Sino-Dutch Potato GAP-project

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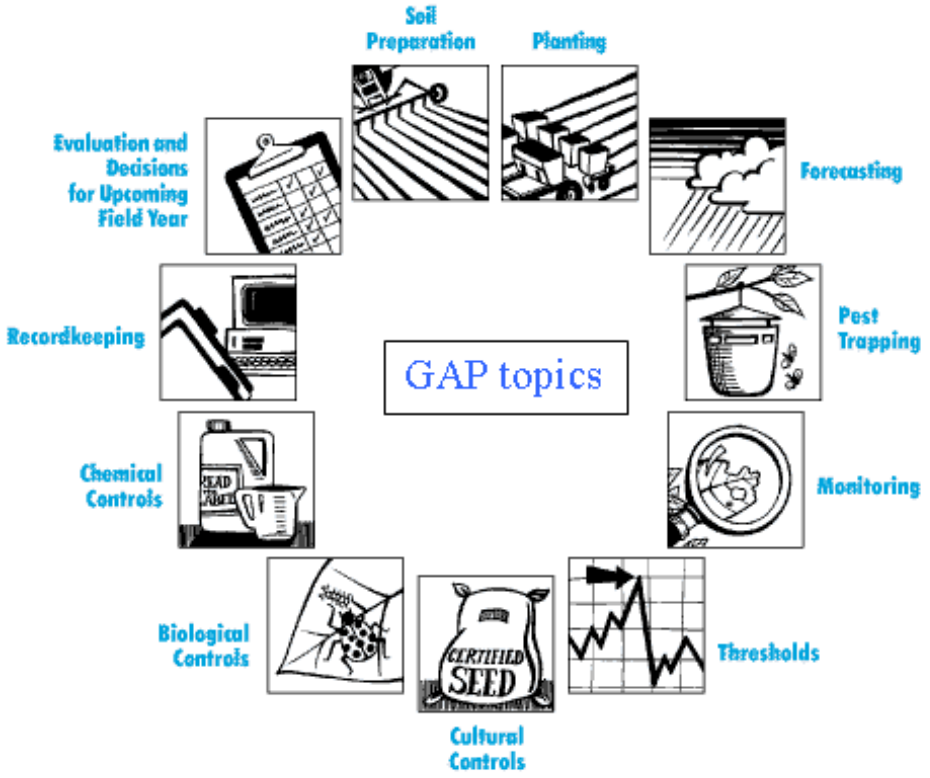
What is Good Agricultural Practice (GAP)?

- GAP is a collection of principles to apply for in agriculture, resulting in safe and healthy food and non-food agricultural products, while taking into account economical, social and environmental sustainability

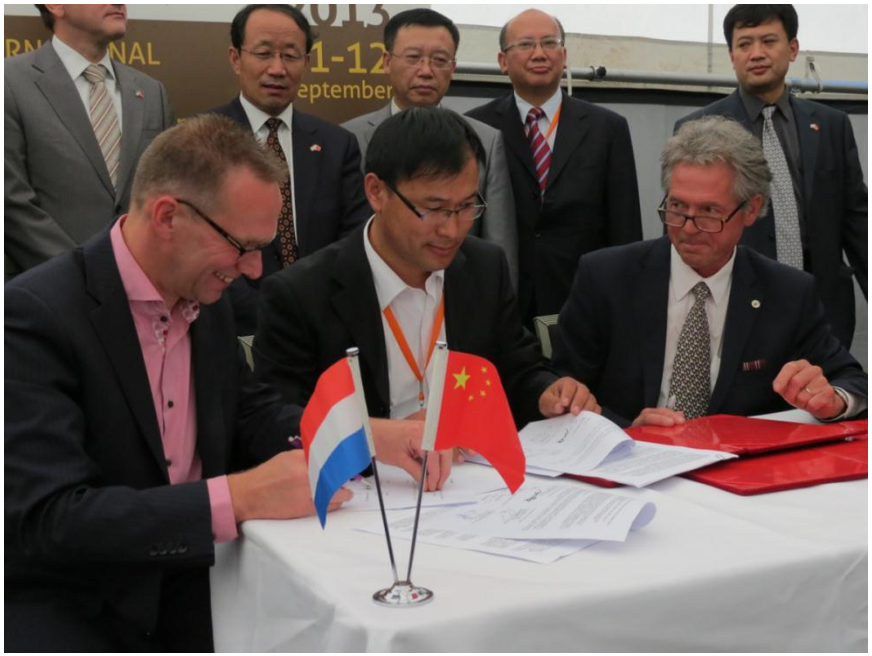
  (FAO definition)



