附件二　林志憲論文發表簡報資料

Advanced pressure management pilot project in Yilan Taiwan

Lin, Chih-hsien

Taiwan Water Corporation

Outline

1.Literature Review

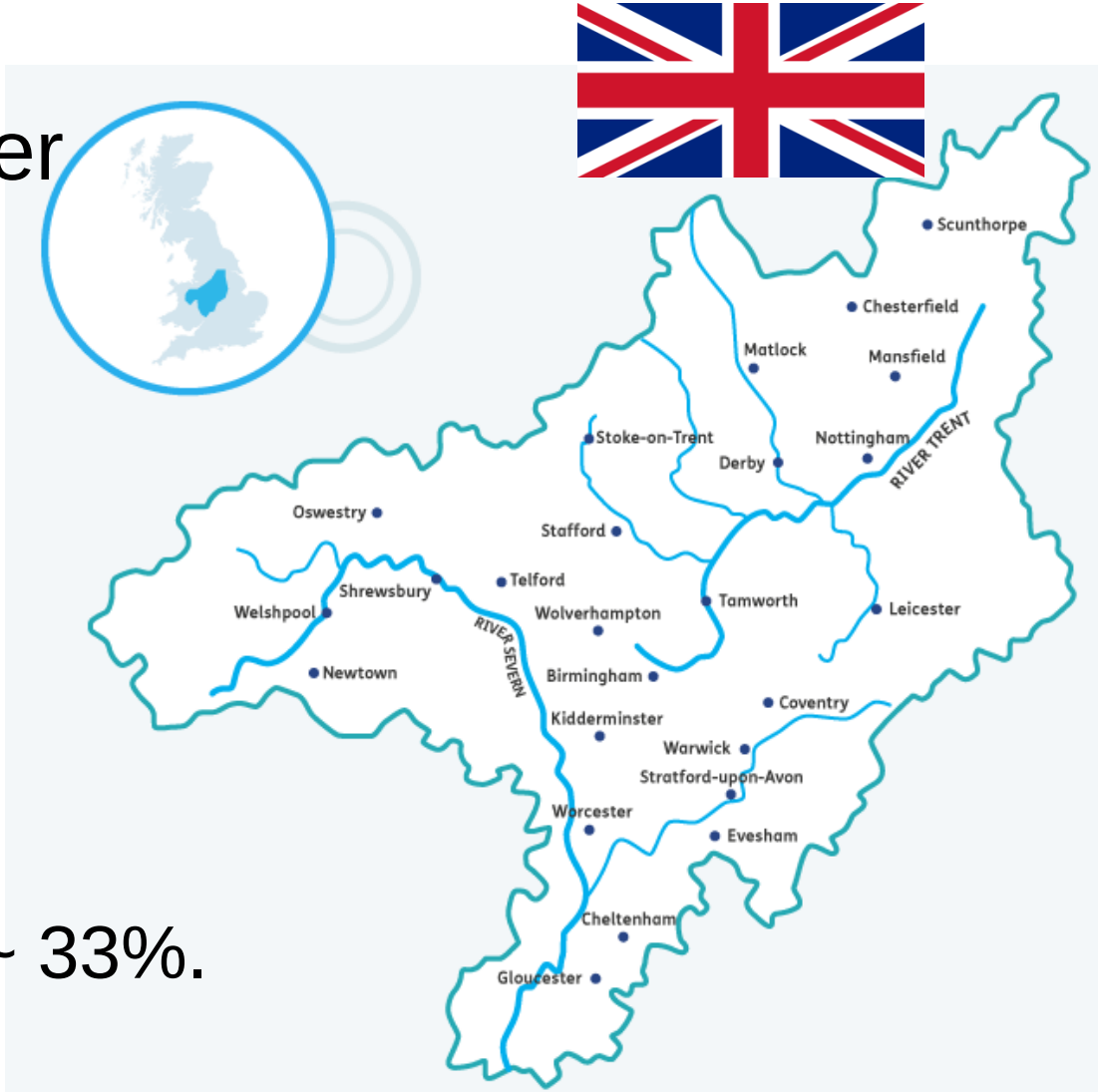
2.Methodology

3.Results

4.Conclusion

Literature Review

- Severn Trent Water



6 systems in 2009

leakage savings 9 ~ 33%.

