

Improvement project for agricultural competitiveness enhancement Bimantakakura district

1. Objective of the project

As recent climate change is salient, as we frequently have torrential rain in our small area, it is difficult to secure stable rainfall. When drought continues for a long time, early growth disturbances are seen in sugar beets immediately after transplant and in soybeans and carrots immediately after sowing. Symptoms of such disturbances include poor root taking, delayed budding, and differing speed of budding. In order to prevent such growth disturbances and drought damages due to soil dryness and to secure stable crop yield, an upland irrigation facility is being improved. In addition, as poor drainage performance, pebbles, and rolling of upland field are disturbing growth of farm products and machine operation, land readjustment, construction of underdrainage, and stone removal are implemented at the same time in order to improve crop yields and labor productivity.

2. Relevant municipality

Otofuke-cho, Kato-gun

™Sugar beets in drought

3. Beneficiary area

657.2 ha

4. Number of beneficiary households

48 households

5. Construction period

2011 - 2016

6. Improvement details of the district

- Total project cost: 2,326,000,000 yen
- Total project amount

Upland irrigation	A = 370.5 ha
Land readjustment	A = 139.5 ha
Underdrainage	A = 254.3 ha
Soil dressing	A = 4.3 ha
Stone removal	A = 10.6 ha



7. Chief crops

Wheat, beans, sugar beets, potato, and sweet corn

8. Cost share

State government: 52%, Hokkaido: 28%, municipality: 20%

9. Construction overview

Name of construction: 41st work section of upland zone (development) in Bimantakakura district
 Construction period: March 24, 2016 - November 30, 2016
 Construction cost: 149,007,600 yen
 Construction overview: Upland irrigation A = 23.9 ha (Water supply pipe work: L = 6,327 m)

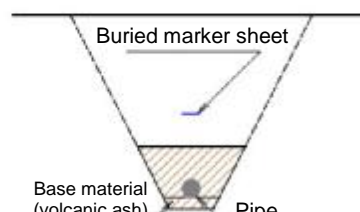
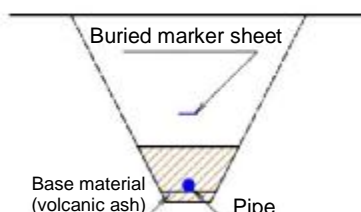
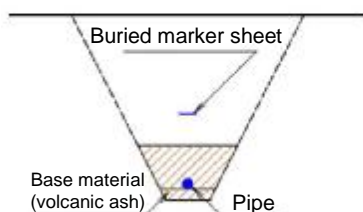
10. Training details