Start of the project

- ASEM meeting in 2008
  - Potato and sustainable production are important for both countries
- Dutch Embassy in Beijing invited WageningenUR to develope a bi-lateral project (2009)
- Inception workshops (2010-2012)
  - e.g. ICAMA, NATESC, CAAS, HAAS, private companies, WUR, DLV Plant, APH, Syngenta, Dacom, ...

Kick off in 2013



Impressions 2014

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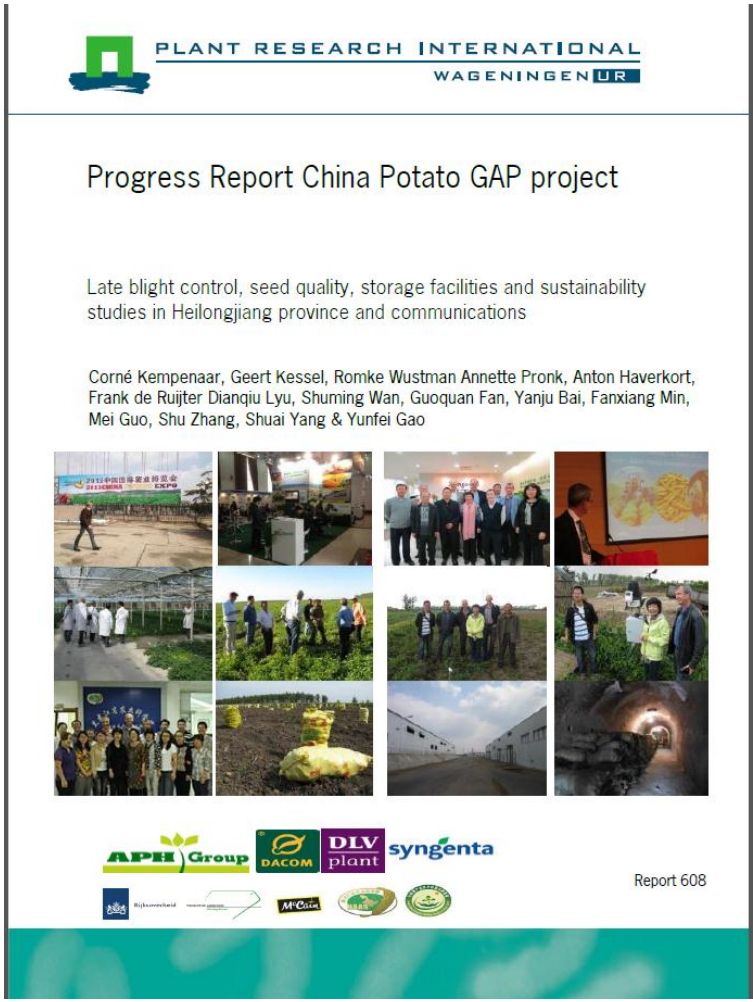
Main challenges for potato production in Heilongjiang

- Seed potato production and quality
- Seed bed preparation and planting
- Late blight control
- Sustainable crop production
  - Other crop protection method
  - Fertilizer use
  - Irrigation
- Harvest methods
- Sustainable storage of potatoes