Literature Review

- Eerste River

PRV with an electronic controller in 2009

leakage savings 12%

burst pipes drop 50%

Leak formula

- FAVAD theory
- $\frac{L_1}{L_0} = \left(\frac{H_1}{H_0}\right)^{N_1}$

Country	Years	N_1
UK	1977	1.13
Japan	1979	1.15
Brazil	1998	1.15
Taiwan TWD	2011	1.85

Why traditional PRV can not pressure management well ?

Fixed outlet pressure for the peak demand

- the off-peak periods pressure will be too high

Check PRV usually 1 times/3years

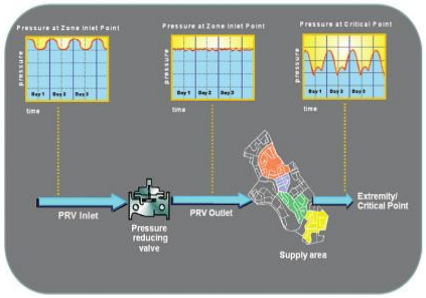
- must be satisfied the 3-years period max demand

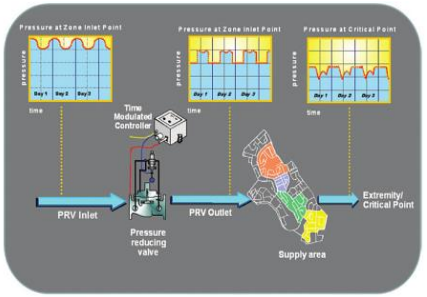
The operator may adjust the target value higher for specific needs

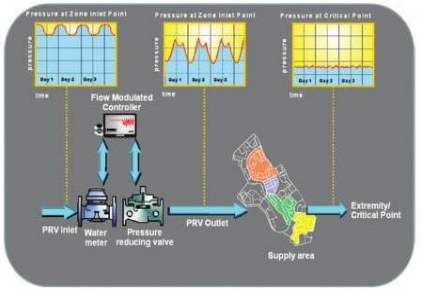
- forget to restore it

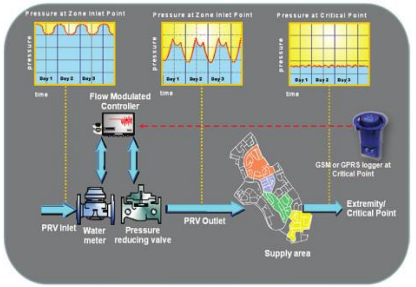
Reducing the pressure modes

1. Fixed outlet pressure control
2. Time-modulated pressure control
3. Flow modulated pressure control
4. Closed loop and hybrid control









(copy from Hamilton, S., McKenzie, R's paper)

