

CIMMYT's maize seed systems interventions in South Asia

AbduRahman Beshir (PhD)
Maize Seed Systems Specialist for Asia
(Kathmandu-Nepal)
a.issa@cigar.org

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CIMMYT at a glance

- International Maize and Wheat Improvement center Centro Internacional de Mejoramiento de Maíz y Trigo-CIMMYT in Spanish)
- Established in 1966, HQ in Mexico and regional offices in Africa (ET,KE,ZM), Asia (CN,IN, PK, NP,BD,TR) and Latin America (CO)
- www.cimmyt.org



CIMMYT in Pakistan



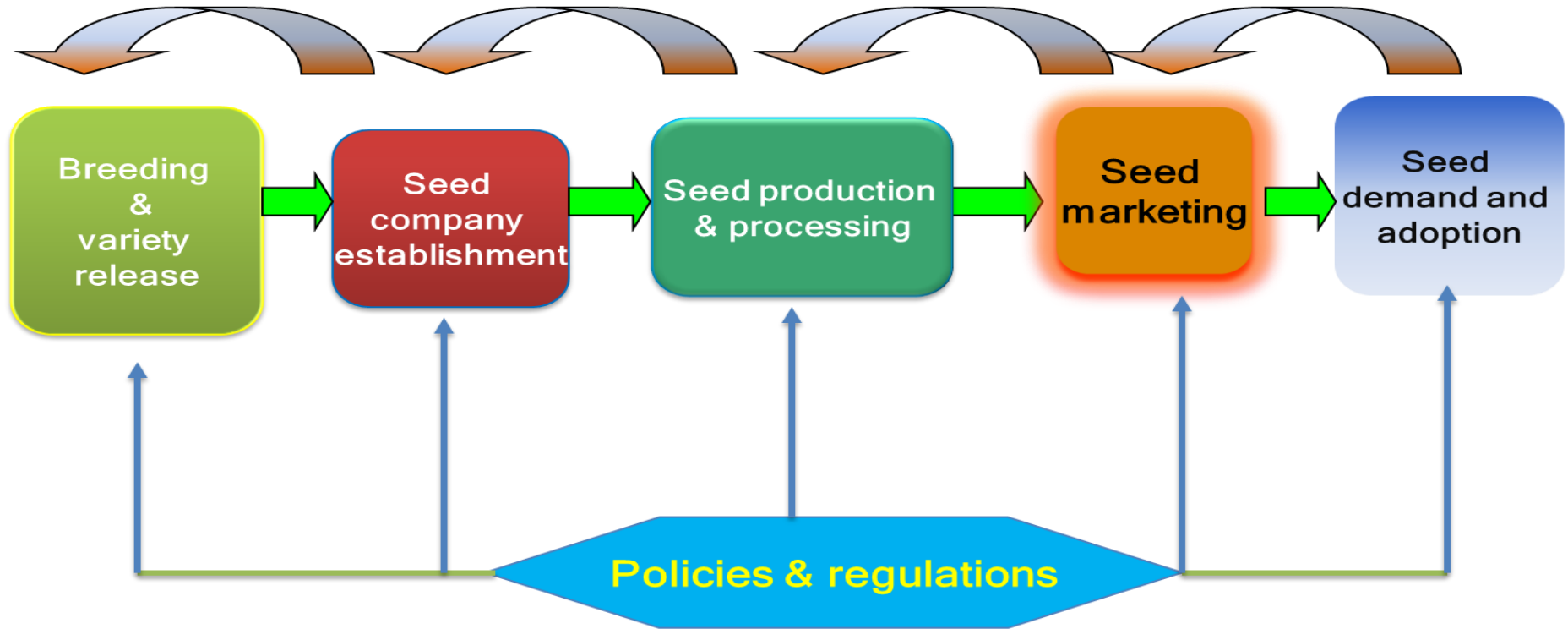
You can't build a peaceful world on empty stomachs and human misery.

— Norman Borlaug —

- Since the 1980s
- History of Mexipak
- Pakistani wheat scientists



The Seed Value Chain



Maize production indicators in S&SE Asia

A. Cultivated maize **area** in South Asia (million hectares)

Countries	2016	2017	2018	2019	2020	% change
Afghanistan	0.15	0.13	0.072	0.094	0.14	-6.67
Bangladesh	0.33	0.39	0.4	0.44	0.47	42.42
Bhutan	0.023	0.026	0.015	0.015	0.011	-52.17
India	9.9	9.63	9.38	9.02	9.86	-0.40
Nepal	0.89	0.9	0.95	0.94	0.96	7.87
Pakistan	1.35	1.25	1.37	1.4	1.42	5.19
Srilanka	0.07	0.05	0.07	0.06	0.08	14.29
South Asia	12.8	12.49	12.35	12.19	13.14	2.66

FAOSTAT,2021 and author analysis



Maize production indicators in S&SE Asia

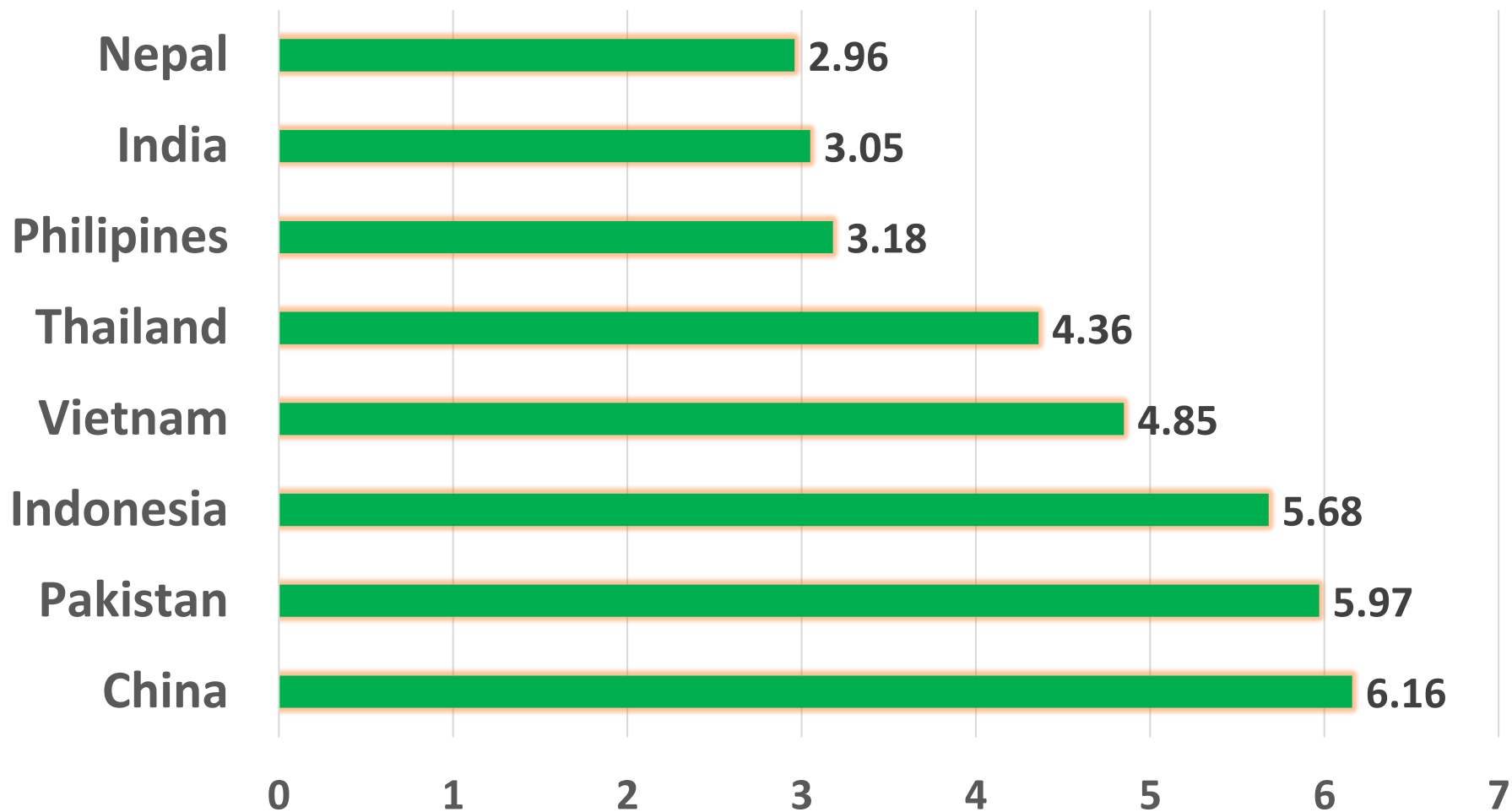
A. Maize **productivity** in South Asia (Mt/ha)

