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Factors for Increasing Trends in Quinoa Production in Eastern Bhutan

CARLEP

Quinoa In Bhutan

Improving the nutritive quality of grains can help reduce the challenges in food security and climate change impacts. Quinoa – *Chenopodium quinoa* Willd offers an alternative option to those countries suffering from food insecurity and food shortage.

In Bhutan, Chenopodium *album* is widely found as a weed while a wild type is said to be cultivated in backyards in remote villages in east and central Bhutan but its identification is not yet clear. The proper cultivation of known quinoa varieties began only in 2015 when Department of Agriculture, MoAF with assistance of Food and Agriculture Organization (FAO) introduced two new varieties (*Amarila Marangani* and *Amarila Saccaca*) from Peru for ensuring household nutritional security, income and as a climate resilient crop against the rapid changing climate.

In Bhutan, as quinoa could fit well with existing maize and potato-based farming system, Agriculture Research and Development Center (ARDCs) carried out on- station and on farm varietal evaluation trials of the introduced varieties to assess its adaptability and performance in varying agro-ecological zones since 2015.

Later in 2016, six additional new varieties were introduced from Peru followed by another one from India and another through informal source were introduced and evaluated to provide varietal choice in future.

Quinoa in the East

Considering the increasing importance given to this nutrient dense cereal, quinoa intensification program in the east was streamlined into annual agriculture development plans through research outreach programs in potential sites, climate smart villages, youth farms and Land Use Certificate (LUCs) sites. Over the years, farmers have started to show interest to take up quinoa cultivation provided assured buy back and thus the demand for quinoa seed has also increased which was met through the center's basic seed production program and buy back from selected growers in the region.

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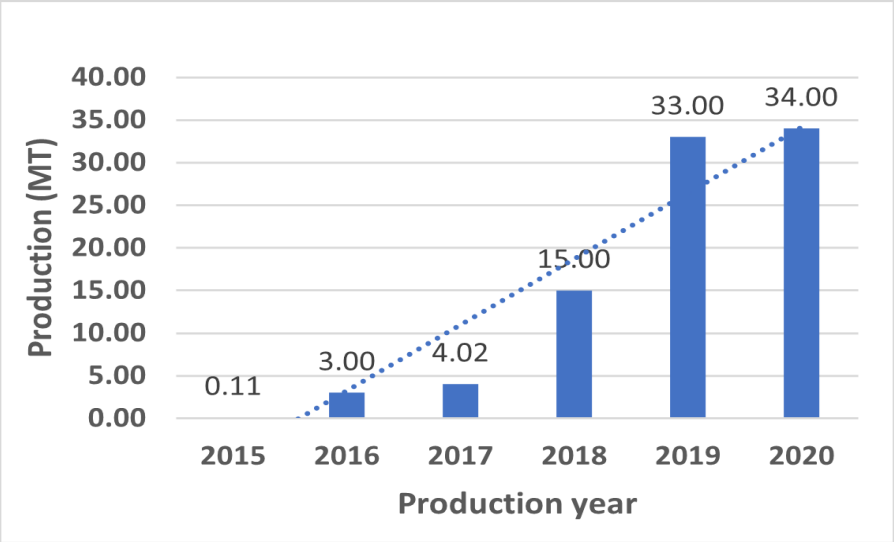
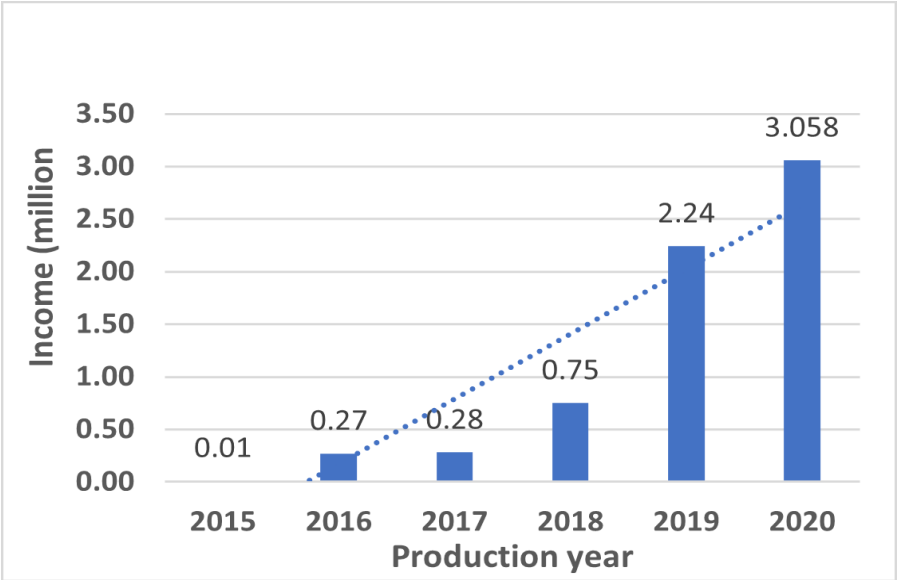
In recent times, quinoa cultivation in eastern Dzongkhag's modality has changed from individual promotional cultivation to community-based production at semicommercial scale by small scale and medium scale farmers as a part of crop intensification for major cereal crop commodity development program in the 12th FYP.