PRV control system network and install

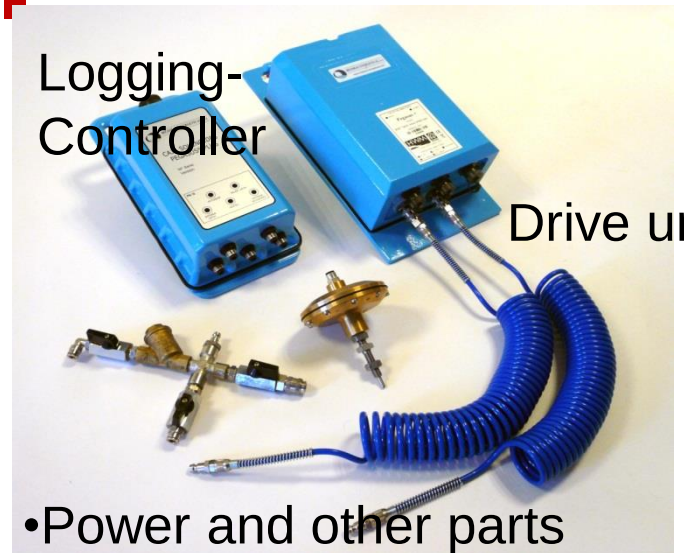
data

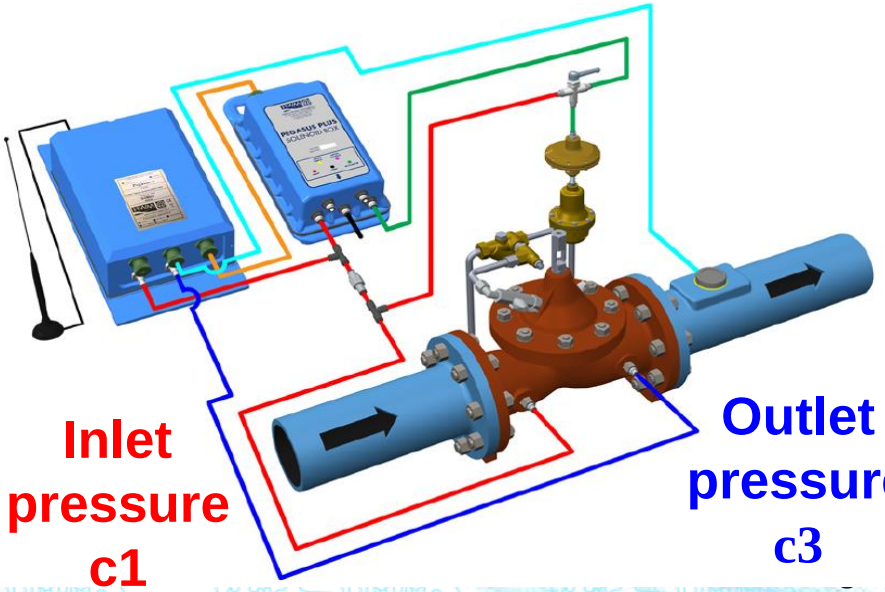
Private VPN

Configure setup

Socket

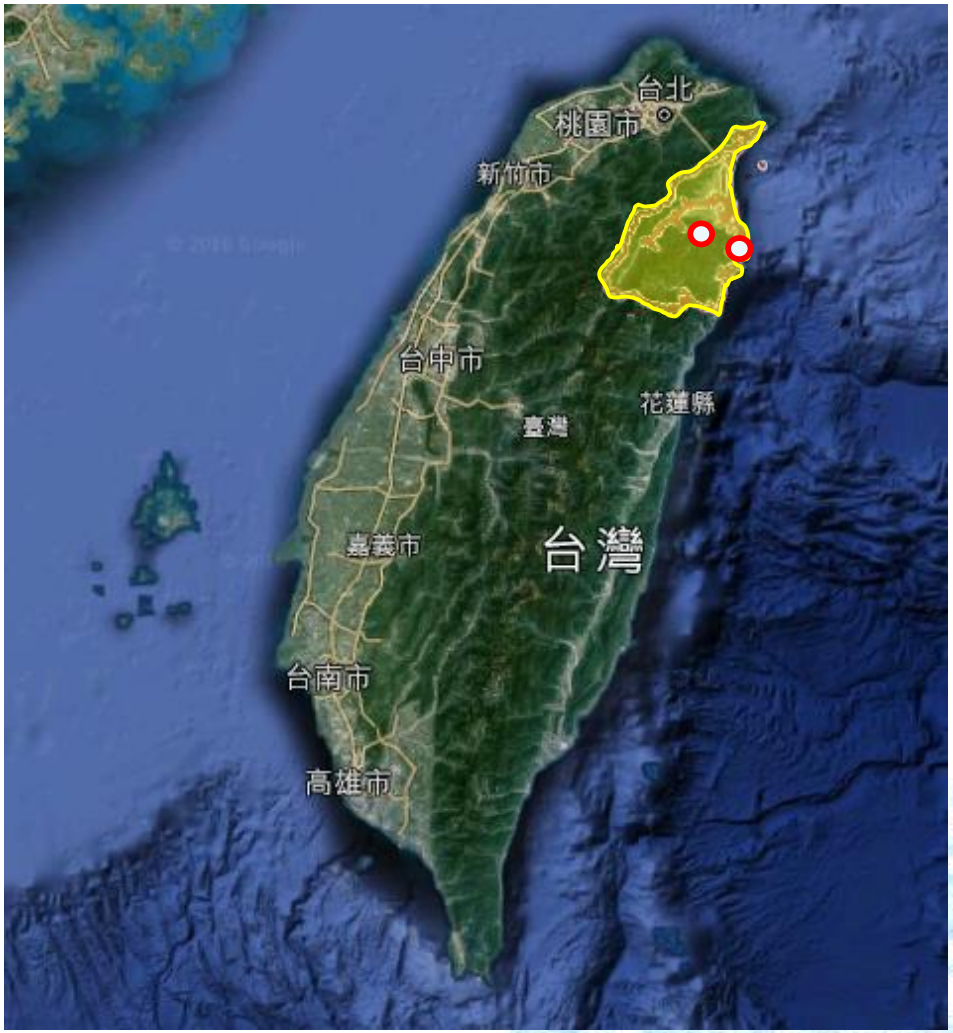