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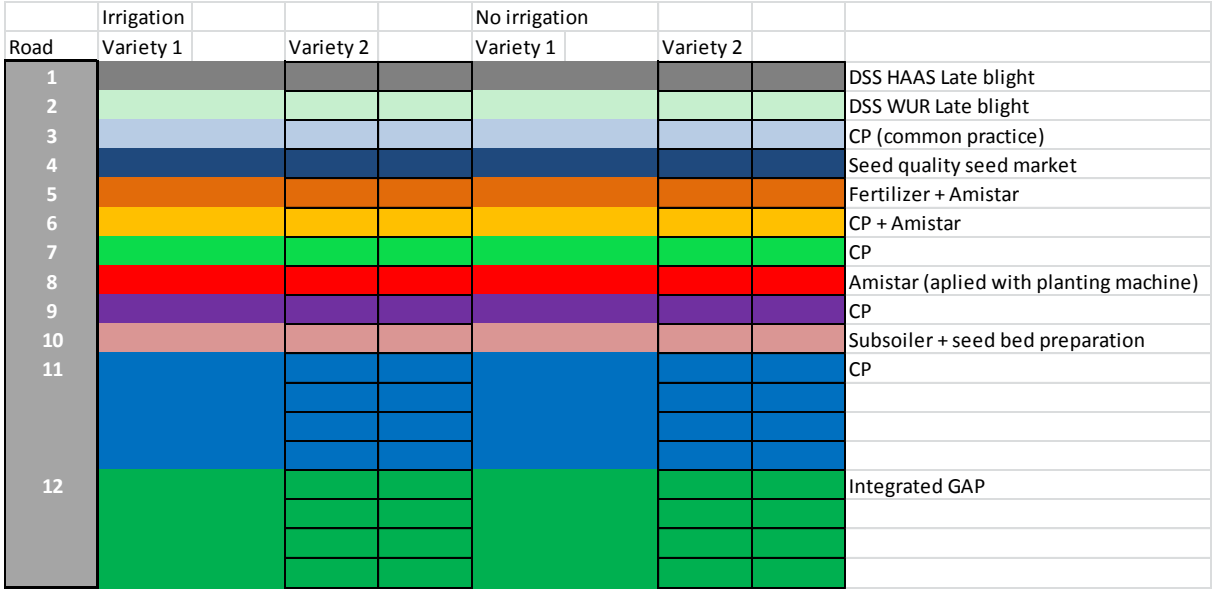
Validation and demonstration of GAP in 2015

- Experimental fields at Minzhu Demonstration park and Keshan
- 7 GAP treatments individually tested with and without irrigation
- 4 common practice (CP) reference plots
- 1 plot with all GAP's integrated



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Good Agricultural Practices (GAP's) in experiment

GAP treatments:

1. Seed bed preparation
2. Cut seed from the market
3. Tuber treatment before planting against Rhizoctonia
4. Tuber treat. applied with the planting machine against Rhizoctiona
5. Decision support system of HAAS for late blight control
6. Decision support system of WUR for late blight control
7. Fertilizer application with BLGG and WUR advice
8. Irrigation

Common practice

- Ploughing: in autumn (30 cm)
- Seed bed: 2 times disc harrowing as seedbed preparation in spring (5-15 cm)
- Planting: Manually at 14-18 cm distance and 2-3 cm depth on (13-14)-6-2015
- Minitubers: Kexin 13 and Zhonshu 5
- Seed treatment: thiophanate methyl, carbendazim, imidacloprid, agricultural streptomycin and talc powder
- Fertilizers: 180 kg N, 120 kg P and 150 kg K per ha
- Herbicide treatment: Acetochlor (1,5 L/ha) and Pendimethalin (2 L/ha) 27-6-2015
- Two times mechanical ridging after planting
- Late blight control based on farmers common practise

