ມ
- ☐ ອ**ຸ**ປ**ະ**ກ**ອ**ນ

ລາ**ຍ**ລ**ະ**ອ**ຽ**ດ**ເ**ພ**ີ**ມ**ເ**ຕ**ີ**ມ

National scientists are trained in breeding and using the Speed Breeding Platform

ການ**ຄົ**ນ**ຄ**ວ**້**າ

ການ**ວ**ິ**ໃ**ຈ**ໄ**ດ**້ຮ**ັ**ບ**ການ**ຮ**ັ**ກ**ສ**າ**ຫ**ົ**ວ**ຂ**ໍ**ຕ**ໍ**ໄ**ປ**ນ**ີ

- ☐ ສ**ັ**ງ**ຄ**ົ**ມ**
- ☐ ເ**ສ**ດ**ຖ**ະ**ສ**າ**ດ** / ການ**ຕ**ະ**ຫ**ຼ**າ**ດ
- ☐ ລ**ະ**ບ**ົ**ບ**ນ**ິ**ເ**ວ**ດ**
- ☐ ເ**ຕ**ັ**ກ**ໂ**ນ**ໂ**ລ**ຍ**ີ
- ☑ Genetics / Breeding

Research in breeding is done by ICARDA, CGIAR centers and NARES centers

ການ**ສ**ະ□ ຶ**ບ**ສ**ະ**□ ຸ**ນ**ທ**າ**ງ**ດ**້**ານ**ການ**ເ**ງ**ິ**ນ ແ**ລ**ະ ອ**ຸ**ປ**ະ**ກ**ອ**ນ**ຈ**າ**ກ**ພ**າ**ຍ**ນ**ອ**ກ

ງ**ົ**ບ**ປ**ະ**ມ**ານ**ປ**ະ**ຈ**ໍ**າ**ປ**ີ ໃ**ນ**ກ**ິ**ດ**ຈ**ະ**ກ**ໍ**າ ການ**ຄຸ**້ມ**ຄ**ອ**ງ**ທ**ີ**ດ**ິ**ນ**ແ**ບ**ບ**ຍ**ືນ**ຍ**ົ**ງ ທ**ີ**ເ**ປ**ັ**ນ**ສ**ະ**ກ**ຸ**ນ**ເ**ງ**ິ**ນ**ໂ**ດ**ລ**າ

- ☐ < 2,000
- ☐ 2,000-10,000
- ☐ 10,000-100,000
- ☑ 100,000-1,000,000
- ☐ > 1,000,000

Precise annual budget: n.a.

The main donors were the Benefit Sharing Fund of the ITPGR (FAO) that provided the funding that resulted in the first Speed Breeding pilot facility with capacity for 3,000 plants and the Arab Fund for Economic and Social Development (AFESD) who provided the funds for the expansion of this initial pilot facility and develop the ICARDA Speed Breeding Platform, a fully automatic facility that allows advancing more than 50,000 cereal and legume plants

ການ**ບ**ໍ**ລ**ິ**ກ**ານ ຫ**ຼ**ື ສ**ິ**ງ**ກ**ະ**ຕ**ຸ**ກ**ຊ**ຸ**ກ**ຍ**ູ້ ດ**ັ**ງ**ລຸ**ມ**ນ**ີ ແ**ມ**ນ**ໄ**ດ**ັ**ສ**ະ**ໜ**ອ**ງ**ໂ**ດ**ຍ**ຜ**ູ**້**ນ**ໍ**າ**ໃ**ຊ**້**ດ**ິ**ນ**ເ**ອ**ງ

- ☐ ການ**ສ**ະ□ ຶ**ບ**ສ**ະ**□ ຸ**ນ**ທ**າ**ງ**ດ**້**ານ**ການ**ເ**ງ**ິ**ນ / ອ**ຸ**ປ**ະ**ກ**ອ**ນ ສ**ະ**□ ອ**ງ**ໃ**ຫ**ແ**ກ**ຜ**ູ**້**ນ**ໍ**າ**ທ**ີ**ດ**ິ**ນ
- ☐ ຫ**ຼ**ຸ**ດ**ປ**ັ**ດ**ໃ**ຈ**ນ**ໍ**າ**ເ**ຂ**ົ**າ
- ☐ ສ**ິ**ນ**ເ**ຊ**ື**ອ
- ☐ ສ**ິ**ງ**ຈ**ູ**ງ**ໃ**ຈ** ຫ**ຼ**ື ເ**ຄ**ື**ອ**ງ**ມ**ື**ອ**ື**ນ**ໆ**

