Science IMPACTS

Transforming Wheat Production in Hot Environments in Africa

The Case of Sudan

The Challenge

Heat stress in sub-Saharan Africa is a major constraint on wheat production. Low and inconsistent yields restrict farmer incomes, and force countries to increase their dependence on foreign imports as demand for wheat grows.

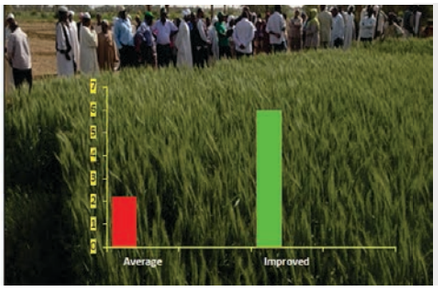
Heat - tolerant wheat varieties are transforming wheat production in Sudan. Generating stable yields of up to six tons per hectare, their introduction has raised farmer productivity and incomes , and convinced policymakers to invest in wheat production as a means of reducing the country's growing dependence on imported wheat.

Temperatures in Sudan during the wheat growing season often exceed 38 degrees Celsius (°C), an intense heat that negatively affects crop performance and limits yields – the national yield average for wheat is only two tons per hectare (t/ha), and can often be much lower. Predictions suggest that climate change will make this situation worse, and there are signs that conditions are already becoming harsher - last year, only eleven successive cold days were recorded (calculated at 12 - 18 ° C).

Heat-tolerant wheat varieties, developed by ICARDA and Sudan's Agricultural Research Corporation (ARC), are helping farmers adapt to this situation, however, bringing higher and more stable yields. Farmers across the wheat-producing regions of Sudan are now achieving up to six t/ha over successive growing seasons. The impact: higher and more stable incomes.

"It is clear that these new varieties have adapted to the harsh conditions prevalent in Sudan successfully" says Prof. Ibrahim Eldukheri, Director General of ARC, referring to the successful introduction of heat-tolerant wheat varieties. "We have proved that if you have the land and the right application of science and technology you can always grow wheat."

Approximately 7500 farmers have been reached through different technological interventions including improved seed – a number expected to grow as word spreads. The new varieties have also become a crucial component of Sudan's 'agricultural transformation' strategy for wheat – the area growth of this strategic crop is expected to increase from 300,000 ha to half a million ha over the coming three years.



Improved heat - tolerant wheat varieties yield up to 6t/ha in Sudan, way above the national average of 2 t/ha

An integrated 'systems' approach

The improved varieties are being introduced as part of an initiative to boost wheat production across twelve sub-Saharan African countries. Working through the wheat component of the project, Support to Agricultural Research for Development of Strategic Commodities in Africa (SARD-SC), funded by the African Development Bank (AfDB), the initiative is pursuing a strategic agenda of food security and self-sufficiency.

Successes are not down to the introduction of improved varieties alone. Seed is being disseminated alongside a package of interventions aimed at transforming wheat production. Efforts are incorporating a full range of interventions, including: optimal land preparation and sowing dates, integrated pest management, and more efficient irrigation systems. While seed is the crucial ingredient in Sudan's wheat transformation, this alone will not bring the required change.

PROJECT IN NUMBERS:

- More than 7500 farmers have been reached through different technological interventions including improved seed. Farmers are achieving yields of up to 6 t/ha and even more in relatively less heat-stressed areas–way above the national average of 2t/ha.
- Heat - tolerant varieties are thriving in temperatures that often exceed 38 ° C.
- The area devoted to wheat production is expected to increase from 300,000 to half a million ha over the next three years.

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Science for Better Livelihoods in Dry Areas

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A National Wheat Field Day in The Gezira Scheme of Sudan, was inaugurated by H.E The Vice President of Sudan, The ICARDA Director General and other Senior Sudanese Officials.

Innovation Platforms

Solutions are also being disseminated through 'innovation platforms ' a unique and participatory research dissemination strategy that brings together all stakeholder groups – policymakers, scientists, extensionists, farmers, and the private sector – to identify challenges and jointly define the solutions required to overcome these challenges .

"The innovation platform approach is working – we have witnessed farmers, policymakers, extentionists , and other stakeholders, all working together as a team to define priorities and collaboratively implement the efforts needed to realize the country's wheat production potential," says Solomon Assefa, the ICARDA scientist responsible for coordinating the SARD-SC (Wheat) initiative. So successful has the approach been that the Sudanese government is now applying the model to the production systems of all its major agricultural commodities , including food legumes.

Field days organized at Innovation Platform (IP) sites provide a good opportunity for exchange of useful information among the wheat value chain stakeholders on wheat issues and solutions (2014).

Changing mindsets

The success also has policy implications: it is convincing the country's decision makers that domestic wheat production is a solution to Sudan's growing dependence on wheat imports.

Sudan currently produces only 30% of the wheat it consumes and imports some 1.5 million tons of wheat each year – a dependence that exposes its growing population to the vagaries of global commodity markets. Domestic production therefore means food security and protection from food crises and rising prices for basic food items.

Once considered not suitable for the hot, dry conditions prevalent across Sudan, the success of heat-tolerant wheat has changed perspectives, convincing many that wheat has a productive future in the country. Successes could also be replicated elsewhere: the higher yields, reduced import dependence, and effective dissemination strategy being implemented in Sudan provide a model for countries across sub-Saharan Africa where similar conditions and levels of import dependence prevail.

"People thought that wheat could not be grown successfully here," comments Izzat Tahir, national coordinator for SARD-SC (Wheat). "But we have proved otherwise, and our success here means that we can provide a model for neighboring countries whose policymakers can apply it to their own context, implementing their own transformative wheat production plans."

POLICY IMPACT

- Innovation Platform approach applied by the Sudanese Officials as a model to the production systems of all major agricultural commodities.
- Guaranteed minimum purchase price for wheat committed by the government.
- Subsidized wheat fertilizers and herbicides.
- Access to credit for wheat growers.

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Project Contact:
Dr. Solomon Gizaw Assefa
(S.Assefa@cgiar.org)
For more information visit:
www.sard-sc-wheat.icarda.org