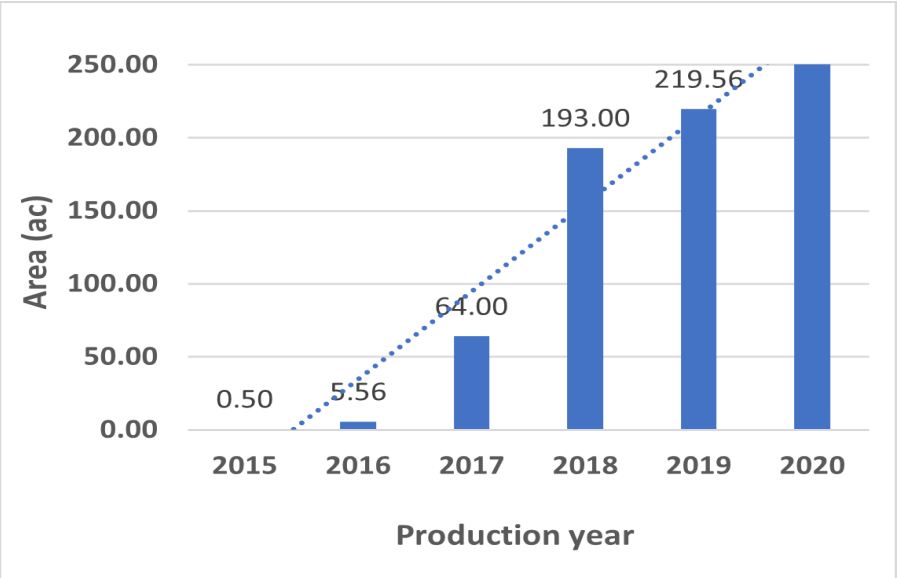


Quinoa Production Trends

Over the last five years (2015 to 2020), the promotion of quinoa in the six eastern Dzongkhags has experienced an increasing trend in area, production and income as shown in Figure 1 to 3. Ever since the varietal evaluation in 2015 and 2016, the area expansion under quinoa cultivation increased significantly from 64 acres in 2017 to more than 500 acres by 2020.



However, the trends for households growing quinoa fluctuated over the years. By 2020, more than 2000 farmers have taken up cultivation. Despite variation in number of households taking up quinoa production, the area for the crop followed a gradual increase annually as well.



During the initial years in 2015 and 2016, more than 90 % of the production was procured by research centers and Dzongkhags as a seed for crop intensification programs implemented from the Centre and the Dzongkhags. Currently, the Food Corporation of Bhutan Limited (FCBL) is the major buyer of the grains from the farmers through market

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facilitation by the Regional Agriculture Marketing and Cooperative office (RAMCO, Mongar) and Gewog Agriculture Extension Centres in the region. During the last five years, income generated from quinoa has increased from Nu 0.010 Million in 2015 to Nu 3.058 million in 2020.

Factors for increased in trends

Multiple factors have led to the increasing trends in promotion of this new crop. The crop has received the highest level of advocacy followed by a consistent on farm research evaluation, demonstrations and field days undertaken by the research centre and the gewog extension centres in the region. The promotional price at Nu. 100 per Kg raw grain (unhusked) through the buyback mechanism instituted by MoAF mandated to FCBL and RAMCO, Mongar and linkages to shop outlets in Thimphu mainly the convenient stores and the One Gewog One Product Shop Outlet (OGOP) outlet providing market opportunities. And most importantly, the promotion of the crop is followed up initially with the technical assistance and start up seed supports from FAO through the DoA MoAF and ARDC Yusipang and the promotional programs in partnership with the European Union Climate Change Adaptation Programs of MoAF, RGoB.