ການວິເຄາະຜົນກະທົບ ແລະ ສະຫຼຸບລວມ

ຜົນກະທົບຂອງການນຳໃຊ້ແນວທາງ

	ບໍ່ມີ	ເລັກນ້ອຍ	ປານກາງ	ຫຼາຍ
ການຈັດຕັ້ງປະຕິບັດ ວິທີທາງ ສາມາດຊ່ວຍຜູ້ນຳໃຊ້ທີ່ດິນ ໃນການຈັດຕັ້ງປະຕິບັດ ແລະ ບຳລຸງຮັກສາ ເຕັກໂນໂລຢີ ການຄຸ້ມຄອງ ທີ່ດິນແບບຍືນຍົງໄດ້ບໍ? Through the Speed Breeding Platform, improved varieties are publicly released to farmers and seed cooperation. This allows them to use their land more sustainable.				☑
ການນຳໃຊ້ ວິທີທາງ ສາມາດປັບປຸງ ການປະສານງານ ແລະ ຄ່າໃຊ້ຈ່າຍ ການຈັດຕັ້ງປະຕິບັດ ທີ່ມີປະສິດທິພາບ ຂອງການຄຸ້ມຄອງ ທີ່ດິນແບບຍືດຍົງໄດ້ບໍ? Building on strong collaboration between international partners and national partners, breeding became more centralized making it more cost-effective. The reduced breeding time also contributes to higher resource efficiency.			☑	
ການນຳໃຊ້ ວິທີທາງ ສາມາດປັບປຸງຄວາມຮູ້ ແລະ ຄວາມສາມາດ ຂອງພາກສ່ວນທີ່ກ່ຽວຂ້ອງໄດ້ບໍ? Staff of NARES centers are trained in breeding.			☑	
ການນຳໃຊ້ ວິທີທາງ ສາມາດສ້າງຄວາມເຂັ້ມແຂງ ໃຫ້ສະຖາບັນການຈັດຕັ້ງ, ການຮ່ວມມື ລະຫວ່າງພາກສ່ວນທີ່ກ່ຽວຂ້ອງບໍ? Staff of NARES centers are trained in breeding.				☑
ການນຳໃຊ້ ວິທີທາງ ໄດ້ປັບປຸງ ການຄ້ຳປະກັນສະບຽງອາຫານ ຫຼື ປັບປຸງໂຄສະນາການໄດ້ບໍ? Improved varieties are more climate resilient contributing to food security.				☑
ການຈັດຕັ້ງປະຕິບັດ ວິທີທາງ ສາມາດສ້າງຄວາມອາດສາມາດໃຫ້ຜູ້ນຳໃຊ້ດິນ ໃນການປັບຕົວ ຕໍ່ການປ່ຽນແປງດິນຟ້າອາກາດ / ຫຼຸດຜ່ອນຄວາມສ່ຽງ ທາງໄພພິບັດໄດ້ບໍ? Improved varieties are better adapted to the changing climate.				☑

ສິ່ງກະຕຸກຊຸກຍູ້ໃຫ້ຜູ້ນຳໃຊ້ທີ່ດິນ ໃນການປະຕິບັດການຄຸ້ມຄອງທີ່ດິນ ແບບຍືນຍົງ

- ☑ ການຜະລິດເພີ່ມຂຶ້ນ
- ☑ ກຳໄລເພີ່ມຂຶ້ນ (ຄວາມສາມາດ), ການປັບປຸງຄ່າໃຊ້ຈ່າຍ, ຜົນປະໂຫຍດ, ອັດຕາສ່ວນ
- ☐ ຫຼຸດຜ່ອນດິນເຊື່ອມໂຊມ
- ☑ ຫຼຸດຜ່ອນຄວາມສ່ຽງຂອງໄພພິບັດ
- ☐ ການຫຼຸດຜ່ອນຜາລະວຽກ
- ☐ ການຊ້ຳລະເງິນ / ເງິນອຸດ ຸນ
- ☐ ກິດລະບຽບແລະລະບຽບການ (ລະອຽດ) / ການບັງຄັບໃຊ້
- ☐ ກຽດສັກສີ, ຄວາມກົດດັນທາງສັງຄົມ / ການຕິດຕໍ່ກັນທາງສັງຄົມ
- ☐ ລວມເຂົ້ານຳກັນກັບການເຄື່ອນໄຫວ / ໂຄງການ / ກຸ່ມ / ເຄືອຂ່າຍ
- ☐ ຄວາມຮັບຮູ້ ທາງສີ່ງແວດລ້ອມ
- ☐ ພາສີ ແລະ ຄວາມເຊື່ອຖື, ສົມບັດສິນທຳ
- ☐ ການປັບປຸງ ຄວາມຮູ້ ແລະ ຄວາມສາມາດ ຂອງການຄຸ້ມຄອງ ທີ່ດິນແບບຍືນຍົງ
- ☐ ການປັບປຸງຄວາມງົດງາມ
- ☐ ການຫຼຸດຜ່ອນຂໍ້ຂັດແຍ່ງ

ຄວາມຍືນຍົງຂອງການຈັດຕັ້ງປະຕິບັດກິດຈະກຳຂອງແນວທາງ

ຜູ້ນຳໃຊ້ທີ່ດິນ ສາມາດຈັດຕັ້ງປະຕິບັດຕາມແນວທາງໄດ້ເອງບໍ (ໂດຍປາດສະຈາກການ ສະ ັບສະ ຸນຈາກພາກ່ສນພາຍນອກ)?