Intranet





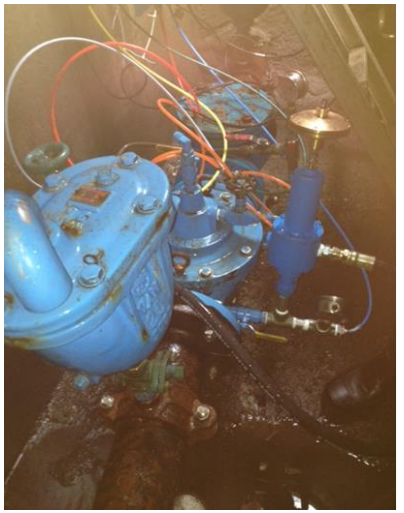
Results

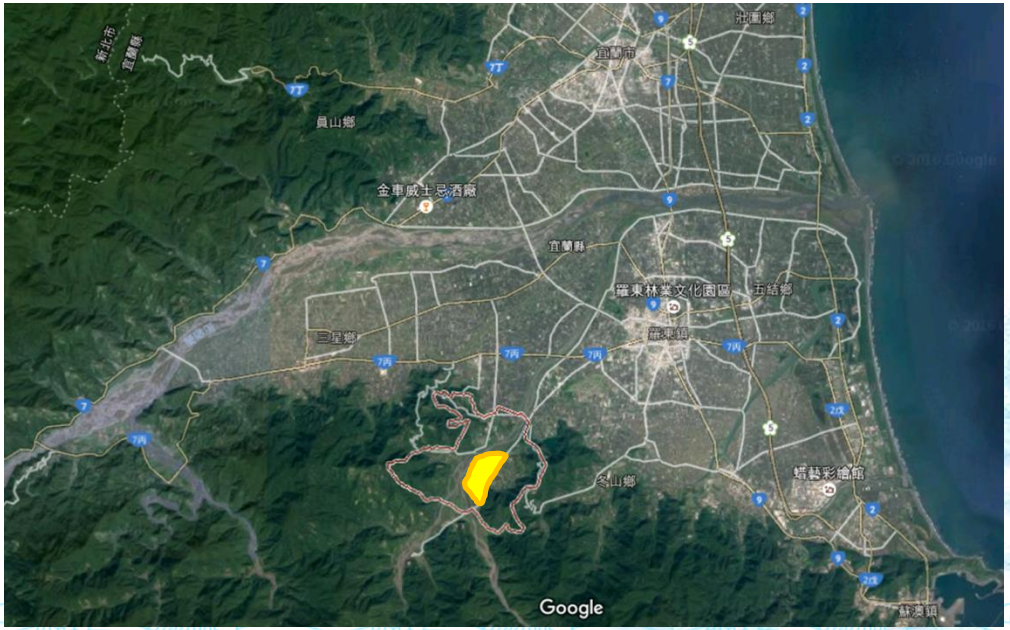
- The pilot project, two fields in Yilan, Taiwan
  - Dajin
  - Nanfang'ao



