Genebanks of six global research institutions including ICRISAT have begun a 100-year experiment at the Svalbard Global Seed Vault in a quest to know how long seeds live. Data from seeds of 13 crops, four of which will be provided by ICRISAT’s genebank in India, will be collected during the experiment.

“ICRISAT will bring seeds of chickpea, groundnut, pearl millet and pigeonpea to the experiment during 2022-23. The seeds will be tested initially before being put in the vault for storage at -18 degree Celsius. They will be taken out for testing once every decade during the course of the next 100 years to determine longevity,” said Dr Vania Azevedo, Head of ICRISAT’s RS Paroda Genebank.

The first test sets deposited in the vault for the experiment on Thursday were barley, pea, wheat and lettuce produced by the German genebank IPK in Gatersleben. Over the next three years, six institutions will be placing seeds of other crops into the vault for the experiment. The crops and the participating institutions include–

**Rice** – The National Rice Seed Storage Laboratory for Genetic Resources (NRSSL) in Thailand

**Groundnut, chickpea, pearl millet and pigeonpea** – ICRISAT in India

**Maize** – Instituto Nacional de Investigação Agrária, (INIAV) in Portugal

**Soybean** – Empresa Brasileira de Pesquisa Agropecuária (Embrapa) in Brazil

**Barley, pea, wheat, lettuce and Brassica oleracea** (of the cabbage family) – The Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) in Germany

**Timothy** – Nordic Genetic Resource Centre (NordGen) in Sweden.

“This experiment will provide future generations with valuable information about seed viability and more precise knowledge of how often seeds need to be regenerated,” said Dr Asmund Asdal, Seed Vault Coordinator at NordGen, the genebank responsible for managing the project.

The main principle for conserving seeds is that well-dried and frozen seeds from many important food crops can stay alive for a very long time in a genebank. Exactly for how long seeds can maintain germination after storage under optimal conditions is not fully explored. But, it is assumed that seeds of many species can stay alive for centuries; some species may even survive for more than thousand years.

Genebanks test seeds in their collections regularly to be able to regenerate them in time and keep the genetic resources viable and available for research and plant breeding. Increased knowledge about how long seeds can stay alive will be extremely useful for the world’s genebanks and also for the management of the Svalbard

The Global Seed Vault in Svalbard.
Global Seed Vault, which is a facility where genebanks store duplicates of their primary seed collections as a security in case seeds are lost at home.

Many genebanks, including the ones participating in the experiment, are about five decades old and have accumulated some knowledge about seed longevity during the course of their work. However, that knowledge is far from complete as most of it was gathered during routine work without the specific purpose of measurement of long-term viability.

“In this experiment, all the variables that cannot be measured or recorded during the normal course of genebank operations will be measured using advanced techniques when learning about seed longevity. Seeds from multiple harvest years of different crops and differing varieties produced under varying conditions in diverse geographies are subject to extensive testing for germination and gene expression once a decade over a very long time. This kind of testing hasn’t been attempted before,” added Dr Azevedo.

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**Agri-buzz**

**Auctions in markets herald higher incomes for Malawi’s crop-livestock farmers**

Farmers in three districts of Malawi are able to earn more than they did from selling goats, thanks to a simple intervention that brought transparency, demand and competition for high quality meat.

It was the competition among buyers that increased the price for heavier goats of good quality, while the goats of poor quality fetched low prices,” observed Mr Bictor Chimtondo, a goat rearing farmer, during an auction at Kachala market in Malawi.

With vibrant goat markets and growing goat populations, the demand for goat meat is increasing in urban and rural areas in Malawi. Despite their growing importance as source of nutritious meat and income, goat value chains remain poorly commercialized.

Goats are of high value for farmers in the southern Malawi. One-in-three farmers own goats; a flock size of up to 10 goats provides regular supplementary income. Women and men seem equally successful in raising profits from goats. The money from goat sales is used to buy inputs for crop production or food during periods of shortage and to pay for the education of children. However, farmers benefit very little from their sales especially due to low prices that they fetch through farm-gate sales, the predominant market channel. For instance, at the beginning of planting season, goat prices usually plummet due to increased supply. The demand for goat meat peaks only two months after, during the festive season towards the end of the year.

