

Onion drying project in arid regions - Joint work between AAI and the drying machine maker Taikisangyo Co., Ltd- <Part 2>

Machinery introduction and dry onion production

The feasibility study originated from our collaboration with the National Organization for Technology Assimilation (NOTA) and started with placement of machinery in Kassala in March 2016. The machinery that arrived in Port Sudan was transferred overland to Kassala and brought to, and installed, in the existing building within the Horticulture Department plot of the State Ministry of Agriculture in Kassala which is a project counterpart organization. Machinery that is necessary for the study such as electric dryers, slicers, and crushers was procured from Taikisangyo Co., Ltd which is the leading institution for this feasibility study.



A building with drying machine and installed machinery

This field work aimed to confirm adaptability of introduced machinery in the local environment and to transfer the knowhow of machinery operation methods to NOTA staff. Two NOTA staff participated in the field work throughout the period and one head of administration played a coordination role including procurement of materials, NOTA internal communication, sales, negotiation and liaison with the State Ministry of Agriculture. In addition, government staff including women, experimental plot technicians and young staff of NOTA also participated in the activities.

The main onion variety in Kassala colors red called Baftem Red. It is a variety which is relatively suitable for processing into dried onions. It is cultivated using water basin irrigation, with seeding in August, transplanting in September and the harvest season is concentrated during the period from January to March. This means during the harvest season, the market price of onions goes down sharply, resulting in some farmers abandoning onions on their farms and affecting farmer incomes in a major way. Therefore, dried onion processing can utilize excess onions effectively, stabilize market prices and contribute to income increase among local residents, in particular smallholders.

With local staff we conducted experimental operations

for about two months in the field. During the period, the best drying methods were explored, changing the amount of onions to put into the machine at a time, thickness of slices, drying temperature and different ways of hot air circulation. At the same time, we checked production costs including labor, electricity and water bills and packaging. A result was that with the introduced drying machine, it was possible to dry more than 120 kg of sliced onions at a time. At the drying temperature of 70 °C, it took around 10 hours to finish drying circulating the air. It was revealed that if washing of onions, slicing and drying are done efficiently, it was possible to do a maximum of 1.5 times the production cycle per day. Moreover, it is possible to achieve further efficiency in operation by sun-drying onions in the beginning of the drying operation.



Onions before drying (left) and after drying (right)

Produced dried onions are packed by NOTA in original packaging and they plan to sell it in Kassala and Khartoum. Also, after the departure of Japanese experts, NOTA has been continuing drying experiments using eight other crops including tomato, molokheya and mango.



Dried onion production scene

NOTA staff showing products

With this survey we confirmed that the introduced machinery such as the electric dryer was operational without problems. We also confirmed that operation and cleaning of the machine was carried out by local staff. In future, more machinery will be introduced. The next step is to verify how economic efficiency can be increased while maintaining dried onion production and its supply chain, ensuring efficiency of operation and management.

In future, more Japanese dryers will be deployed. Production of dried onions can be expanded, in addition to Kassala, along the River Nile which is the largest onion producing region, and markets can be further developed in Sudan and beyond the borders. It is important to continue support aiming to contribute to increase the income of onion producing farmers and organizations.