

Dashanbao Potato Growers Cooperative of Zhao Yang County

Located in Zhaotong, Yunnan, China

Contributed by Dr. Peter VanderZaag, Yunnan Normal University

The initiative to grow high quality seed potatoes at this very high altitude was initiated by Township leaders who approached TuMaMa for assistance. Specialists from the Zhaotong Academy of Agricultural Sciences and the author were invited to give lectures on the possibilities and challenges of growing high-quality seed potatoes. Dashangbao township is a high elevation mountainous plateau region of greater than 2,900 masl with only a single summer crop possible as it gets cold in the winter season. This can be an ideal location to start basic seed potato production using greenhouse grown minitubers as the starting planting material.

Public Partners: Zhaotong Academy of Agricultural Sciences and Yunnan Normal University provided potato experts to give lectures but also provided technical guidance and farm management advice throughout the growing season.

Principle Private Partners: TuMaMa (develops and sells organic/humic acid fertilizers with inorganic NPK added as required by potatoes, apples and other crops), sourced and provided the crop inputs at wholesale prices plus transport costs. TuMaMa also gave weekly technical support. Fudian Bank provided the full financing for all the crop inputs as well as cash for paying the labor costs for all the cooperative members who participated in the field operations. TuMaMa guaranteed the Fudian bank loan.

1. Collaboration and institutional support for the Dashangbao seed potato growing cooperative.

Poverty alleviation is in the overall mandate from the Central Government and this goes to the regional governments like that of Zhaotong City and down to the county and township levels. This cooperative group comprised of 472 families of which 464 were defined as living in poverty. Within 2 years these families must no longer be poor. This is the mandate that all levels of Government must accomplish. Zhaotong City comprises 11 townships and most of them have a single summer crop of potatoes. Yields remain very low at about 15 tonnes/hectare because of poor seed quality, heavy late blight pressure during the rainy season, lack of rotation crops and relatively low solar radiation. Quality seed potato production is one of the easiest ways to help farmers of commercial crops to access higher quality seed potatoes. Local governments will purchase the high-quality seed and distribute it to the needy farmers throughout the Zhaotong City area. Dashangbao township, which is located on a Plateau above 2,900 masl, is ideally suited to grow high quality seed of G1 and 2 levels for further multiplication at lower elevations.



View of the production area on this high-altitude plateau at the end of the Himalayas

2. Quality & healthy potato planting material

TuMaMa approached some larger specialized seed suppliers of greenhouse minitubers (G0) in Qu Jing, Huize and Xun Dian counties. Minitubers of the popular variety Cooperation 88 (C88) were obtained of 3 seed sizes: 10-15g, 5-10g and some of 1-3g. The seed was ready for planting with little or no sprouts by mid April. For the smallest size there were 2 seed tubers planted / hill. C88 is a high quality fresh and processing potato with durable resistance to Late Blight and excellent overall virus resistance.



Greenhouse grown minitubers ready for planting.

3. Farm management & crop production techniques

TuMaMa provided weekly technical support for the 2 team leaders who engaged the cooperative members who wished to work and earn some money as daily laborers in their own cooperative fields. Exactly 63 hectares were planted in April with the G0 seed potatoes of C88. All land preparation was by



Planting the minitubers by size at prescribed spacing, planting depth and assurance of the proper placement of fertility additives

tractor and rotovator. All fertilizer placement and seed treatment and planting were done manually. Inorganic fertilizer enhanced humid acid was formulated and sold to the cooperative by TuMaMa. The NPK content was 8-8-14. During the growing season the crop was sprayed 6 times with a combination of contact and systemic fungicides. Boron as Boric Acid was sprayed 4 times from flower initiation along with the last 4 fungicide sprays. At total of 320g Boron was applied/hectare. There was a serious hailstorm that

did negatively impact some of the cropped area. The recovery was remarkable, but it did delay maturity and reduced yield. A strong frost occurred on September 20 killing most of the foliage. Weed control and hilling up was well done and the crop had excellent growth and beautiful appearance. The limited supply of N kept the foliage at about 1 meter in height and produced a full canopy cover of all the fields for the 2 larger seed sizes. The small seed size of 1-3g didn't fill the rows with foliage.