Countries	2016	2017	2018	2019	2020	% change	Productivity gain (Kg/ha/yr)
Afghanistan	2.05	1.29	1.47	1.94	1.93	-5.85	-24
Bangladesh	7.3	7.75	8.21	8.01	8.51	16.58	242
Bhutan	3.57	3.51	3.52	3.06	3.62	1.40	10
India	2.61	2.68	3.01	3.07	3.05	16.86	88
Nepal	2.5	2.55	2.72	2.81	2.96	18.40	92
Pakistan	4.54	4.71	4.96	5.61	5.97	31.50	286
Srilanka	3.6	3.72	3.81	3.87	4	11.11	80
South Asia	2.99	3.06	3.43	3.58	3.61	20.74	124

FAOSTAT,2021 and author analysis



Maize yield (Mt/ha) for selected S&SE Asia countries based on area coverage in 2020 (near to 1m and above ha)



CIMMYT products to partners

- In Pakistan 62 market ready hybrids and OPVs allocated to 22 partners
- Products include-
 - Climate resilient- Heat and drought tolerant, LN stress
 - Biofortified- QPM, PVA
 - White and yellow kernel hybrids and OPVs
- In Nepal 22 market ready products allocated to 8 partners
 - Climate resilient-early maturing, heat stress tolerant
 - Aflatoxin tolerant
 - Biofortified, QPM, QPM+PVA, Zn



Variety releases

- Between 2017 and 2021, South Asia released a total of 48 CIMMYT/IITA derived varieties
- Out of this, 50% (24) are from Pakistan and in 2020, Pakistan had the highest number of releases.



Maize variety releases-2017

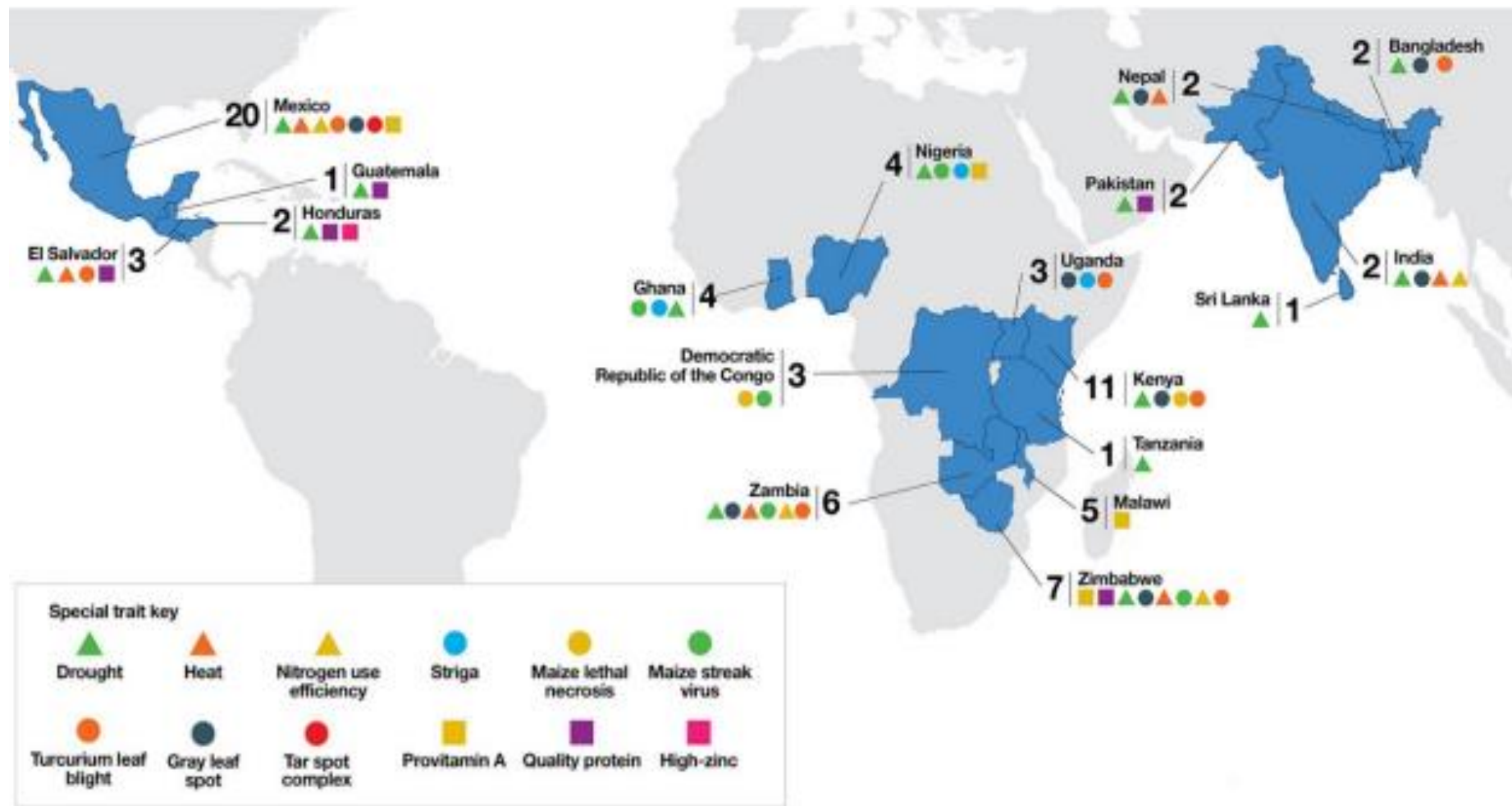
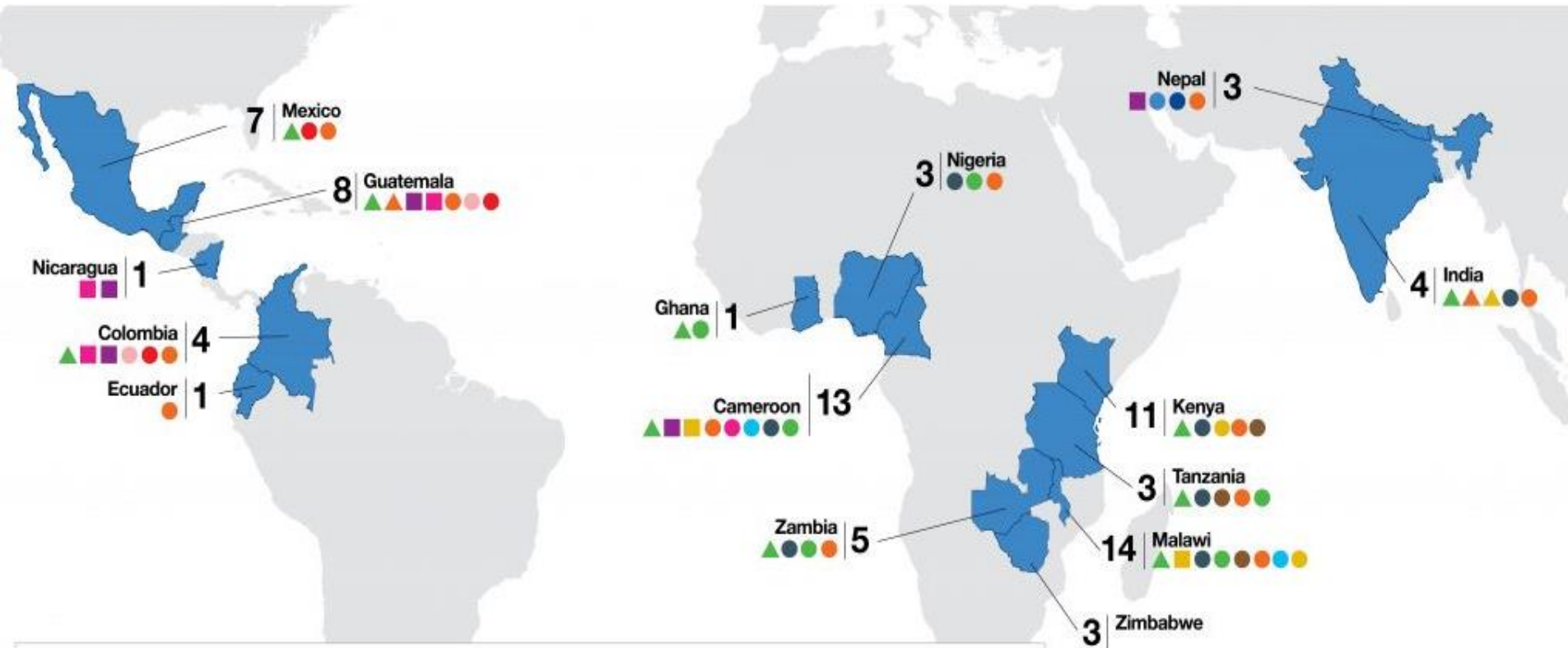