Overview of upland irrigation

Polyethylene pipe for agricultural use
φ75

Polyethylene pipe for agricultural use
φ100

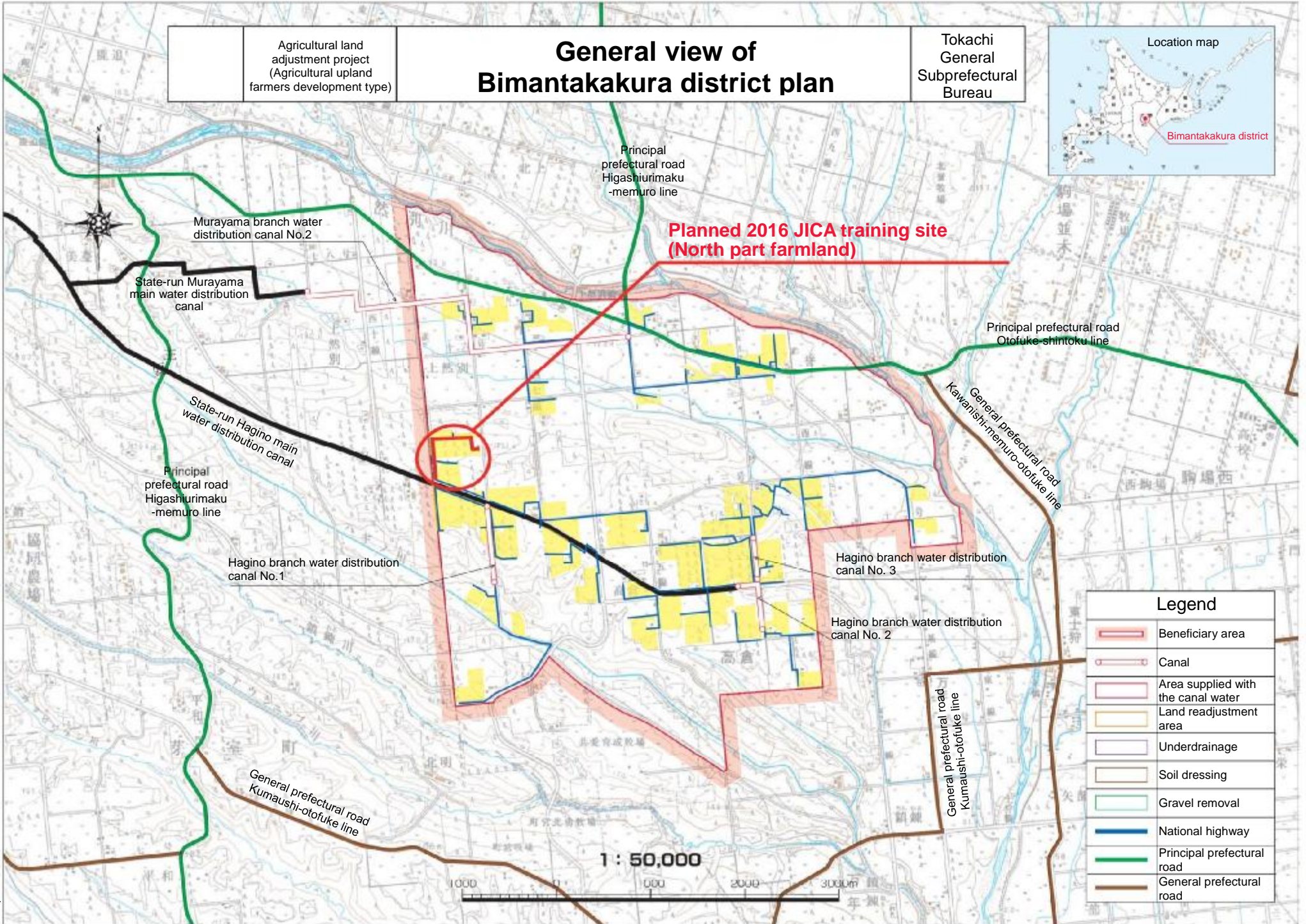
Hard vinyl chloride pipe
φ150



Agricultural land adjustment project
(Agricultural upland farmers development type)