Sub soiltreatment and seedbed preparation

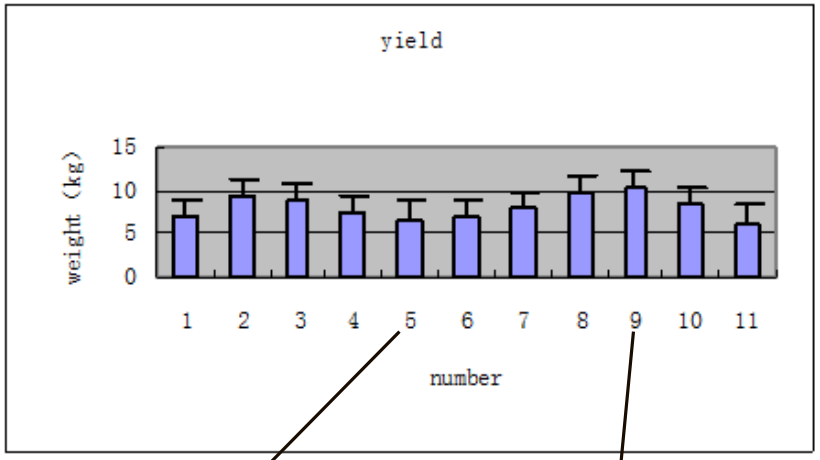
A sub soiler or ripper was used up to 55 cm to break a planking layer.

An additional seedbed preparation with a power harrow cultivator at 8 cm depth was done to improve planting quality.

Cut seed material from the seed market

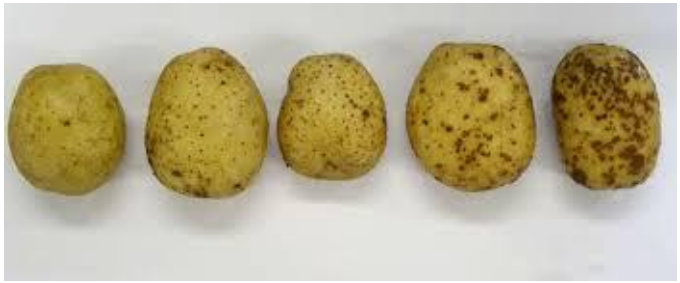
This plot uses cut seed from the market instead of minitubers. Variety Eugene 885 is used

Seed quality experiment, cv Keshan 13 (2014)



- Seed quality and performance: big differences

Amistar against Rhizoctonia



50 mL Amistar was applied to the tubers before planting

Amistar against Rhizoctonia 2

50 mL Amistar was applied with planting machine during planting.

The tuber fell through an Amistar fog

GAP fertilizer application

Soil analysis by BLGG

This plot used a fertilization strategy based on BLGG and WUR advice:

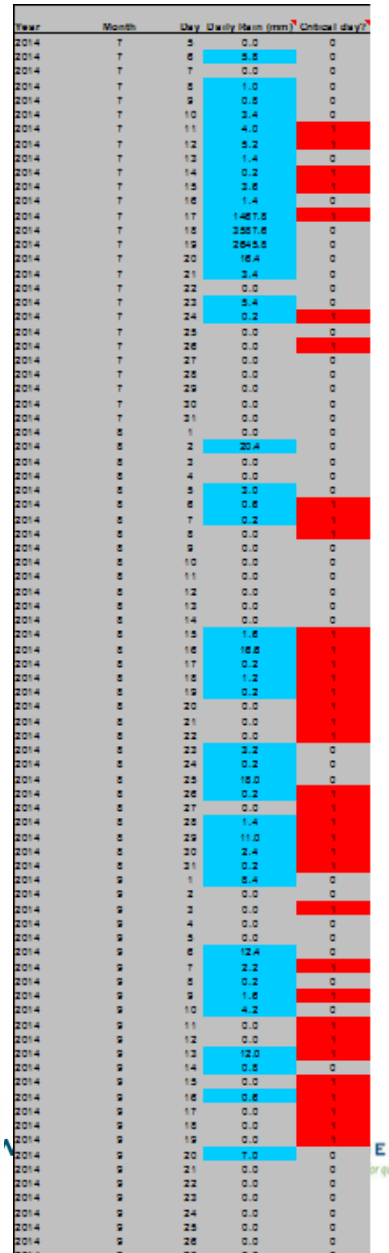
1st 180 kg N
1st 100 kg P
1st 125 kg K
2nd 75 kg N
2nd 75 kg K
2nd 2 kg Cu + 0,5 kg Zn

Decision support system HAAS

The DSS of HAAS gives an advice for controlling late blight when the humidity level is 90% for at least 10 hours. Depending on the weather they spray.