- ☐ ບໍ່ມີ
- ☐ ແມ່ນ
- ☑ ບໍ່ແນ່ນອນ

ບົດສະຫຼຸບ ແລະ ບົດຮຽນທີ່ໄດ້ຮັບ

ຄວາມເຂັ້ມແຂງ: ທັດສະນະມຸມມອງ ຂອງຜູ້ນຳໃຊ້ທີ່ດິນ

- Varieties reach farmers faster by reducing the time from crossing to field testing
- Allows testing during advancement increasing the resilience of new varieties to pests and diseases
- Can help coordinating breeding action between CGIAR and NARES by co-designing crosses and centralizing advancement

ຄວາມເຂັ້ມແຂງ: ທັດສະນະມຸມມອງ ຂອງຜູ້ປ້ອນຂໍ້ມູນເອງ

ຈຸດອ່ອນ / ຂໍ້ເສຍ / ຄວາມສ່ຽງ: ທັດສະນະມູມມອງ ຂອງຜູ້ນຳໃຊ້ທີ່ດິນ ວິທີການແກ້ໄຂແນວໃດ

- Relatively high initial investment to develop the facilities ICARDA platform is open to NARES and other collaborators hence costs can be shared.
- Expertise is needed to achieve results Code of conducts and protocols of the facilities has been published and trainings of NARES staff are being done.

ຈຸດອ່ອນ / ຂໍ້ເສຍ / ຄວາມສ່ຽງ: ທັດສະນະມຸມມອງ ຂອງຜູ້ປ້ອນຂໍ້ມູນ ເອງວິທີການແກ້ໄຂແນວໃດ

ເອກກະສານອ້າງອີງ

ການລວບລວມ
Joren Verbist

Editors

ການທົບທວນຄືນ
William Critchley
Rima Mekdaschi Studer

ວັນທີຂອງການປະຕິບັດ: July 23, 2023

ປັບປຸງລ່າສຸດ: July 15, 2024

ບຸກຄົນທີສຳຄັນ
M Zaim - Developed the Standard Operating Procedures of ICARDA Speed Breeding Platform
H Morsli - Speed Breeding Platform co-developer
M Visioni - Physiologist
R Boulamtat - Entomologist
S.A. Kemal - Pathologist
M Sanchez-Garcia - Barley Breeder and Speed Breeding Platform designer

ການບັນຍາຍລາຍລະອຽດ ໃນຖານຂໍ້ມູນ ຂອງ WOCAT
https://qcat.wocat.net/lo/wocat/approaches/view/approaches_6875/

ຂໍ້ມູນການເຊື່ອມໂຍງຂໍ້ມູນການຄຸ້ມຄອງການນຳໃຊ້ດິນແບບຍືນຍົງ
n.a.

ເອກກະສານ ແມ່ນໄດ້ອຳນວຍຄວາມສະດວກໂດຍ

ສະຖາບັນ
- International Center for Agricultural Research in the Dry Areas (ICARDA) - ລິບານອນ

ໂຄງການ
- ICARDA Institutional Knowledge Management Initiative

ເຊື່ອມໂຍງກັບ ຂໍ້ມູນຕ່າງໆ ທີກ່ຽວຂ້ອງທີມີ
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- Miguel Sanchez-Garcia, Zewdie Bishaw, Abdoul Aziz Niane. (31/12/2021). 2022 ICARDA global barley breeding program International Nurseries. Beirut, Lebanon: International Center for Agricultural Research in the Dry Areas (ICARDA).: https://hdl.handle.net/20.500.11766/66860
- Samira El-Hanafi, Souad Cherkaoui, Zakaria Kehel, Miguel Sanchez-Garcia, Jean-Benoit Sarazin, P. Stephen Baenziger, Wuletaw Tadesse. (14/2/2022). Hybrid Seed Set in Relation with Male Floral Traits, Estimation of Heterosis and Combining Abilities for Yield and Its Components in Wheat (Triticum aestivum L.). Plants, 11 (4).: https://hdl.handle.net/20.500.11766/67050