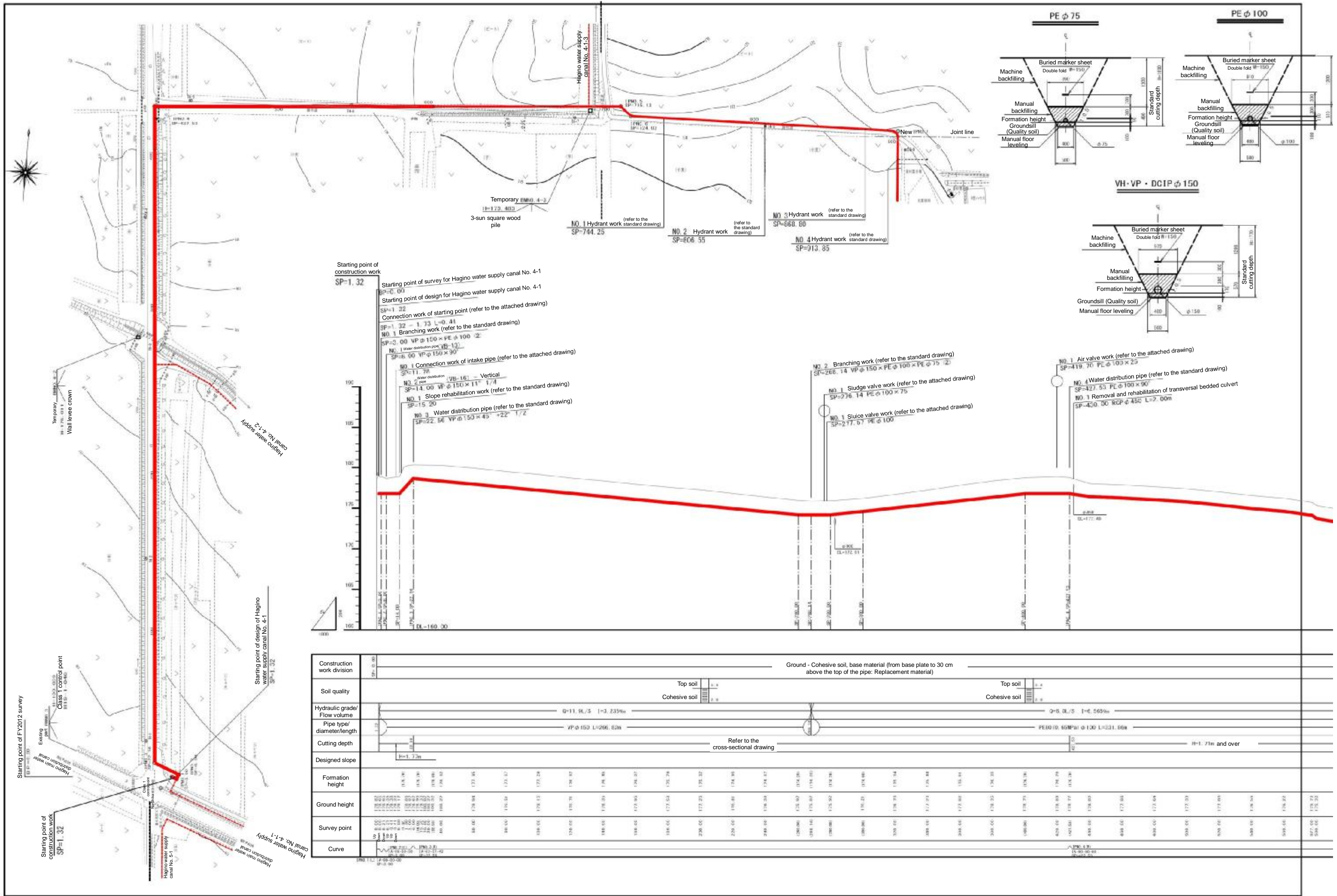
General view of Bimantakakura district plan

Tokachi General Subprefectural Bureau



Legend	
	Beneficiary area
	Canal
	Area supplied with the canal water
	Land readjustment area
	Underdrainage
	Soil dressing
	Gravel removal
	National highway
	Principal prefectural road
	General prefectural road