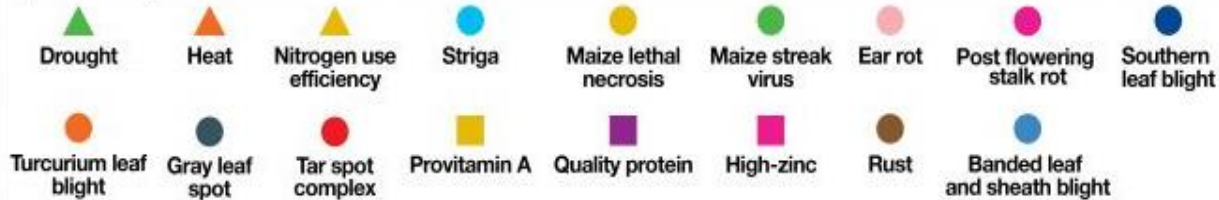
Figure 1: Elite maize varieties released by MAIZE CRP partners in 2017. with depiction of key traits.



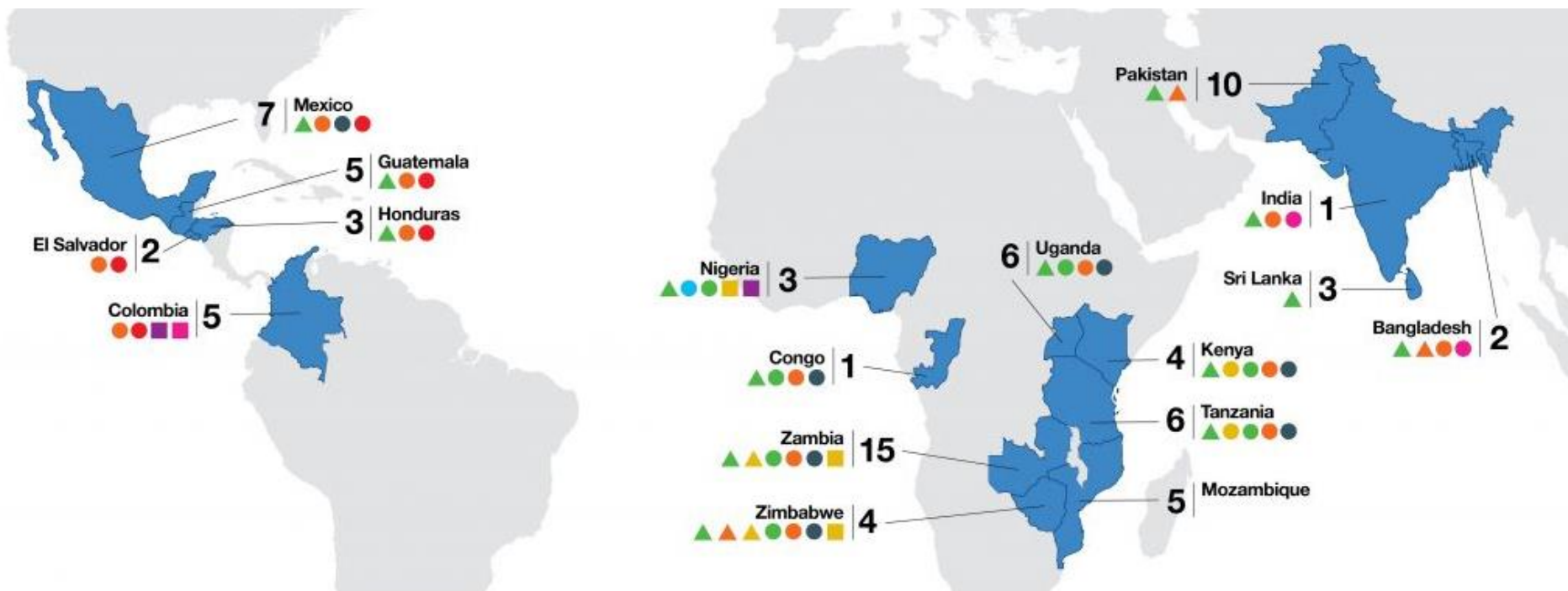
Maize variety releases-2018



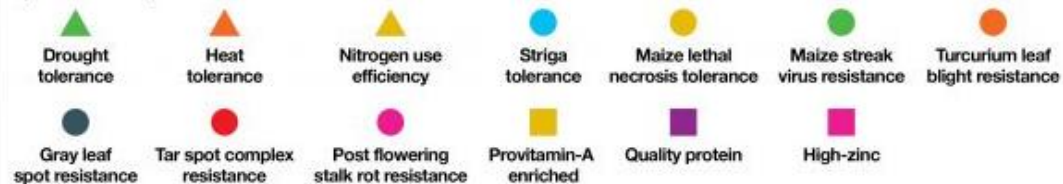
Special trait key



Maize variety releases-2019



Special trait key



Maize variety releases-2020

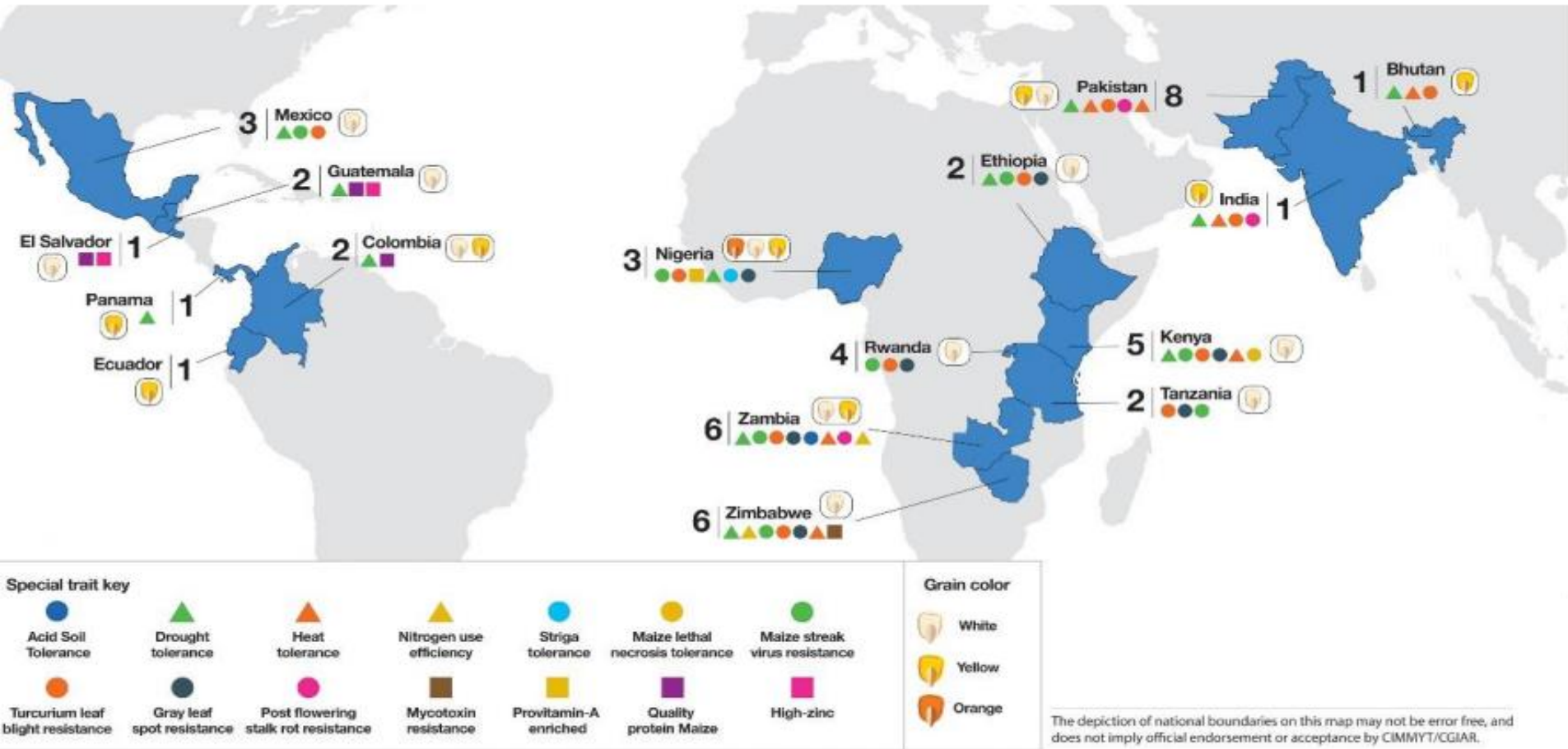


Figure 1: Elite maize varieties released by MAIZE CRP partners in 2020, with depiction of key traits.



Maize variety releases-2021

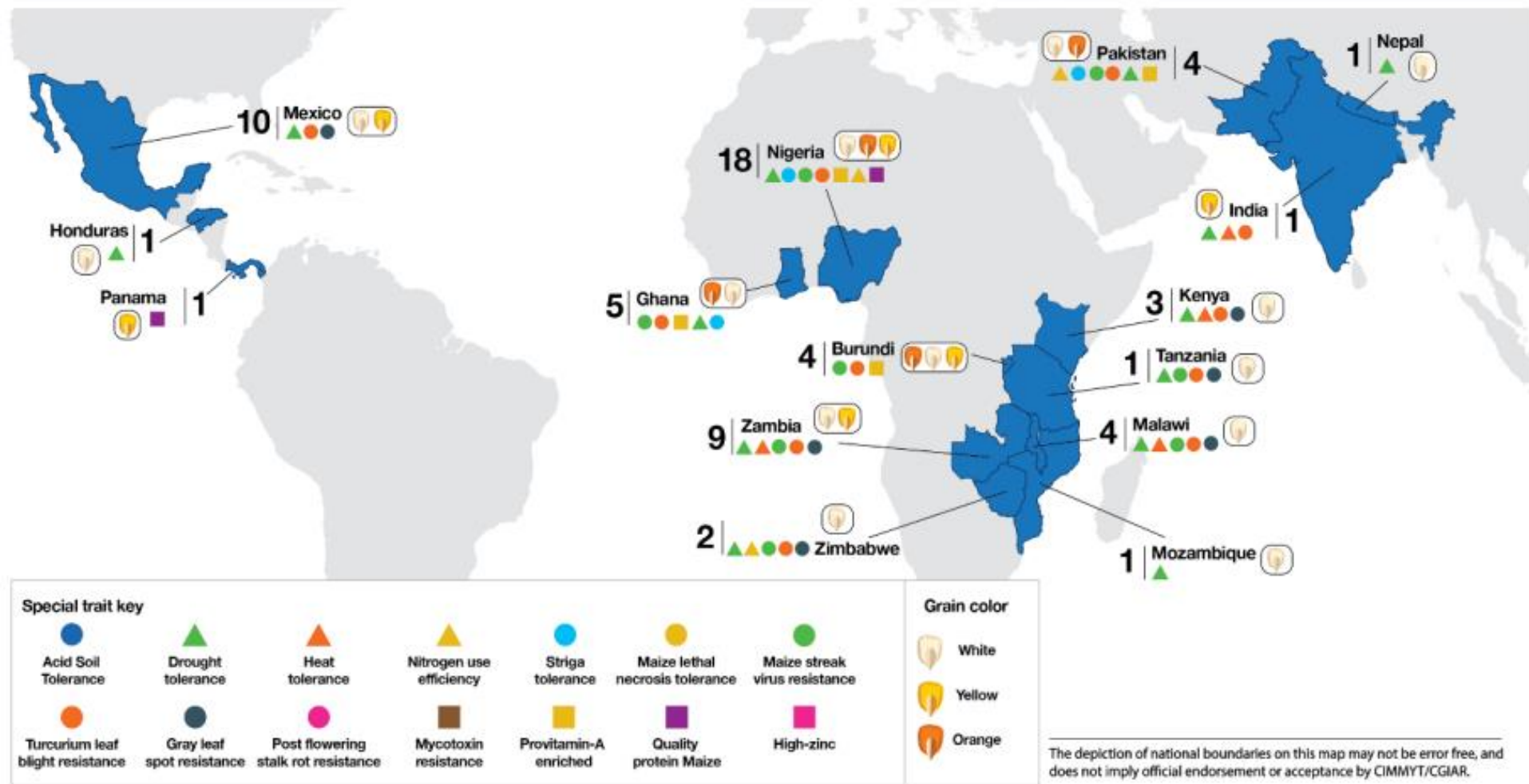


