

Regenerative agriculture empowers arid potato production sustainably in China

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Exhibitor

The Nature Conservancy in China

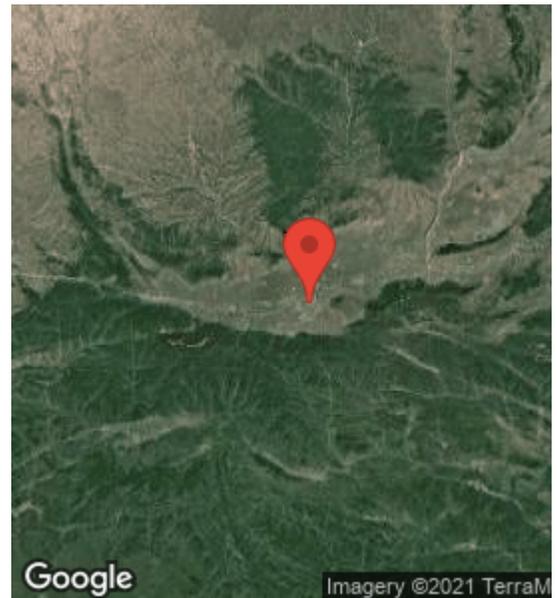
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Team

Dan Zhang

Location



Beijing | China

Summary

Presentation

Regenerative agriculture empowers arid potato production sustainably
in China

The climate of Northwest China is relatively arid, with abundant sunshine, strong photosynthesis and large temperature difference between day and night, which is convenient for starch formation. Potato is a semi-arid crop with small water demand and strong environmental adaptability. Therefore, Northwest China is an important potato producing area in China. However, there are still many problems in potato planting.

On one hand, problems of soil health exist in arid and semi-arid areas in China. In arid and semi-arid areas, natural precipitation is rare, while evaporation is strong and windy; Most of the surface vegetation is desert steppe, and the vegetation coverage is low. This will cause soil erosion, transportation and accumulation under the action of wind, water, gravity and other external forces, resulting in soil erosion.

On the other hand, continuous cropping obstacle has become one of the important limiting factors affecting potato production in China, which is mainly manifested in the decline of potato yield, quality and marketability. The formation mechanism is the decrease of soil enzyme activity, the decrease of soil microorganism quantity, the transformation from "bacterial type" to "fungal type", the aggravation of soil borne diseases, the weakening of plant growth, the decrease of tuber quantity, etc.

Regenerative agriculture is a nature-based solution (NbS) which has at its core the intention to improve the health of soil through elevated soil organic content and nitrogen elements as well as reduced chemicals input and mechanical operations, so to realize the sustainable development of agriculture, namely enhanced soil carbon sequestration, maximized biodiversity and improved quality of water, vegetation and land-productivity.

Crop rotation and cover crop are the most effective practices to solve the problems of potato planting in arid and semi-arid areas. Crop rotation refers to the cultivation of different crops in a prescribed order on the same land. Crop rotation is conducive to the improvement of biological diversity, which can promote the balanced use of various elements in the soil, improve fertilizer efficiency, soil structure, and prevent diseases and insect pests. A diversified ecosystem can effectively improve the health level and ecological service function of soil. Cover crop is also a key technology in regenerative agriculture. Between crops, many fields have a period of free time from planting crops. If a plant is planted during this period to provide stable soil cover, it is called a cover crop. They protect soil from wind and water erosion, reduce runoff, sediment and nutrient loss, and maintain soil fertility, thereby reducing the application of nitrogen fertilizer.

In collaboration with the Snow Valley Group and the CAAS, The Nature Conservancy (TNC) and Syngenta are implementing a demonstration trial project to understand the benefits of crop rotation in combination with other practices to break disease cycles and improve potato quality. The experimental field covers an area of 3.33 hectares, 2km away from SnowValley factory. Potato has been planted for three years continuously. From 2018, rotation test will be conducted according to the planting scheme shown in Table 1 to explore the effects of different rotation modes on crops, soil and agricultural products.

Table 1 rotation planting scheme of experimental field

Code	2018	2019	2020	2021	2022
1	spring wheat	potato	spring wheat	potato	spring wheat
2	spring wheat	ulless oat	potato	spring wheat	ulless oat
3	ulless oat	potato	ulless oat	potato	ulless oat
4	ulless oat	soybean	potato	ulless oat	soybean
5	pea	potato	soybean	potato	soybean
6	potato	potato	potato	potato	potato

The result shows that rotation can increase the effective water content of soil by 15% and the stability of soil aggregates by 4%, increase soil fertility, and increase soil total nitrogen by 21%, soil organic carbon by 9%, increase soil microbial carbon by 111% and soil enzyme activity by 10% - 16%, so as to accelerate soil biochemical process and activate soil nutrients, increase soil microbial carbon by 111% and soil enzyme activity by 10% - 16%, so as to accelerate soil biochemical process and activate soil nutrients.

Overall, by adopting natural based methods, renewable agriculture can reduce the input of machinery and chemical level, optimize and adjust the crop growth environment in an all-round way, improve crop output and soil health, so as to realize the sustainable development of agriculture. Adopting the concept of renewable agriculture in Northwest China can effectively increase the economic and ecological benefits of potato and help the sustainable development of agriculture in China .

With the development of the experiment, we identified another local challenge - soil erosion in winter, so we conducted coverage crop planting experiments in the local area, and screened the grass species with good coverage effect (winter rye of Russia). Combined with the big data (experimental data reported in literature), it is found that it is a win-win planting mode to integrate the covering crops (the technology belonging to the renewable agriculture) into the rotation system of potato. This will be the main model of renewable agriculture that we will promote in the future.

Image gallery

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Videos

Further information

Partnerships

Clients / Target group

Write here...

Established collaborations and partnerships

Write here...

Desired collaborations and partnerships

Write here...

Time for discussion (Video Chat)

During the indicated periods, one of the team members is available for a chat.

Stand No	Time zone	+/-UTC	Date	Start local time (hh:mm)	Duration (hh:mm)	Attendant	Video chat link
113							https://meet.lax.init7.net/4p1000stand113
113							https://meet.lax.init7.net/4p1000stand113
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Events

Stand No	Time zone	+/-UTC	Date	Start local time (hh:mm)	Duration (hh:mm)	Description	Video link
113							https://meet.lax.init7.net/4p1000stand113
113							https://meet.lax.init7.net/4p1000stand113
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Handouts

File 

Modified

Microsoft Word Document presentation of potato project.docx

Apr 30, 2021 by Dan Zhang