Common practice + DSS HAAS

Decision support system (DSS) from WUR



Year	Month	Day	Daily Rain (mm)	Critical day?
2014	7	5	0.0	0
2014	7	6	5.6	0
2014	7	7	0.0	0
2014	7	8	1.0	0
2014	7	9	0.6	0
2014	7	10	3.4	0
2014	7	11	4.0	1
2014	7	12	5.2	1
2014	7	13	1.4	0
2014	7	14	0.2	1
2014	7	15	3.6	1
2014	7	16	1.4	0
2014	7	17	1467.6	1
2014	7	18	3567.6	0
2014	7	19	2645.6	0
2014	7	20	16.4	0
2014	7	21	3.4	0
2014	7	22	0.0	0
2014	7	23	5.4	0
2014	7	24	0.2	1
2014	7	25	0.0	0
2014	7	26	0.0	1
2014	7	27	0.0	0
2014	7	28	0.0	0
2014	7	29	0.0	0
2014	7	30	0.0	0
2014	7	31	0.0	0
2014	8	1	0.0	0
2014	8	2	20.4	0
2014	8	3	0.0	0
2014	8	4	0.0	0
2014	8	5	3.0	0
2014	8	6	0.6	1
2014	8	7	0.2	1
2014	8	8	0.0	1
2014	8	9	0.0	0
2014	8	10	0.0	0
2014	8	11	0.0	0
2014	8	12	0.0	0
2014	8	13	0.0	0
2014	8	14	0.0	0
2014	8	15	1.6	1
2014	8	16	16.6	1
2014	8	17	0.2	1
2014	8	18	1.2	1
2014	8	19	0.2	1
2014	8	20	0.0	1
2014	8	21	0.0	1
2014	8	22	0.0	1
2014	8	23	3.2	0
2014	8	24	0.2	0
2014	8	25	15.0	0
2014	8	26	0.2	1
2014	8	27	0.0	1
2014	8	28	1.4	1
2014	8	29	11.0	1
2014	8	30	2.4	1
2014	8	31	0.2	1
2014	9	1	5.4	0
2014	9	2	0.0	0
2014	9	3	0.0	1
2014	9	4	0.0	0
2014	9	5	0.0	0
2014	9	6	12.4	0
2014	9	7	2.2	1
2014	9	8	0.2	0
2014	9	9	1.6	1
2014	9	10	4.2	0
2014	9	11	0.0	1
2014	9	12	0.0	1
2014	9	13	12.0	1
2014	9	14	0.8	0
2014	9	15	0.0	1
2014	9	16	0.8	1
2014	9	17	0.0	1
2014	9	18	0.0	1
2014	9	19	0.0	1
2014	9	20	7.0	0
2014	9	21	0.0	0
2014	9	22	0.0	0
2014	9	23	0.0	0
2014	9	24	0.0	0
2014	9	25	0.0	0
2014	9	26	0.0	0

The DSS of WUR gives an advice for controlling late blight according to a new computer program with weather data as input.

Timing of spray is based on predicted red periods.

Integrated GAP's

A combined field with:

Sub soiler and seed bed preparation

GAP fertilizer

Amistar treatment

DSS WUR

Planting done by planting machine

No ridge rolling

1 time ridging with additional fertilization

Better development since 19-6-2015

What effects did we see so far in the demo experiment?