Figure 1: Elite maize varieties released by MAIZE CRP partners in 2021, with depiction of key traits.



Maize product profiles for the Asian Tropics



Demand Led Product Development (DLPD)- Market focus

- Product concepts based on market segments in south and South East Asia
 - SSE Asia Drought (SADT)- 1.3 million ha
 - SSE Asia Water logging +Drought (SAWLDT)- 3.86 million ha
 - SSE Asia Heat+ Drought (SAHDT)- 2.89 million ha
- Based on “must-have-traits” and “nice-to-have traits”

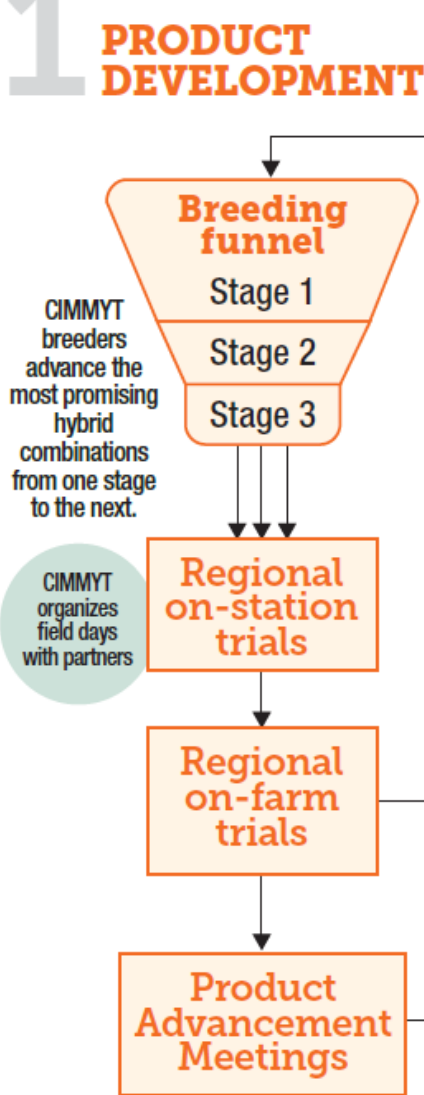




How does CIMMYT's IMPROVED MAIZE get to the farmer?