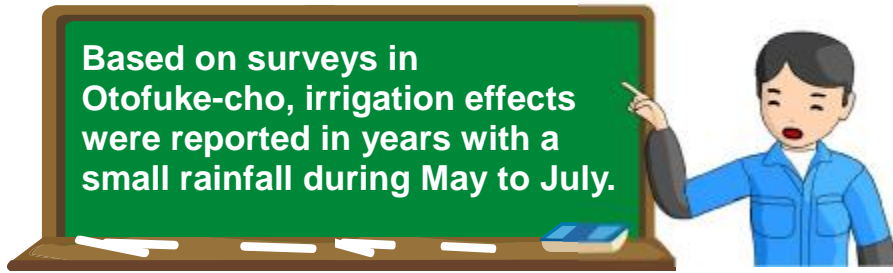
Tokachi General Subprefectural Bureau



- Starting point of construction work SP=1.32
- Starting point of survey for Hagino water supply canal No. 4-1 SP=0.00
- Starting point of design for Hagino water supply canal No. 4-1 SP=1.32
- Connection work of starting point (refer to the attached drawing) SP=1.32 - 1.73 L=0.41
- NO. 1 Branching work (refer to the standard drawing) SP=0.00 VP φ 150 × PE φ 100 (2)
- NO. 1 Water distribution pipe (refer to the standard drawing) SP=6.00 VP φ 150 × 30°
- NO. 1 Connection work of intake pipe (refer to the attached drawing) SP=11.78
- NO. 2 pipe (refer to the standard drawing) SP=14.00 VP φ 150 × 11° 1/4
- NO. 1 Slope rehabilitation work (refer to the standard drawing) SP=15.20
- NO. 3 Water distribution pipe (refer to the standard drawing) SP=22.56 VP φ 150 × 45° + 22° 1/2
- NO. 2 Branching work (refer to the standard drawing) SP=26.14 VP φ 150 × PE φ 100 × PE φ 75 (2)
- NO. 1 Sludge valve work (refer to the attached drawing) SP=27.14 PE φ 100 × 75
- NO. 1 Sludge valve work (refer to the attached drawing) SP=27.67 PE φ 100
- NO. 1 Air valve work (refer to the attached drawing) SP=419.70 PL φ 100 × 25
- NO. 4 Water distribution pipe (refer to the standard drawing) SP=427.53 PL φ 100 × 90°
- NO. 1 Removal and rehabilitation of transversal bedded culvert SP=430.00 RCP φ 450 L=7.00m

Construction work division	SP=0.00	SP=1.32	SP=6.00	SP=11.78	SP=14.00	SP=15.20	SP=22.56	SP=26.14	SP=27.14	SP=27.67	SP=419.70	SP=427.53	SP=430.00
Soil quality	Ground - Cohesive soil, base material (from base plate to 30 cm above the top of the pipe; Replacement material)											Top soil	
Hydraulic grade/ Flow volume	Q=11.9L/S I=0.235‰											Q=5.9L/S I=0.565‰	
Pipe type/ diameter/length	VP φ 150 L=266.52m											PE φ 100 60MPa φ 100 L=331.96m	
Designed slope	Refer to the cross-sectional drawing											H=1.71m and over	
Formation height	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81
Ground height	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81
Survey point	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81	132.81
Curve	Refer to the attached drawing												

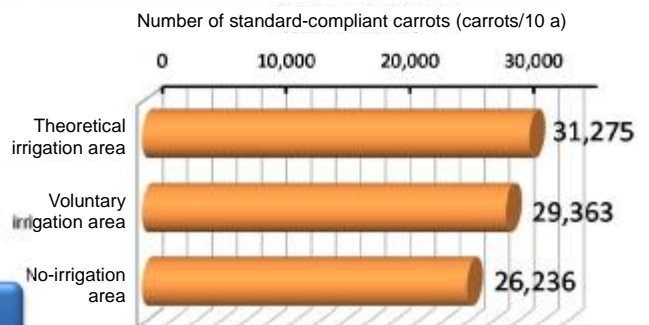
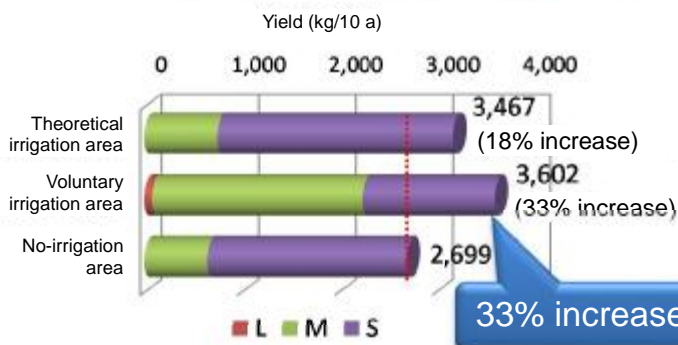
Q1. How big is the effect of upland irrigation?



(1) CARROT

Yield increased by 18 - 33% in irrigated area!