In the eastern Dzongkhags, the introduction of the crops timed with the inception of the ongoing Commercial Agriculture Resilient Livelihoods Enhancement Program (CARLEP- IFAD / MoAF) in the region which opened up collaborative programs that's supported seeds, small machines, awareness and training programs through the Crop Intensification and diversification component aimed to enhance resilience to climate change impacts through production enhancement and income generation.

Quinoa is gradually adjusting into the maize based farming systems predominant in the six eastern Dzongkhags creating an opportunity for farmers in the region to bring nutritional improvement, livelihood enhancement and enhance climate resilience. However, in order to achieve the maximum potential from growing this crop, observation shows that the promotion of this crop needs consistent monitoring, improve cultivation practices especially irrigation and soil fertility with at least farm yard manure applications, mechanization and processing. Experimental yields of 0.750 t/acres to 1.1 t/acre and average farmers yield of 0.5 t/ acre to 0.6 t/acre are reported.

Further production should focus on commercially acceptable varieties such as the Amarilla marangani (Ashi Heychum – AM), Amarilla sacacca (Ashi Heychum – AS) and DoA -1-2015 (PMB) (Ashi Heychum TW). Research centers should continue to fast track some additional promising varieties with higher market preference to enable diverse choice for growers and consumers. Finally, a market based production planning and enterprise development through a value chain intervention targeting creation of committed growers linked to processing, value addition enterprises will not only take the crop further into the region but will ensure a major livelihood source for small scale growers and enterprises.

The National quinoa Program at ARDC Wengkhar will be planning for a market based production planning in the following year in collaboration with the Regional Agriculture Marketing and Cooperative Office.

The intensification of quinoa in eastern Bhutan is currently supported through partnership with the Commercial Agriculture Resilient and Livelihoods Enhancement Program (CARLEP – IFAD / MoAF) supports to ARDC Wengkhar and the six project Dzongkhags.

Young people drive local climate solution

DoL

A youth-led group engaged in climate-smart green forage production and sustainable dairy farming in Zhemgang, one of Bhutan's remotest districts, improve livelihoods and tackle human-wildlife conflict and biodiversity loss.

Life was anything but easy or attractive in Shingkhar Gewog, Zhemgang. Large swathes of farmlands remained fallow as the remote community grappled with lack of irrigation facilities. Livestock depredation by wild animals was a serious concern. Many livestock owned by the villagers are unproductive local breeds, so they contribute nothing or very little to household income. It was no surprise that people in the community started leaving their villages in search of better lives. Shingkhar has 60 empty households, the highest among the eight gewogs in the district.

But things have been changing for better in recent years. From a forlorn community a few years ago, Shingkhar is now teeming with life. At the heart of this transformation is a youth group.

In 2018, the group comprising 23 young people- 19 women and 4 men- ventured into climate-smart green forage production and sustainable dairy farming, an initiative of the Regional Livestock Development Corporation supported by GEF-LDCF funded project, Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscape and Community Livelihoods.

The group was provided with fodder seeds, such as Paspalum, Ruzi, Stylo, Lucerne, Leucaena diversifolia and Gliricidia slips, and fencing and cattle shed construction materials. All members were also provided with a heifer each and received trainings in fodder development, production, and conservation technologies. They were exposed to the Total Mixed Ration (TMR), a feeding method that ensures a nutrient rich diet for the cattle.

Together, these young people have so far brought 35 acres of fallow land under green forage production, harvesting more than 315,000 kilograms of fodder every year.

25-year-old Ms. Kesang Dema leads the group. "Human-wildlife conflict was our main challenge. The wild boars and bears ate all our crops and killed our livestock," she said.

"The problem has eased a lot after we started growing fodder. We don't have to let our cattle into forests for grazing any more. This also meant less pressure on the forests. And the fencing supported by the project has helped keep the wild animals away from our fields."

Currently, the group produces 80-90 litres of milk every day and dairy products made from it are sold to schools in the community. "We earn around Nu. 12,000 every month from the sale of dairy products, such as cheese, butter and yoghurt, in addition to the monthly income of around Nu. 3000 per member from the sale of milk to the Milk Processing Unit," said Kesang.

Seemingly insignificant but the climate-smart green forage production and sustainable dairy farming initiative has helped address numerous pressing social, economic, and environmental challenges facing the remote community. And the youth group driving this success have bigger hopes and dreams. "We want to upscale our forage as well as livestock production," said Kesang.