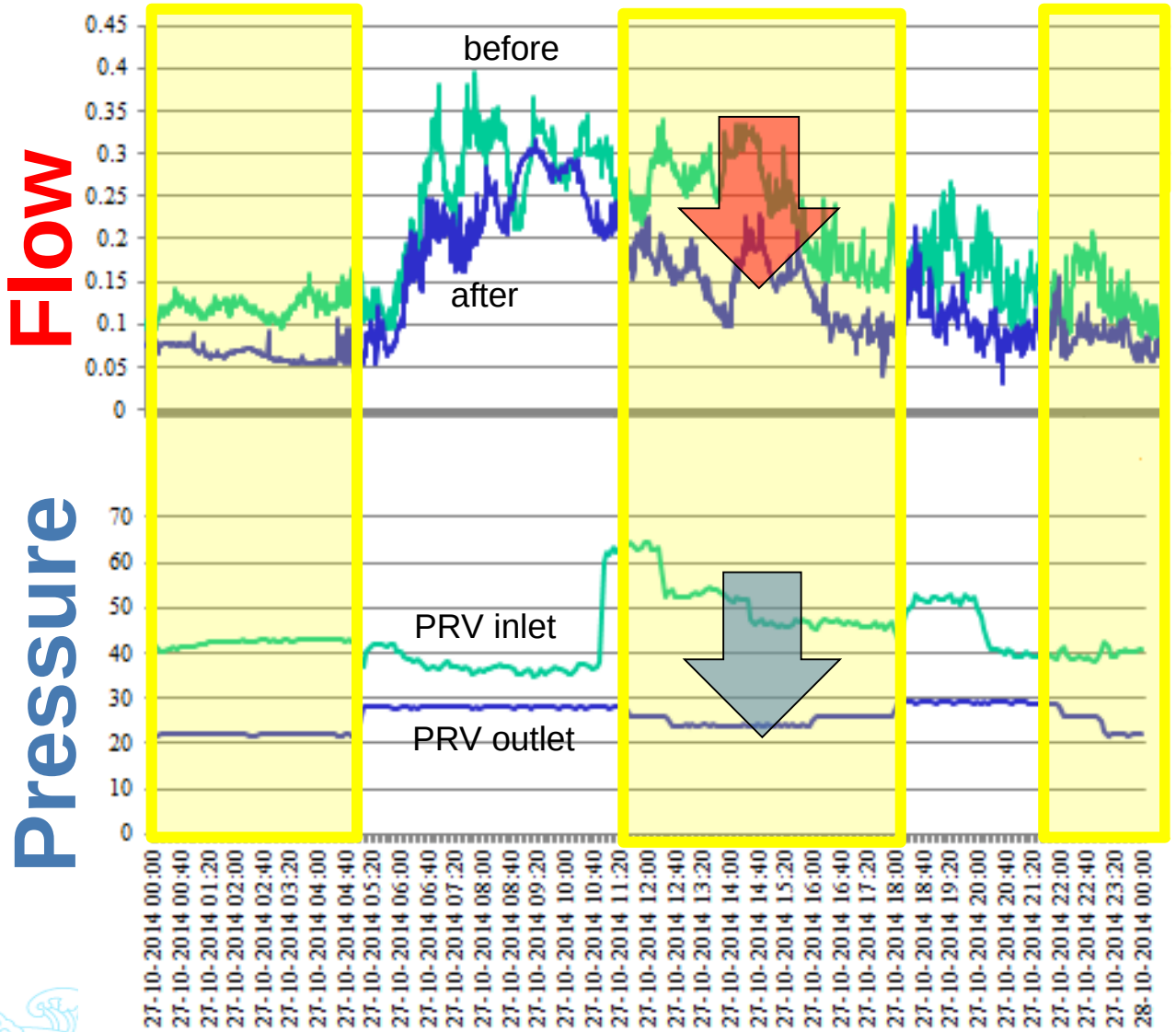
Results(1)