To push for higher quality in goat markets and better reward farmers for investing in enhancing quality of their goats, the CLIM-project piloted goat auction sales between October 2019 and February 2020 in the three project districts – Balaka, Chiradzulu and Thyolo.

**Direct impacts of goat auction sales**

Sales records illustrate that goats sold through auctions where they are weighed and the weight announced fetched on average 6% higher prices than those through conventional sales.

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*Photo: Temwa Mvula*
“The use of weighing scale worked to our advantage as we knew the weight of the live goat before selling. Knowing the weight of the goat helped determine the price,” says Mrs. Chisinga, who sold her goat of 24 kg at a price of K 17,000 (US$ 23) on the market day.

### Table 1. Average selling/buying prices per kg live-weight of goats at different markets

<table>
<thead>
<tr>
<th>Market site</th>
<th>Type of market</th>
<th>Number of goats traded</th>
<th>Average selling price per kg live weight (Mk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chikwakwata Chiradzulu</td>
<td>Auction</td>
<td>18</td>
<td>850</td>
</tr>
<tr>
<td>Kachala Balaka</td>
<td>Auction</td>
<td>12</td>
<td>883</td>
</tr>
<tr>
<td></td>
<td>Non-auction</td>
<td>3</td>
<td>796</td>
</tr>
<tr>
<td>Kamala Chiradzulu</td>
<td>Auction</td>
<td>12</td>
<td>498</td>
</tr>
<tr>
<td>Thekerani Thyolo</td>
<td>Auction</td>
<td>16</td>
<td>749</td>
</tr>
<tr>
<td></td>
<td>Non-auction</td>
<td>15</td>
<td>726</td>
</tr>
<tr>
<td>Total</td>
<td>Auction</td>
<td>58</td>
<td>787</td>
</tr>
<tr>
<td></td>
<td>Non-auction</td>
<td>18</td>
<td>737</td>
</tr>
</tbody>
</table>

The prospect of securing higher prices at goat auction sales motivate farmers to give supplementary feed to their livestock. Even though supplementary feeding leads to substantial weight gains, conventional market sales do not pay off the cost of feed. Feed technology improvement alone is thus not sufficient. It has to go hand in hand with market improvement, for farmers to improve their goat business at a profit.

**How auction sales work?**

The success of auctions hinges on collaboration between all stakeholders in Malawi’s goat value chain. The CLIM2 project initiated pilot auction sales that brought together farmers wanting to sell their goats, vendors, butchers and government extension.

**Understanding goat quality:**

The auction sale opened with farmers and buyers exchanging information on goat quality that they believed would sell well.

1. Farmers and buyers described attributes of a good quality goat from their perspectives.
2. They identified a goat that represented good quality.
3. Both farmers and buyers discovered that they shared the same understanding. A good quality goat has attributes of sleek skin, high weight and visible fat on the bone.

- **The auctioning process:** A portable digital scale was used to determine the weight of goats. The animal owners then indicated an expected price, which the auctioneer, represented by the local agricultural extension officer, announced to the buyers. The bidding continued until the final price was reached. The farmer had a final say to sell their goat or not incase buyers bid prices lower than the expected price. A record of the number of farmers and buyers was kept.

- **Benefits from auction sales:** Buyers competed for good-quality goats and those goats sold faster, indicating to farmers what type of goat the market wants and the prices they can expect. Farmers appreciated transparent price setting at the auction and understood that it can help keep theft under control. Buyers found quality products easily and at reduced transport costs, when normally they would spend time and resources searching for goats at farm gates. Government’s extension staff witnessed how this simple model conveyed higher returns to farmer and buyers.

**Recommendations**

While goats are high value for farmers in the southern region of Malawi, they fall lowest on the priority list in terms of government support relative to other commodities in the agricultural sector. Absence of adequate goat market facilities significantly hinders efforts to alleviate poverty, improve nutrition and food security. Agricultural interventions must therefore go beyond increasing productivity; active support of goat markets is required with conditions conducive for investing in goat markets and for farmers to be rewarded for their efforts.
With conventional goat markets not distinguishing goat meat quality, consumers fail to get the meat quality that they would be willing to pay for; the high demand for goat meat is also reflected in higher prices of goat meat than beef. Furthermore, transparent weighing mechanisms, e.g. through mobile scales, bring objectivity in the pricing.