1

PRODUCT DEVELOPMENT



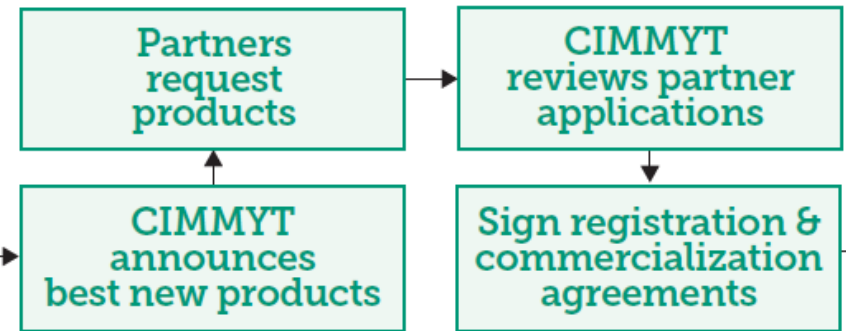
Feedback to inform breeding targets.

Assessment of farmer preferences and preferred traits.



2

PRODUCT ALLOCATION



3

RELEASE & COMMERCIALIZATION



Feedback from partners and impact assessment.



What CIMMYT offers hybrid licensees

- Permission to register and commercialize CIMMYT hybrid within a specific geography
- Geographic exclusivity (in most cases)
- No royalties or licensing fees
- Freedom to use parental lines for further breeding activities



What CIMMYT asks of licensees

- Nominal recovery for some of the costs associated with seed production and/or shipment
- Commitment to make a genuine effort to commercialize in each of the geographies under license
- Annual reports on progress towards commercialization milestones



Annual reporting: What, how and why?

- Progress towards commercialization of each product in each country
 - Have you received the seed from CIMMYT?
 - Have you presented it for release?
 - Has it been released? (When & under what name?)
 - Annual production (MT)
 - Annual sales (MT)
- Reporting now via online [questionnaire](#)



Annual reporting: What, how and why?

We ask for this information in order to:

- Make sure our products aren't just “sitting on the shelf”
- Learn what products are working and what aren't (and where), so as to further improve our breeding program
- Identify success stories and demonstrate the value and impact of CIMMYT's research, which can help encourage continued donor support



Annual reporting: What, how and why?

- **WE TAKE YOUR CONFIDENTIALITY SERIOUSLY!**
 - Only very few people within CIMMYT will have access to confidential information on a need-to-know basis, in order to generate aggregated figures for reports.
- Please be candid and honest
- We may follow up to confirm data provided, and possibly seek additional information



Evaluation Criteria for License Applicants

- Likelihood that seed will become widely available to smallholder farmers as soon as possible.
- Track record of the applicant as a CIMMYT collaborator.
- Investment by the applicant in variety testing and seed production.
- Diversity among suppliers of improved seed.
- Diversity of regions where the variety will be marketed.
- Relative importance of a variety for the variety portfolio or success of an applicant.



IP Ownership

- CIMMYT owns the intellectual property (IP) rights for the hybrids we develop, and of the parental lines
- We selectively license out the rights to other organizations to use the IP for certain purposes
- If a partner uses CIMMYT material to derive a new improved maize line, the partner will own the IP rights for the improved product, subject to the terms and conditions of the SMTA
- If a partner creates a new hybrid combination using CIMMYT lines (“combination hybrid”), the partner owns the IP of that hybrid combination (even if CIMMYT owns the IP of some or all of the individual lines)

Partners should still report the use of CIMMYT materials in any commercialized products.



Unique products allocations

- Provitamin A/Orange maize hybrids- 8
- Aflatoxin tolerant synthetics- 2
- PVA synthetics- 1
- Orange/yellow maize hybrids- 5
- New Specialty maize (pop & sweet corn) 2



- New products allocated to private seed companies who are now allowed to have R&D license in Nepal



International Maize Improvement Consortium for Asia Phase II (IMIC-Asia II) - India Chapter A Partnership for Targeted Impacts



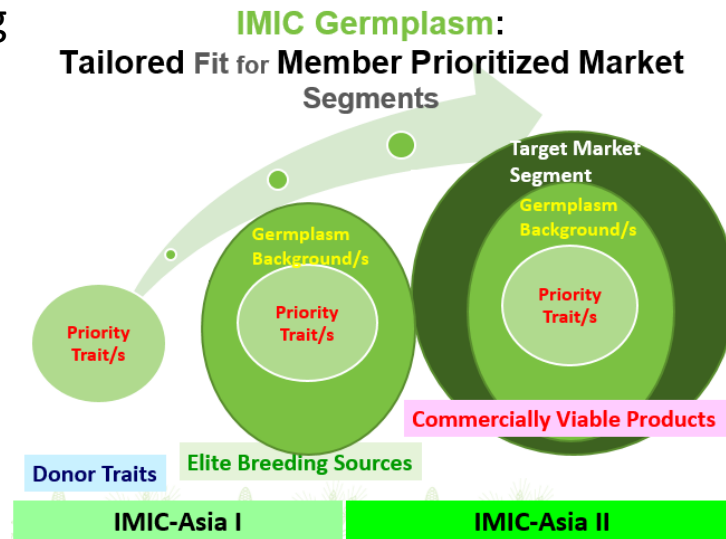
IMIC-Asia II Launch; 8 June 2017

- A model for intensive engagement, especially with private seed companies
- **Partners: maize R&D institutions including Indian Maize Program**
- Annual membership fee
 - ▶ Commitment, Accountability, Focus, Impact Tracking



Strengthening germplasm and its delivery through IMIC-Asia

- Platform for distribution of germplasm materials under development
 - Diverse and Elite Inbreds and Breeding Sources to IMIC Partners
- Expanded collaborative testing
- Shifted CIMMYT's breeding program from trait-based approach to developing commercially viable products
- Pulse of the farmer
 - Product profiles and trait priorities determined by members (based on market demand)