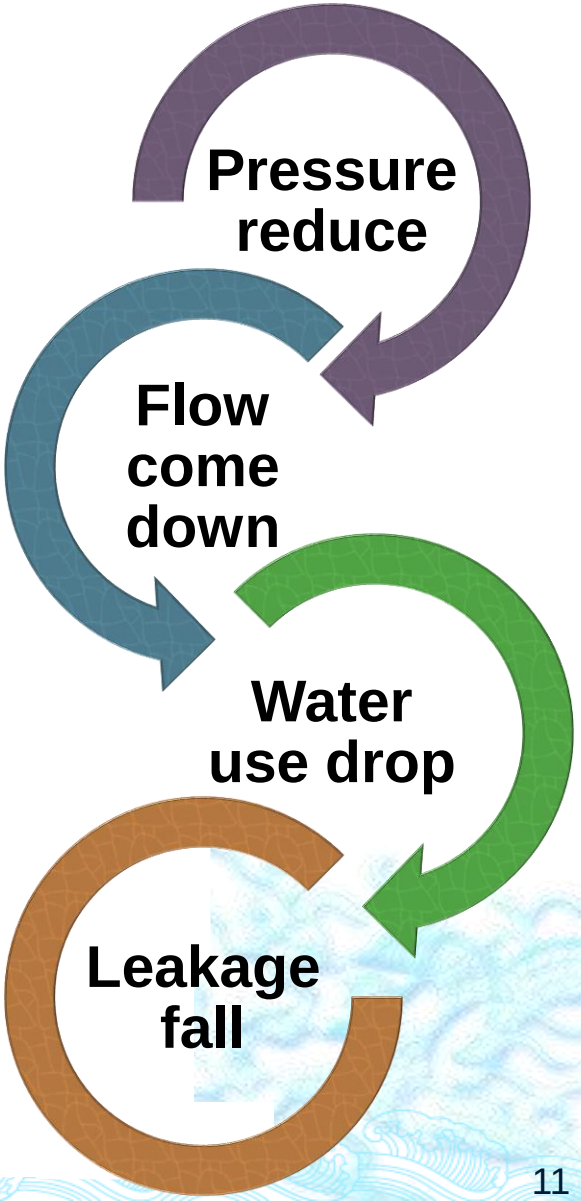
- Dajin (first area)
  - about 200 households
  - farming demand pattern
  - Ø100mm PRV
  - September 2014 installed
  - set time control mode





Dajin test results (before and after)