Such a move will not only lead to improved livelihoods for the locals but also encourage the young people stay in their villages, curbing rural-urban migration. Meanwhile, the group's success story is already inspiring others to follow suit. A similar initiative is being replicated in Langthel gewog in Trongsa.

Leisure

Community based citrus fruit fly management

Fruit fly is one of the most serious pests of citrus. It causes the fruit to turn yellow and drop early. The fly is as big as housefly. It is yellow in colour with dark brown to black markings on the segment where the wings are attached.

• Regularly collect the infected fallen fruits and destroy by deep burial to kill the larvae and prevent adults emerging

• Hoe the orchard in the winter season to disturb the pupae. This brings them to the surface and birds will pray on them. This reduces the population of adult flies for the coming season.

• Use pheromone traps between April and September to trap the males so that females lay sterile eggs. This leads to a reduced fly population. To prepare the trap, put 5 drops of methyl eugenol and 5 drops of Malathion 50% EC onto a piece of cotton. Put the cotton into a transparent 1/2kg bottle with thumb size holes in both the lid and base of the bottle. Hang the bottle on the trees 2-3 meters above the ground. One trap is required for 4 plants.

• Apply Malathion 5% DP dust to the soil in a two meter radius around the trunk after rainy season. It takes 200 grams Malathion 5% DP for 20 plants.

JOKES

At a crocodile farm

When a group of tourists visited a crocodile farm, the owner of the place launched a bold proposal. "Whoever dares to jump, swim to the coast and survive, I'll give you $ 1 million."

No one dared to move, suddenly, a man jumped into the water and desperately swam to the shore while being chased by all the crocodiles.

With enormous luck he survived, taking everyone's admiration at the scene, then the owner announced, "We have a brave winner! "After collecting his reward, the couple returned to the hotel, upon arrival, the manager told him he was very brave to jump. Then the man said, "I didn't jump, someone pushed me!"

His wife smiled...

Did you know?

Fruit flies don't actually eat fruit. They're attracted to fruit that is overly ripe or fermenting, but what they eat is the fungus or rot that grows on or inside the fruit. They also lay their eggs either on the rotted part, or deposit the eggs inside the fruit -- so the larvae will have something to eat once hatched.

Please submit your articles for RNR-Newsletter at

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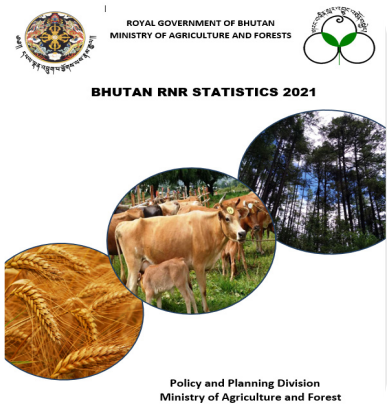
The Ministry's week

Bhutan RNR Statistics 2021



The Ministry of Agriculture and Forests is pleased to bring out the Bhutan RNR Statistics 2021. It is a comprehensive and systematic compendium of the relevant statistics in the domain of Renewable Natural Resources (RNR).

The BRNRS21 is expected to serve as the major source of information for planners, policymakers, researchers, and academicians. The statistics presented are compiled based on the information gathered through the statistical surveys and censuses as well as from the administrative data maintained by different agencies and departments under the Ministry of Agriculture and Forest

DoL launched Fish, Yak, Mastiff and Queen Bee related documents

The Department of Livestock launched four documents. The Honorable Secretary of the Ministry of Agriculture & Forests graced the launching of the books, at the DoL conference hall. A book titled Fishes of Eastern Bhutan provides data and information needed to help guide management and mitigation strategies for aquatic biodiversity in Bhutan.

National Yak Breeding Strategy Plan document will provide timely and critical technical guidance for

the improvement of yak genetic resources in the country to enhance productivity and the overall economy of yak-rearing highland communities. National Strategic Plan for Breeding of Bhutanese Mastiff – Bjop-Khyi provide scientific and technical guidance in implementing mastiff dogs breeding program in the country. The other two includes Queen Breeding Rearing Handbook and Standard Operating Procedure for Yak Semen Donor Bull Selection and Management.

Youth Skilling Program

A Memorandum of Understanding was signed between the Ministry of Labour and Human Resources and the Ministry of Agriculture and Forests on the implementation of the Skills Development Program in the agriculture sector on 8th July 2022. Through the MoU, ministries aims to train about 1500 youths on some of the potential agri-business prospects and additional 300 youths on advance farming systems. The MoU will be implemented in the

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