IMIC- Asia III Partners



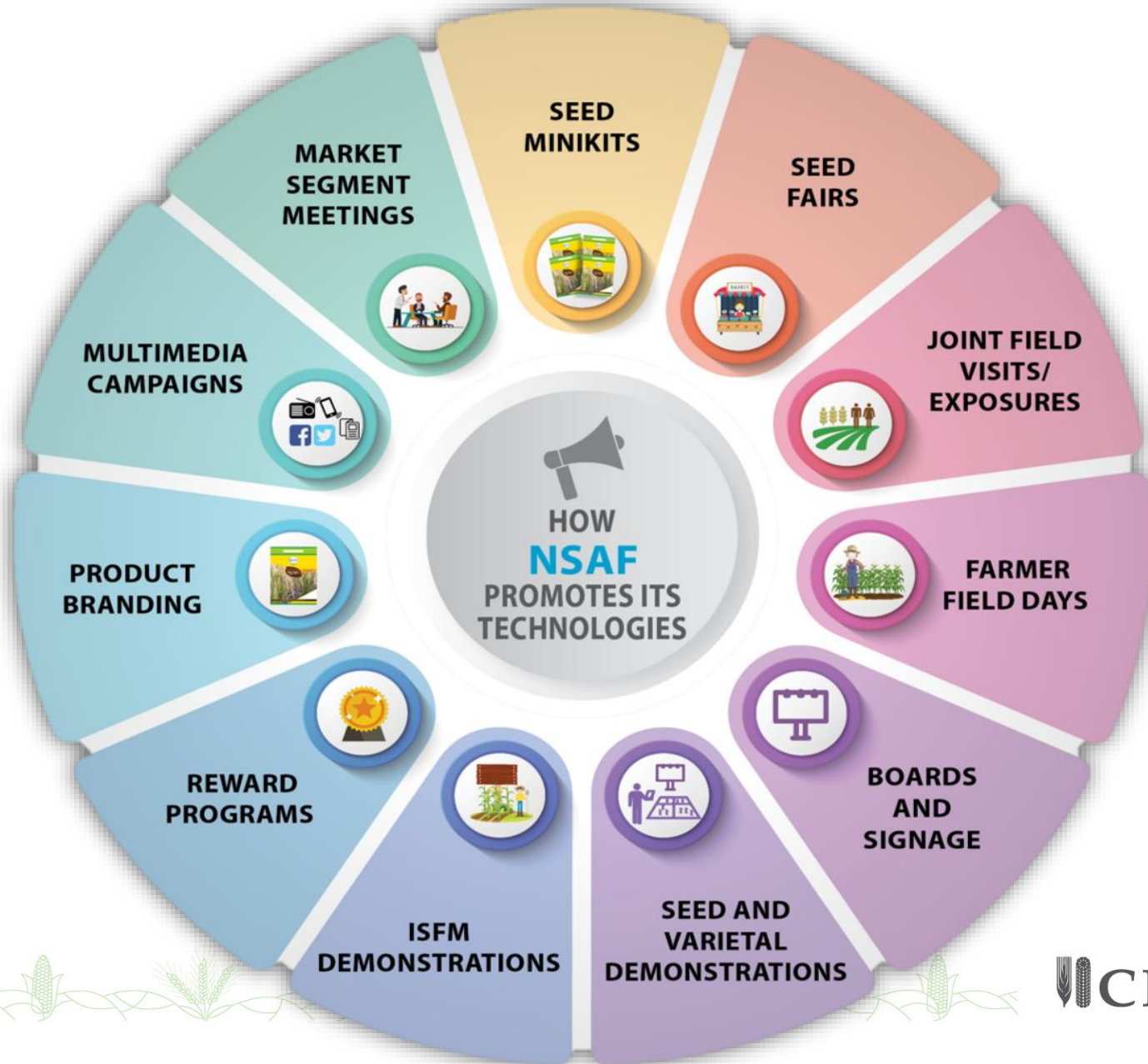
Sunrise Agri Tech Private Limited



22 seed companies + AICRP Maize led by ICAR-IIMR



Seed market systems interventions- case of NSAF



“Push-pull” approach

- Input and output market interventions
- Enhancing maize business ecosystem
- “Seed to feed”- Maize commercialization model-MCM
- Engage value chain actors
 - Farmers
 - Seed companies
 - Aggregators/wholesalers
 - Feed mills
 - Machinery service providers...etc
- Market segment traders meeting
- Promoting “Mystery shopping” in seed business



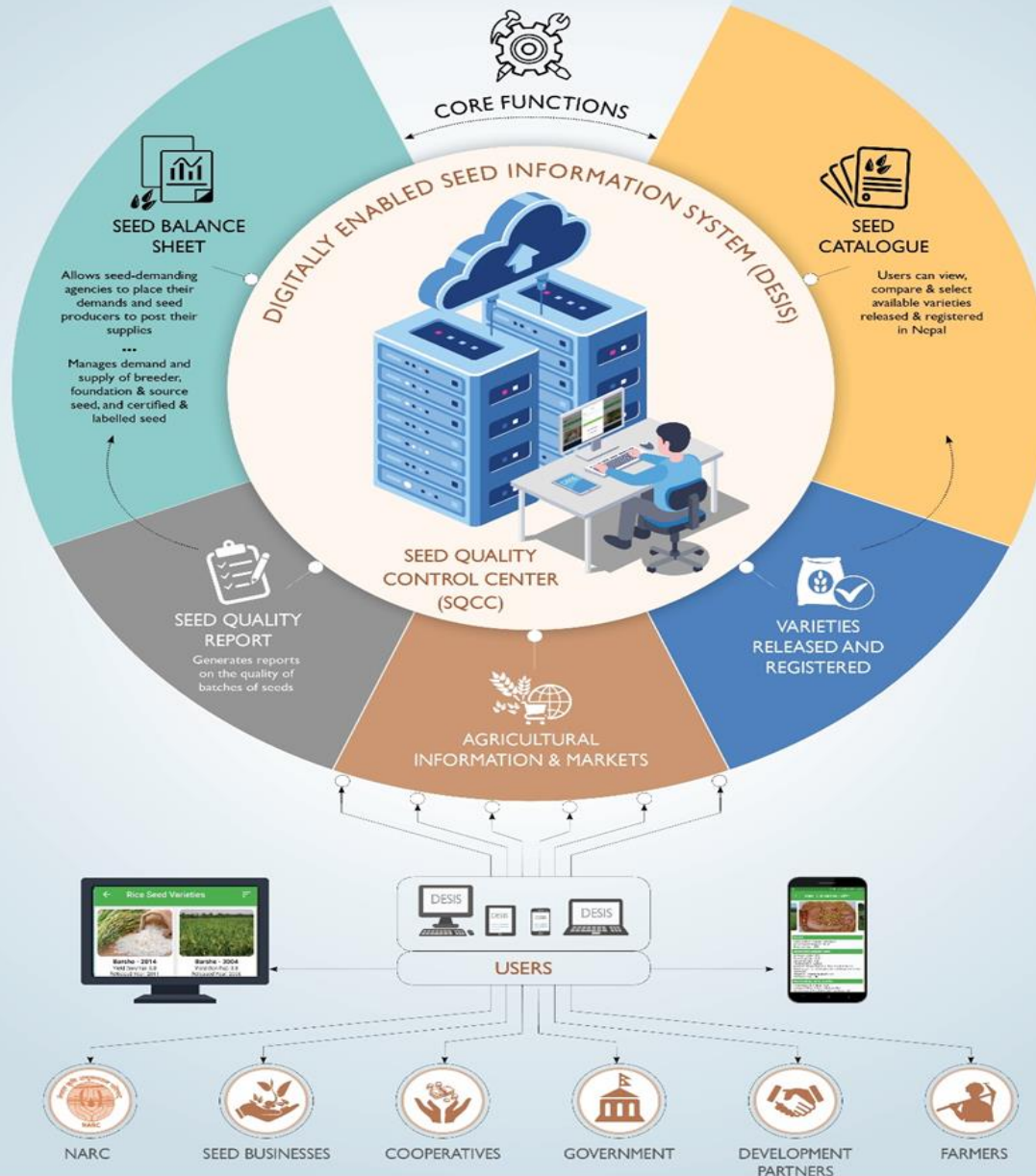
Digitally Enabled Seed Information System- the case of Nepal

- Demand and supply management
- Seed information portal
- Seed quality monitoring and tracking
- Digital seed inspection and certification
- In Nepal
 - Digital seed balance sheet
 - Digital varietal catalogue
- Harmonization of seed laws or regulation, e.g COMESA