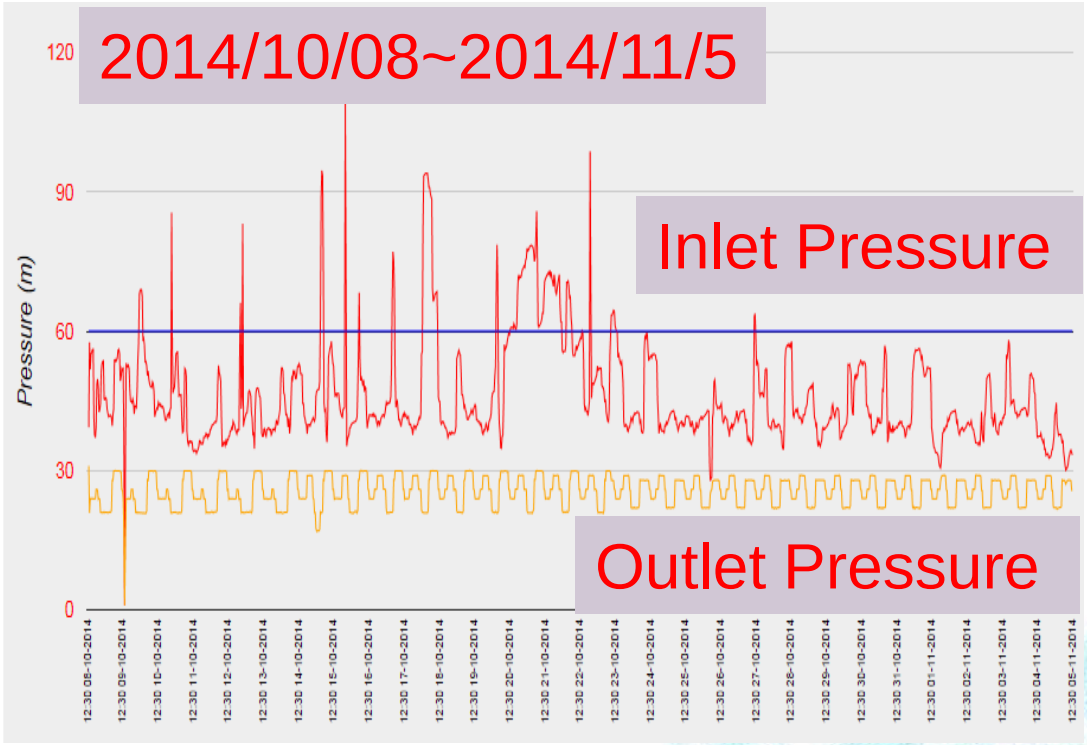


Dajin test discuss

Test around 1 month

Total water use
232➔154m3/day

Saving 33.6%

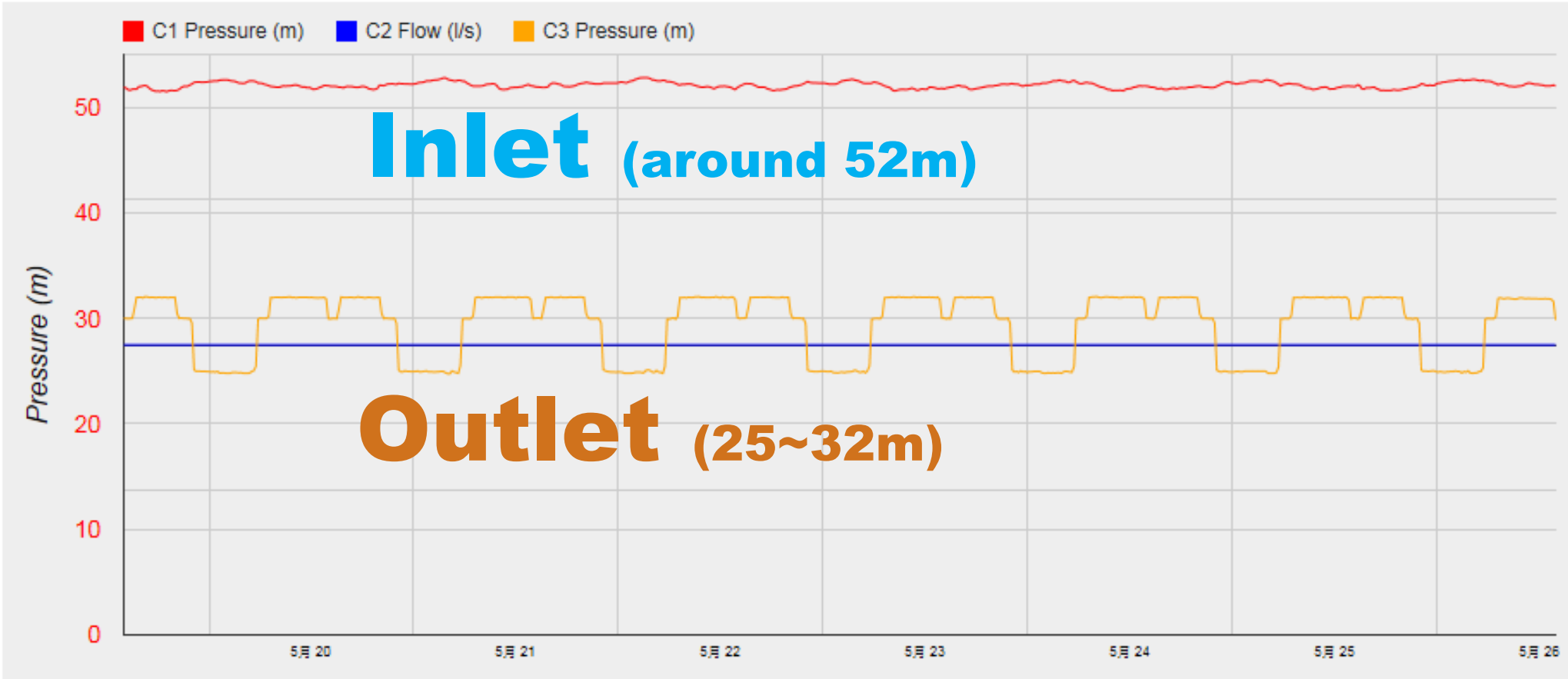


Results(2)