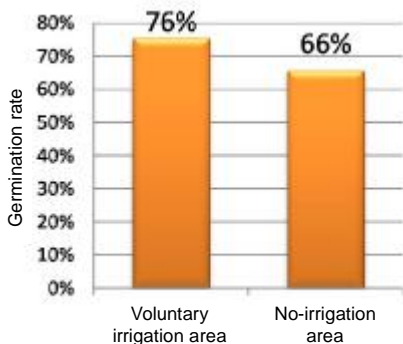
Number of carrots increased by 3,000 - 5,000 (10 - 20%)!



Mainly at the end of May to the beginning of June, when soil dryness is aggravated, watering of carrots was conducted. **Increase in the yield by 18 - 33%** was reported in the irrigated area. By the number, **3,000 - 5,000 (10 - 20%) more carrots** were yielded than in the no-irrigation area.

Watering immediately after sowing, and 10% increase in germination rate!

Watering right after sowing **increased germination rate by 10%**. Early growth is also good. **Increase in the yield by 44%** is reported in the irrigated area.

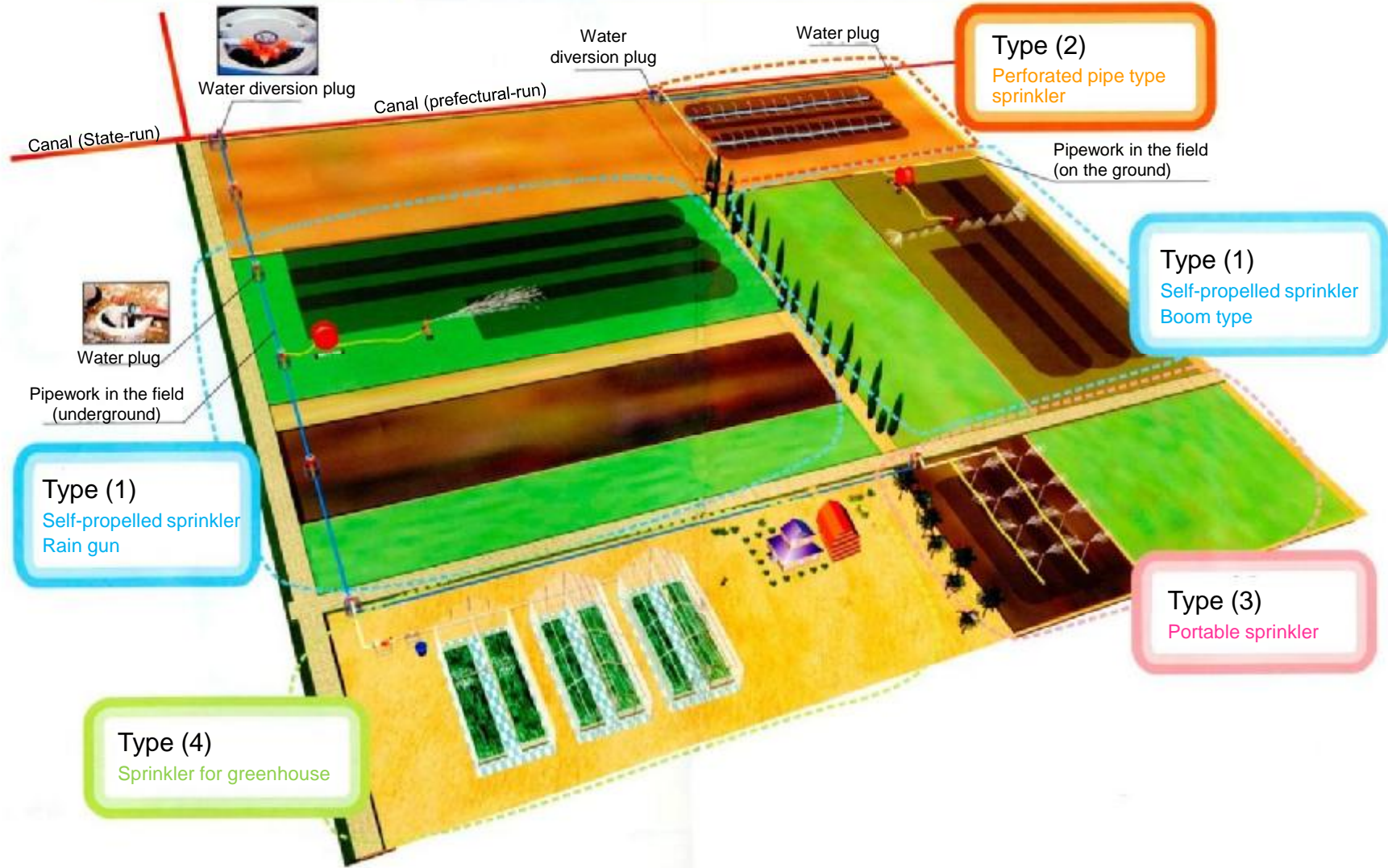


Decrease in abnormal roots (cracked/branched roots) in irrigated area!



Upland Irrigation Model

- ™ Water refilling in drought
- ™ Improvement in crop production
- ™ Improvement in crop quality
- ™ Prevention of wind/insect damage
- ™ Preventive use
- ™ Promoting germination/root taking
- ™ Scheduled crop system



Working processes of water supply pipe work

- (1) Removal of top soil (To prevent damage to the field, top soil within 0-30 cm from the surface is removed and accumulated)