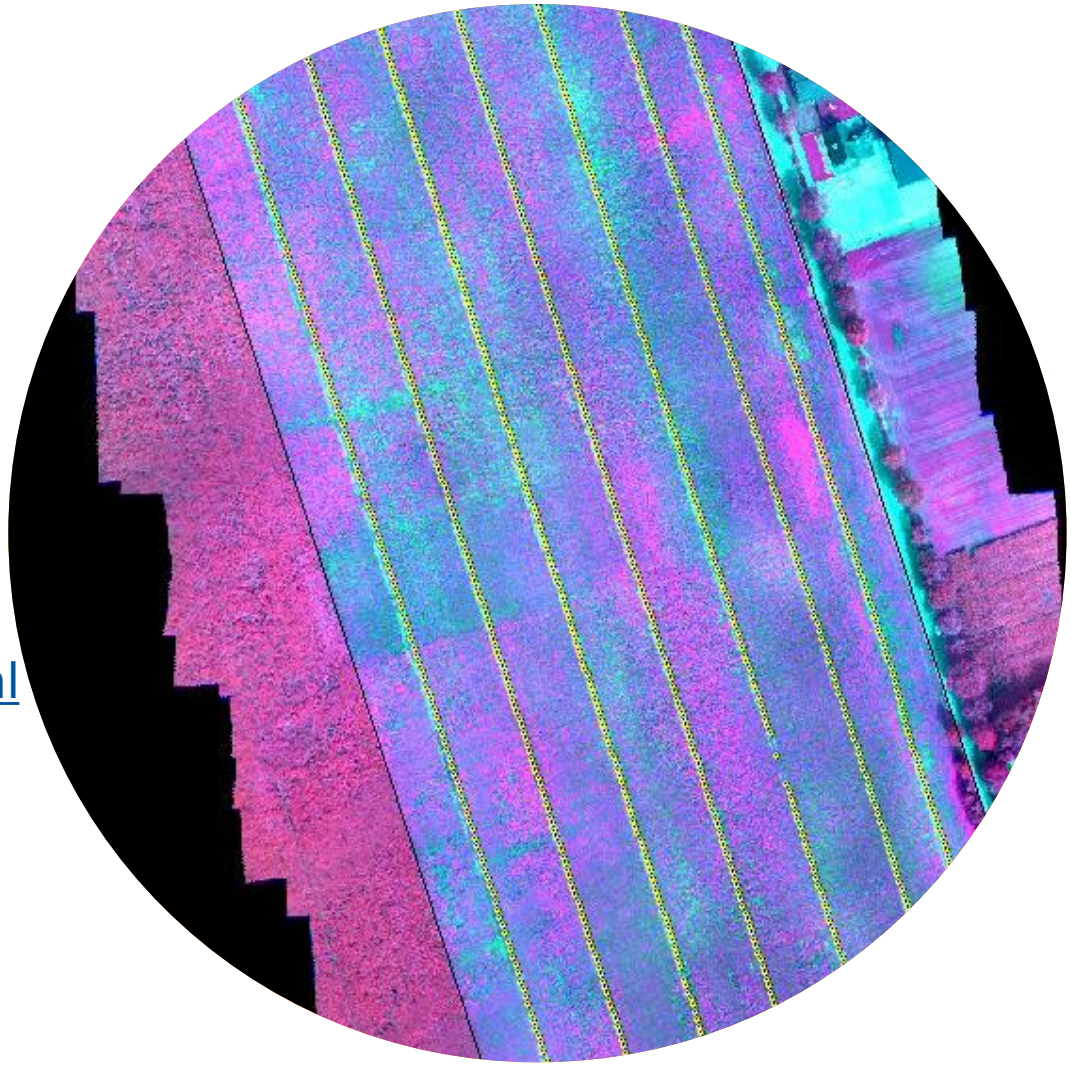
1. Planking layer
2. Seed quality
3. Seed size
4. Planting method
5. Ridging method
6. Aphid pressure
7. Viruses

Traditional potato stores in Heilongjiang

Conclusions and recommendations

- Good seed quality free from virusses and pests, late blight control and GAP crop management are prerequisite for high potato yields in Heilongjiang
- Eight GAP's were tested in 2015. More GAP's are available, e.g. precision farming.
- In 2016, we like to extent the knowledge transfer part of the GAP project in China
  - Demonstration farms
  - Workshops
  - Training programs

Thank you for your attention



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