Farmers worked as teams in doing all field operations including fungicide spraying.

4. Sustainable production and improved storage of potatoes

The crop was harvested in November when the rainfall was less, and the soil was dry enough to dig. The tuber skin set was excellent. The average yield for the 2 larger seed sizes was just over 40 tonnes/hectare. For the 1-3-gram seed size the yield was only 10 -12 tonnes/hectare. It was decided not to plant such small seed into the field again. This small seed needs more intense management in a greenhouse or fields with irrigation. Overall the yield was considered phenomenal by all involved in this cooperative. All the inputs plus labour payments for all field operations came to US\$8000/hectare. Revenue paid to the Cooperative was US\$357/ tonne of seed potatoes at harvest. This totaled close to net income of US\$14,000/ hectare. The average area of land for any family was 0.133 Hectares. So, the net earnings for an averaged sized land holder would be US\$800. This plus the wages earned would bring most of these 464 poverty level families out of poverty.

Sustainable farming practices has so far eluded this county as well as all the other counties in Zhaotong city. At lower elevations potatoes are grown every summer season year after year on the same fields! Here in Dashanbao, often the land returns to pasture for several years before it is cultivated again. Major

discussions are being held on the absolute necessity of having good rotation crops for improving the soils. Buckwheat, canola, cabbage family crops and legumes are suggested good rotation crops. There should be a mandate that potatoes can only be grown every 2nd year and that volunteer plants be removed in the alternate years as well. These possibilities are being evaluated by the public and private partners along with county leaders. Storage of potatoes is still rudimentary in Dashanbao. In ground pit storage covered with straw and soil is the common practice. TuMaMa, which is purchasing all the harvested crop has arranged to provide excellent storage space for all the harvest. The storage has an insulation value of $R=1.9$ in the walls and ceiling. The seed potatoes are sized into small and medium/large and are in 41 kg net bags. These bags are stored on pallets with up to 2.5 meters in height. Ventilation is provided and temperature is measured in various parts of the storage with the goal of keeping the temperature at 4-5C by cooling with outside air at night or with heaters on very cold nights.



Happy Farmer

5. Marketing.

Zhaotong city has a population of 6 million. Over 20% of the people live in poverty. The government has an aggressive program to provide improved seed potatoes to all farmers free of charge or at a subsidized rate. This has created a good demand for seed potatoes which government agencies purchase and distribute. TuMaMa will take the risk and sell the seed to any potential buyer including government agencies. A portion of the seed will return to Dashangbao in 2020 for the production of G2 seed potatoes on new land that was not in potatoes in 2019.



Group of farmers harvesting together

6. Creating added value (branding, packaging, excellent appropriate storage, transportation)

Branding the potatoes that TuMaMa purchased has been carefully done with a unique Chinese logo which states: ShuDoDo Seed Potatoes from the Mountain Plateau



Chen Tianpeng (TuMaMa), Xiao Wenyan (Cooperative leader) and Wenyu (TuMaMa) were the key leaders in working with the potato cooperative. Here they show the results of the harvest!

Quotes by Xiao Wenyan, cooperative farmer and team leader:

1. "My efforts were supported by many experts from TuMaMa as well as others!"
2. "I am very happy with the harvest and so are all the cooperative members. The yield was very high, like we have never seen before and the tuber quality is so good!"
3. "The support of TuMaMa is tremendous in helping us grow potatoes properly with the right techniques. I'm so grateful for the opportunity to do this work, formerly I worked in a factory, but I chose to come home and raise my 3 children and do this exciting work to help our family and community".

Quote by Wenyu, Potato Agronomist of TuMaMa: "The 3-way cooperation of a private company + cooperative + individual farmers has many advantages. The company is responsible for supplying the proper high-quality inputs, agronomic techniques and the marketing; the cooperative is responsible for organizing production plan and get their farmers to share their land for rent and labor at the daily rate. This model results in a win-win-win! The Dashangbao result was astounding for all involved as it was so successful!"

"We see this type of linkage and support as part of our Corporate Social Responsibility, it gives us great pleasure to see Cooperative groups like this succeed in the commercialization of the potato."
TuMaMa CEO, Elven Huang