- (2) Laying of steel plates (Preventing heavy machines from damaging the field)



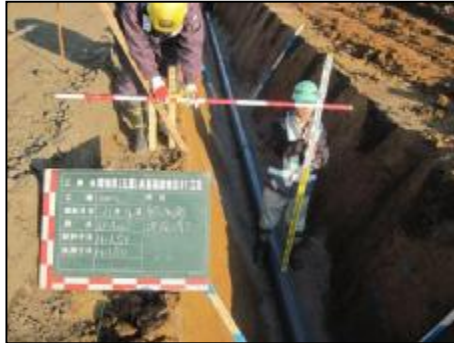
- (3) Excavation
(Excavating a ditch to bury the pipe)



- (4) Floor leveling (Eliminating roughness of the place where the pipe is going to be placed)



- (5) Laying the pipe
(Placing the pipe at the decided level)



- (6) Placing water plug
(Water is obtained from this plug)



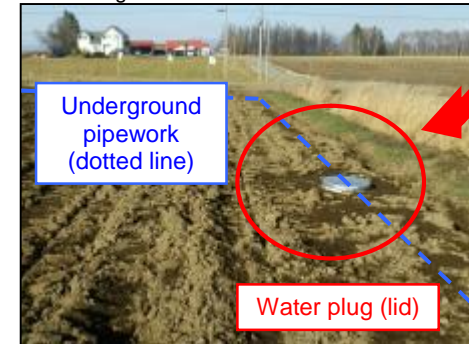
- (7) Backfilling (Backfilling is conducted manually up to 30 cm above the pipe in order to avoid pipe damage)



- (8) Placing a buried marker sheet
(Marking the place to prevent other future construction works from damaging the pipe)



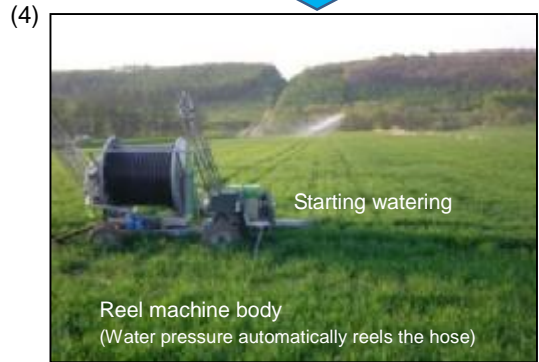
- (9) Completion of the construction work
(After the pipe is placed, top soil is returned and the original conditions of the field are restored)



Underground pipework (dotted line)

Water plug (lid)

Watering process using reel irrigation machine (example)



1) Watering using a rain gun



2) Watering using a boom type sprinkler