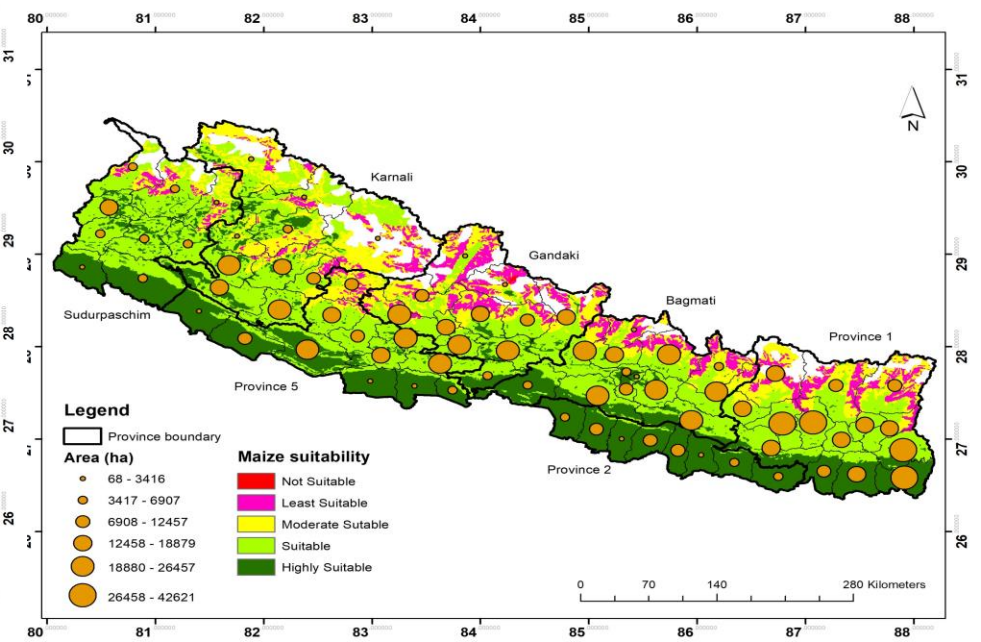
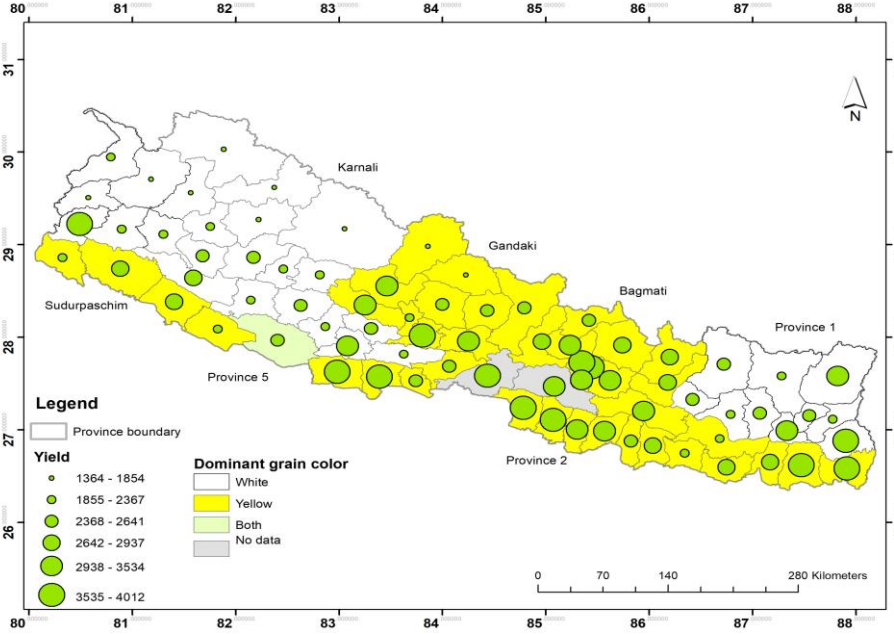
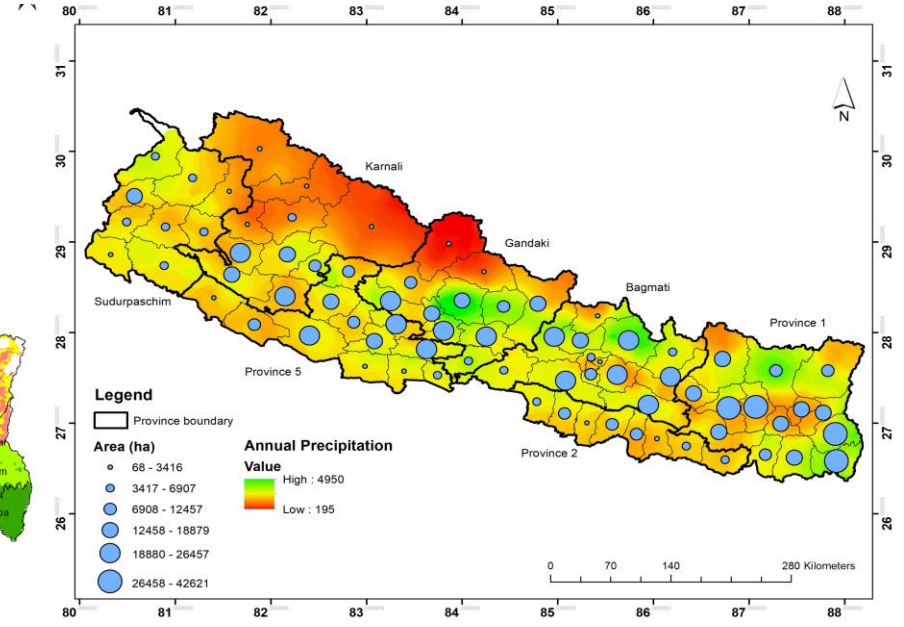
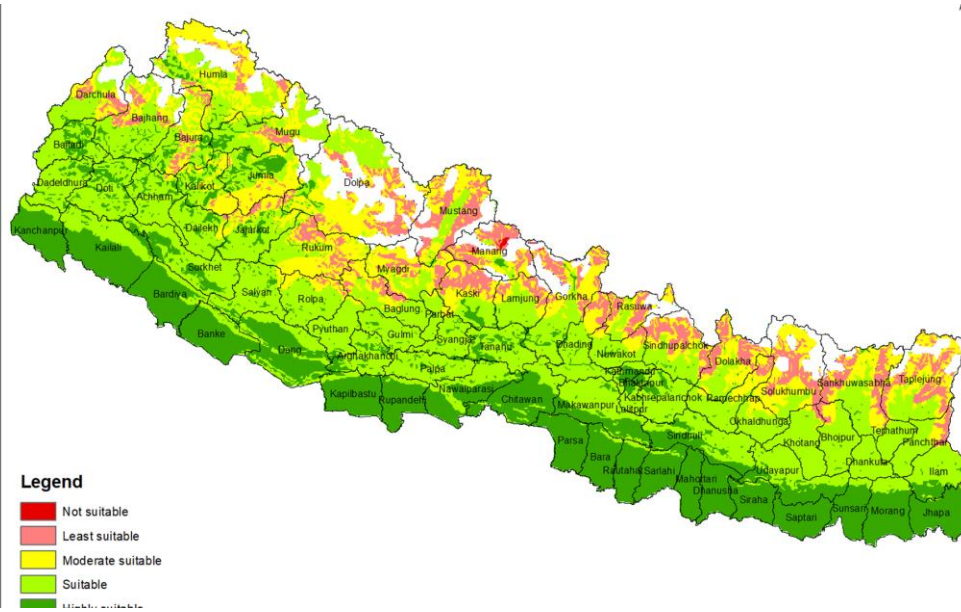


DIGITALLY ENABLED SEED INFORMATION SYSTEM (DESIS)

A real time and integrated national database on seed system managed by the Seed Quality Control Center (SQCC)