Creating parallel channels through the auction model is a way to make available quality meat to consumers with benefits to the entire value chain. Gross margin analyses illustrated that auction sales conveyed higher returns to farmers, vendors and butchers.

By bidding for better quality goats, everyone quickly learned what the market wants. The auction model can also be used to instill an understanding of market criteria, the use of mobile scales and facilities for interactions between farmers and buyers.

Goat auctions present business opportunities for farmers and individual entrepreneurs. Agricultural extension services could use the model as strategic tool for stimulating productivity and profitability at a large scale in the smallholder sector.

Incentives can be introduced for farmers to organize themselves around goat markets, e.g. the auction model to stipulate quality production and pricing. For local empowerment, district level farmer groups and authorities must regularly conduct auction sales.

Authors
Drs Ken Gunsalu, Chamuka Thebulo, Temwa Mwula, Donald Kaonga, Sabine Homann-Kee Tui and Sikhalazo Dube

This work contributes to UN Sustainable Development Goals
Access to, and benefit sharing of plant genetic resources critical to global food and agriculture scenario, say experts

Genetic resources are universal and meant to be shared equitably; national biodiversity policy should be framed around this key idea. Experts in plant genetic resources, biodiversity and policy met virtually to discuss how to develop supporting evidence for such policies. CGIAR's genebanks and their contribution in this area was also highlighted at this webinar, 'Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS)' last week in India.

Flagging off the webinar, Dr Kuldeep Singh, Director, ICAR-National Bureau of Plant Genetic Resources (NBPGR), set the context of the event saying that although access to genetic resources had been largely streamlined, globally as well as in India, there was still much to be done in terms of true sharing of genetic resources and benefits.

Dr VB Mathur, Chairperson, National Biodiversity Authority, discussed the scope and goals of impending amendments to the Access and Benefit Sharing (ABS) guidelines that would better address concerns of all relevant stakeholders. Digitalization and increased transparency of the process is a critical step in this direction, he said.

Dr Juan Lucas Restrepo, Director General, Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT), named India as one of the frontrunners in putting in guidelines for ABS of germplasm; however, he highlighted the need for a wider availability and accessibility of genetic resources across geographies.

Dr Trilochan Mohapatra, Secretary, DARE and Director General, ICAR, hailed the discussion as a much-needed one for developing evidence-based recommendations for the Indian government to implement.

Dr RS Paroda, President, Indian Society of Plant Genetic Resources; and Chairperson, TAAS, reiterated the two basic premises for genetic resources. 1. Genetic resources are the heritage of all humankind, and 2. They are freely available for sharing among all. He affirmed that regulations for access to genetic resources should be for the purpose of creating a system of facilitation, rather than a hindrance.

Dr Vania Azevedo, Head, ICRISAT Genebank, presented the experiences of being part of a CGIAR genebank system with respect to ABS related to plant genetic resources related to food and agriculture. Enumerating the huge number of accessions (700,000) stored in CGIAR genebanks across 11 institutes, including ICRISAT, she clarified that CGIAR genebanks:
Hold the accessions in trust; do not own them.
Conserve the genetic resources for users around the world
Meet and even exceed international quality standards
Are subject to policy guidance of the international community
Provide access to the material for free (or minimal operational cost) for use in food and agriculture
Are under contract approved by international community.

From the CGIAR’s viewpoint Dr Vania highlighted the treaties and ‘in-trust’ agreements with FAO, which defined the rules of benefit sharing of the material. “CGIAR is very active in implementing and guaranteeing benefit sharing in several ways,” she said. “For example, in the last decade over a million samples have been distributed from various CGIAR Genebanks.”

Dr Vania reiterated that redistributing genetic material to users around the world was critical, as “plant genetic resources are of no use if they stay only in freezers or breeding stations.”

“CGIAR fulfills the obligation to share benefits not only by making genebank accessions available, but also the materials developed by breeding programs, and the relevant data generated. It also enables capacity building via frequent short- and medium-term training programs and courses at different levels,” said Dr Vania.

Several other eminent speakers gave their viewpoints on top priorities of plant genetic diversity for authorities to focus on. The overall recommendation was for greater convergence between various regulatory bodies and enhanced consultation with all stakeholders for a more balanced approach.

The webinar was conducted on 27 August 2020 and was chaired by Dr RS Paroda. Dr Mohapatra was the Chief Guest, while Dr Juan Lucas Restrepo was the Guest of Honor.