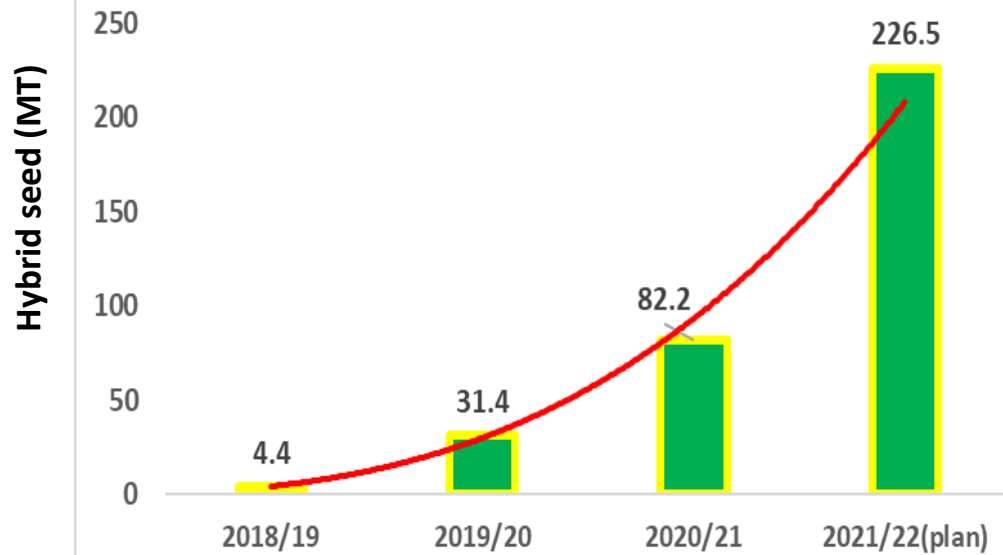
Data driven maize seed marketing



Hybrid maize seed production & scale-up

Journey towards self reliance

Hybrid maize seed production trend (MT)



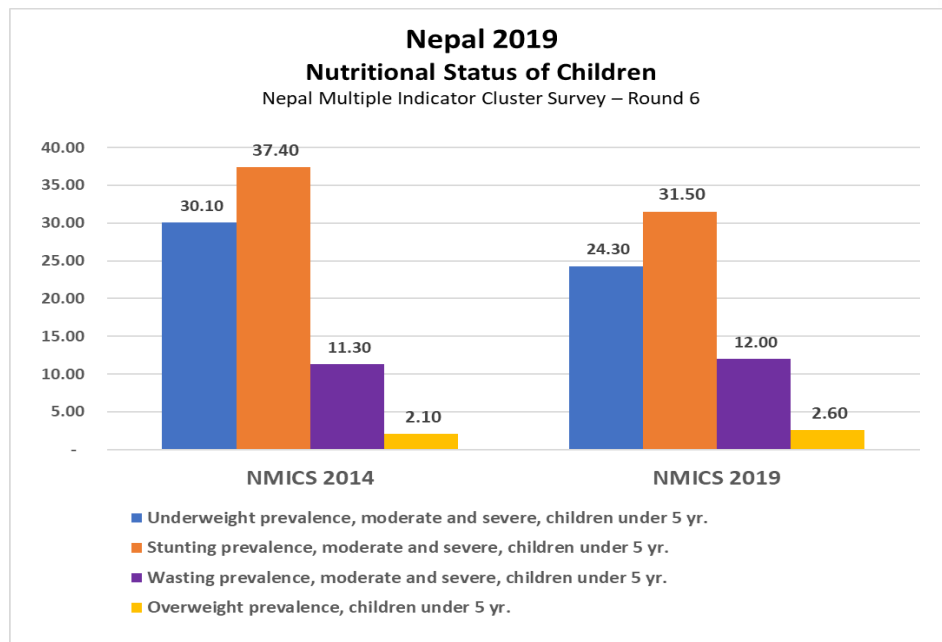
- Covers, 11,325 ha
- Production of 79,275 MT
- Generates 17 million USD
- App. 113,250 beneficiaries

- A joint effort by NARC and CIMMYT (under USAID's NSAF and HTMA projects)



PROMOTION OF BIOFORTIFIED PRODUCTS

Nutritional Status of Children



- PVA maize hybrid seed production
- Zinc enriched synthetic maize seed production
- QPM hybrids shared
- PVA+QPM maize hybrids under testing
- Promoting lentil- Khajura Masoro-3



On farm demonstration of PVA hybrid maize in Nepal



The first QPM hybrids approved for commercial Cultivation in 2017 in Pakistan

- **2 QPM Hybrids**

- QPHM200
- QPHM300



A poster for Quality Protein Maize (QPM) Hybrid Demo Seed. At the top, there are logos for the USA, USAID (with the tagline "FROM THE AMERICAN PEOPLE"), CIMMYT, and the Government of Pakistan (with the acronym "PARC" and the Pakistani flag). Below the logos, it says "USAID-funded Agricultural Innovation Program". The main title is "QUALITY PROTEIN MAIZE" in large black letters, with "Hybrid Demo Seed" in green below it. The central image shows a field of green corn plants with two large, ripe ears of yellow corn in the foreground. Overlaid on the corn is the text "Your Seal of Quality from the Field to the Fork". At the bottom right of the image, it says "QPHM 200". Below the image, the text "Salient Features of Quality Protein Maize:" is followed by a list of four bullet points, each with a green checkmark: "More rich in quality protein than normal maize", "Offers 90% of the nutritional value of skim milk", "Proven to reduce malnutrition in infants and children", and "Good source of protein for livestock, poultry, and the food industry". At the bottom right, there is a green box with the text "Net Weight (when Packed) 2 KG". At the very bottom, there is small text: "For More Information: Maize, Sorghum, Millet and Fodder Research Program, National Agricultural Research Center (NARC), CSI-Complex, Park Road, Islamabad, Pakistan. Telephone: +92 51 82550491 +92 51 96720553-8 www.aip.cimmyt.org".



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



Demo seed distribution of Zn enriched biofortified maize in Nepal



USAID
FROM THE AMERICAN PEOPLE

CIMMYT^{MR}
International Maize and Wheat Improvement Center

Capacity building across the maize seed value chain





Learning by doing

DH lines handed over to partners (UAF and MMRI in Pakistan)



National Maize Stem Borer Mass Rearing Laboratory -NARC-ISB



Regional hybrid maize seed business workshop in Nepal



International Seed Conference and Expert Consultation: Kathmandu Nepal



← Tweet



Dyutiman Choudhary

@Dyutimanshill

Dr. Aslam Yousuf from Pakistan talks about the willingness of regulatory bodies to reduce input dependence resulting in a supportive framework for growth of [#local](#) [#seed](#) businesses [#ISCNepal2019](#) [@CIMMYT](#) [@USAIDNepal](#)



Maize travelling seminar and exposure visits



Promoting inclusive seed system- the women



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



परियोजना कार्यान्वयन इकाई, सिन्धुपाल्चोक

खाद्यान्न तथा तरकारी बालीहरूको गुणस्तरीय बीउ
उत्पादन सम्बन्धी अगुवा महिला कृषकहरूको
क्षमता अभिवृद्धि तालिम

मिति : २०७६ असोज ८ र ९ गते

स्थान : बलेफी गा.पा.-५, सिन्धुपाल्चोक



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CIMMYT
अन्तर्राष्ट्रिय मकै तथा गहुँ सुधार केन्द्र

The youth



Useful links

- Maize hybrid & OPV licensing: <https://maizecatalog.cimmyt.org/>
- Maize Licensing portal: <https://cimmyt.inteum.com/cimmyt/agreementportal/>
- Maize product licensing principles/procedures: <https://www.cimmyt.org/content/uploads/2021/08/Acquisition-and-use-of-CIMMYT-maize-hybrids-and-OPVs-for-commercialization-v2021-08-19.pdf>
- CIMMYT service catalog: <https://www.cimmyt.org/services/>
- CIMMYT seed request page: <https://www.cimmyt.org/resources/seed-request/>
- Maize product announcements: <https://www.cimmyt.org/tag/allocations/>
- CIMMYT germplasm bank: <http://mgb.cimmyt.org/gringlobal/search>
- CIMMYT Maize Lines (CMLs): <https://data.cimmyt.org/dataset.xhtml?persistentId=hdl:11529/10246>



Acknowledgments

- NARS and Seed companies
- USAID's
 - Nepal Seed and Fertilizer Project
 - Agricultural Innovation Program for Pakistan
 - Heat stress tolerant maize for Asia
- IMIC-Asia
- Collogues of GMP of CIMMYT
- NSAF team
- AIP team





**Thank you
for your
interest!**