Click here to watch the video of the event: https://www.youtube.com/watch?v=oTzClNr4wYk

The ICRISAT Genebank conserves 128,155 accessions of 6 mandate crops and 5 small millets, originated from 148 countries.
Over 113,000 accessions safely duplicated at Svalbard Global Seed Vault, Norway.

The ICRISAT Genebank conserves 128,155 accessions of 6 mandate crops and 5 small millets, originated from 148 countries.
Over 113,000 accessions safely duplicated at Svalbard Global Seed Vault, Norway.
Webinar

Understanding Indian legal framework for protecting intellectual property in crop research

The Plant Variety Journal of India will hereon publish Distinctness, Uniformity and Stability (DUS) testing results of crops in India. The testing phase is the most important step in the plant variety registration process and publication of testing data is to ensure transparency, emphasized Dr TK Nagarathna, Registrar at Government of India’s Protection of Plant Varieties and Farmers’ Rights Authority, at a webinar on 26th August 2020.

The journal will start publishing DUS data from its August issue. “The passport information in the journal will provide a hyperlink that can be used to check DUS data online. The photographs will also be published,” Dr Nagarathna said. She was speaking at a webinar organised by the European Business & Technology Centre (EBTC) and the Intellectual Property Facilitation Cell (IPFC) at AIP of ICRISAT on ‘Legal framework for Protection of Plant varieties in India: Challenges and Opportunities’.

Speakers at the webinar introduced Indian law governing intellectual property in crops research, focusing on the Protection of Plant Varieties and Farmers’ Rights Act (PPVFR). They also stressed the importance of registering varieties – both extant and new - to safeguard intellectual property rights. Practitioners of IP law, the regulatory authority, and researchers participated in this first-in-a-series webinar.

Dr Kalpana Sastry, a well-known researcher from the ICAR system who has worked extensively with scientists and entrepreneurs noted pendency in clearing registration applications and lack of awareness of legal rights and guarantees among farmers as challenges faced by users, specifically public sector institutions.

Dr Neeti Wilson, a lawyer specializing in IP management and a partner at the law firm Anand & Anand, provided an overview of international treaties and laws. She discussed CBD, TRIPS, ITPGRFA and statutes in Indian legal system for IP management with respect to plant varieties, farmers’ and breeders’ rights. Dr Wilson noted that the 15-day period given by the Plant Variety Authority to respond to queries raised is often inadequate for scientists or institutions. She recommended a reconsideration of timelines during the application filing process.

Dr Nagarathna noted that a new time-targeted system has been implemented after September 2018 which has expedited the registration process. The new system has helped clear applications faster in the last two years and has also reduced pendency, she said. She added that the government will soon roll out an online system for filing applications which will help expedite the process.

Other takeaways from the webinar:
• The deadline for sending applications for registration has been extended by three months (until October 2020) due to the pandemic.
• Frequently asked questions (FAQs) on the PPVFR website were updated in the last week of August. They are now open to public.
• To protect the interest of plant breeder, the Plant Protection Authority has provided provisional protection for breeders for the period between date of application and date of grant.
• DNA fingerprinting is now added to the DUS testing of a plant variety along with the regular field testing protocols
• PPVFR’s has revised its focus on Post-PVP registration scenario, including plans to assist commercialisation and bring monetary benefits to the registered varieties.

A panel discussion followed the presentations. Dr Surya Mani Tripathi, Legal Counsel, ICRISAT, and Ms Hana Onderkova, Head, IP, EBTC, moderated the discussion.

Dr Tripathi highlighted matters including infringement while discussing rights under PPVFR. Dr Wilson noted that in case of infringement, all data and evidence of infringement should be gathered. Having up-to-date certification and testing data, including a DNA test and other lab tests results, is useful to counter infringement, she said.

A recording of the webinar can be viewed here https://youtu.be/4fV5KVplwDE.
**Events**

**Webinar on Millets as Smart Foods – USP for Millet Marketing as good for you, the planet and the farmer**

**September 5 @ 9:30 am - 1:30 pm IST**

Organized by Nutrihub, Technology Business Incubator of ICAR-Indian Institute of Millet Research, for entrepreneurs/startups, farmers and agriculture officers.

**Chief Guest:** Dr R Hemalatha, Director of Indian Council of Medical Research-National Institute of Nutrition. [Read more](#)

**Award**

Dr Sudarshan Patil K, a research scholar in Pearl Millet Breeding at ICRISAT, was awarded the Neelamraju Gangaprasada Rao and N Kamala Gold Medal during the fourth convocation of Prof. Jayashankar Telangana State Agricultural University (PJTSAU), Hyderabad, on 27 August. Dr Tamilisai Soundararajan, Governor of Telangana and Chancellor of PJTSAU, presided over the virtual awards ceremony.

Dr Patil was awarded for securing the highest overall GPA in the Department of Genetics and Plant Breeding. His doctoral research, ‘Marker based heterotic pooling of diverse Asian and African pearl millet populations’, was supervised by Dr SK Gupta, Principal Scientist, ICRISAT. Dr Patil was also a recipient of CRP-Dryland Cereals International Scholarship for his work during 2015-2017 at ICRISAT and is . Findings from his research work were recently published in the journal [Crop Science](#).

**Webinar on Mass Rearing of the Parasitoids of Fall Armyworm**

Dr Sudarshan Patil (R) being awarded at PJTSAU convocation.
New publications

**Nutrient-dense orange-fleshed sweet potato: Advances in drought-tolerance breeding and understanding of management practices for sustainable next-generation cropping systems in Sub-Saharan Africa**

**Authors:** Low JW, Ortiz R, Vandamme E, Andrade M, Biazin B and Grüneberg WJ

**Published:** Frontiers in Sustainable Food Systems, 4. pp. 1-22. ISSN 2571-581X


**SyBrid - A new breeding method for food legumes**

**Authors:** Saxena KB

**Published:** International Journal of Science and Research (USR), 9 (6). pp. 899-900. ISSN 2319-7064

[http://oar.icrisat.org/11562/](http://oar.icrisat.org/11562/)

**Can pigeonpea hybrids negotiate stresses better than inbred cultivars?**

**Authors:** Saxena KB, Choudhary AK, Saxena RK and Chauhan YS

**Published:** Breeding Science. pp. 1-7. ISSN 1344-7610


**PANOMICS meets germplasm**

**Authors:** Weckwerth W, Ghatak A, Bellaire A, Chaturvedi P and Varshney RK

**Published:** Plant Biotechnology Journal (TSI), 18 (7). pp. 1507-1525. ISSN 1467-7644

[http://oar.icrisat.org/11557/](http://oar.icrisat.org/11557/)

**Crop type identification and spatial mapping using Sentinel-2 satellite data with focus on field-level information**

**Authors:** Gumma MK, Tummala K, Dixit S, Collivignarelli F, Holecz F, Kolli RN and Whitbread AM

**Published:** Geocarto International (TSI). pp. 1-17. ISSN 1010-6049

[http://oar.icrisat.org/11558](http://oar.icrisat.org/11558)

**Limits of conservation agriculture to overcome low crop yields in Sub-Saharan Africa**

**Authors:** Corbeels M, Naudin K, Whitbread AM, Kühne R and Letourmy P

**Published:** Nature Food (TSI), 1 (7). pp. 447-454. ISSN 2662-1355

[http://oar.icrisat.org/11564/](http://oar.icrisat.org/11564/)

**Strategic framework to foster grain legume and dryland cereal seed systems innovations: Guidelines to drive seed delivery systems through commodity value chains**

**Authors:** Ojiewo C, Akpo E, Hagmann J and Varshney RK

**Published:** Manual. ICRISAT


**Dissection of the genetic basis of oil content in Chinese peanut cultivars through association mapping**


**Published:** BMC Genetics (TSI), 21 (1). pp. 1-12. ISSN 1471-2156

[http://oar.icrisat.org/11560/](http://oar.icrisat.org/11560/)

**Modelling climate change impacts on maize yields under low nitrogen input conditions in Sub-Saharan Africa**


**Published:** Global Change Biology (TSI). pp. 1-23. ISSN 1354-1013


**Arresting soil erosion in hilly terrains with pigeonpea - the Chinese experience**

**Authors:** Saxena KB and Kumar RV

**Published:** International Journal of Science and Research (USR), 9 (6). pp. 896-898. ISSN 2319-7064

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