- Nanfang'ao (second area)
  - about 2,400 households
  - fishing village demand pattern
  - Ø300mm PRV
  - March 2015 installed, test twice
  - set closed-loop control mode
  - critical point at Nan'an Junior High School

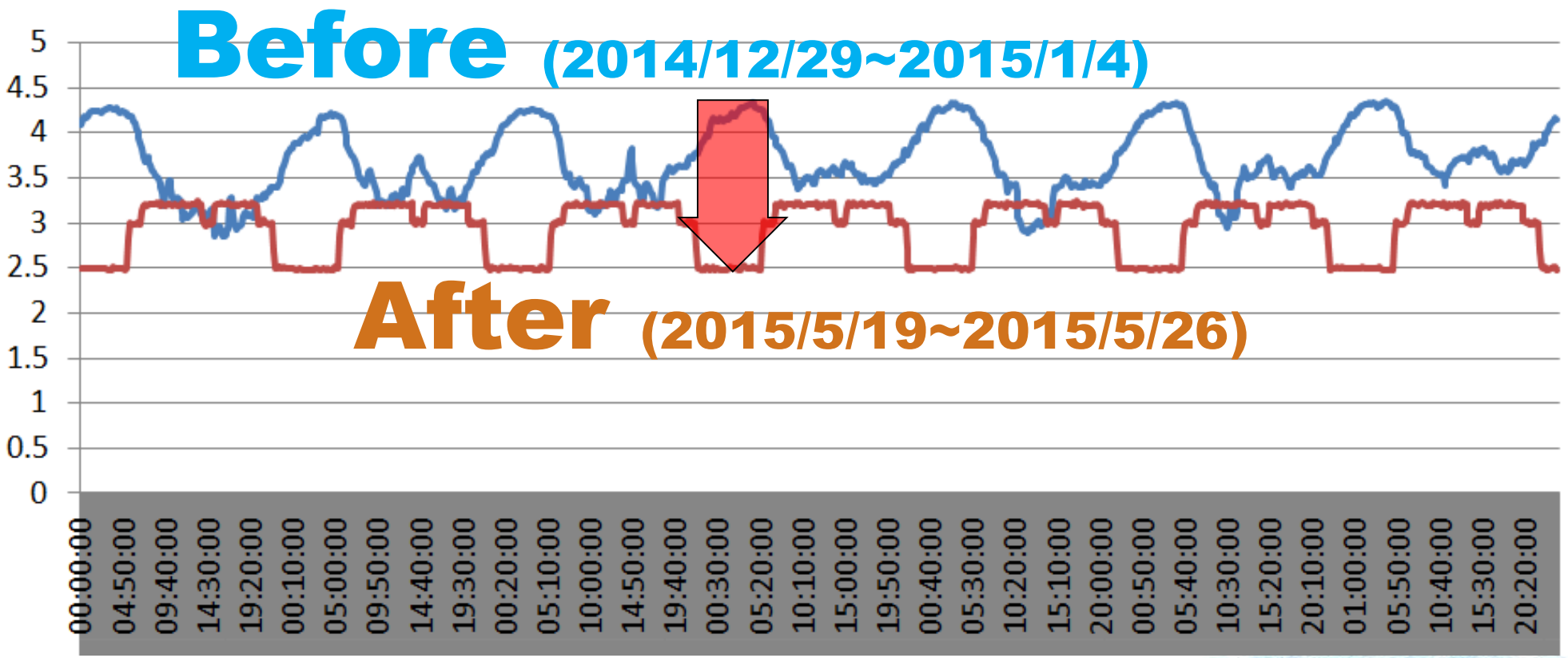
Nanfang'ao test 1 results
(inlet and outlet)

- 2015/5/19~2015/5/26 PRV pressure



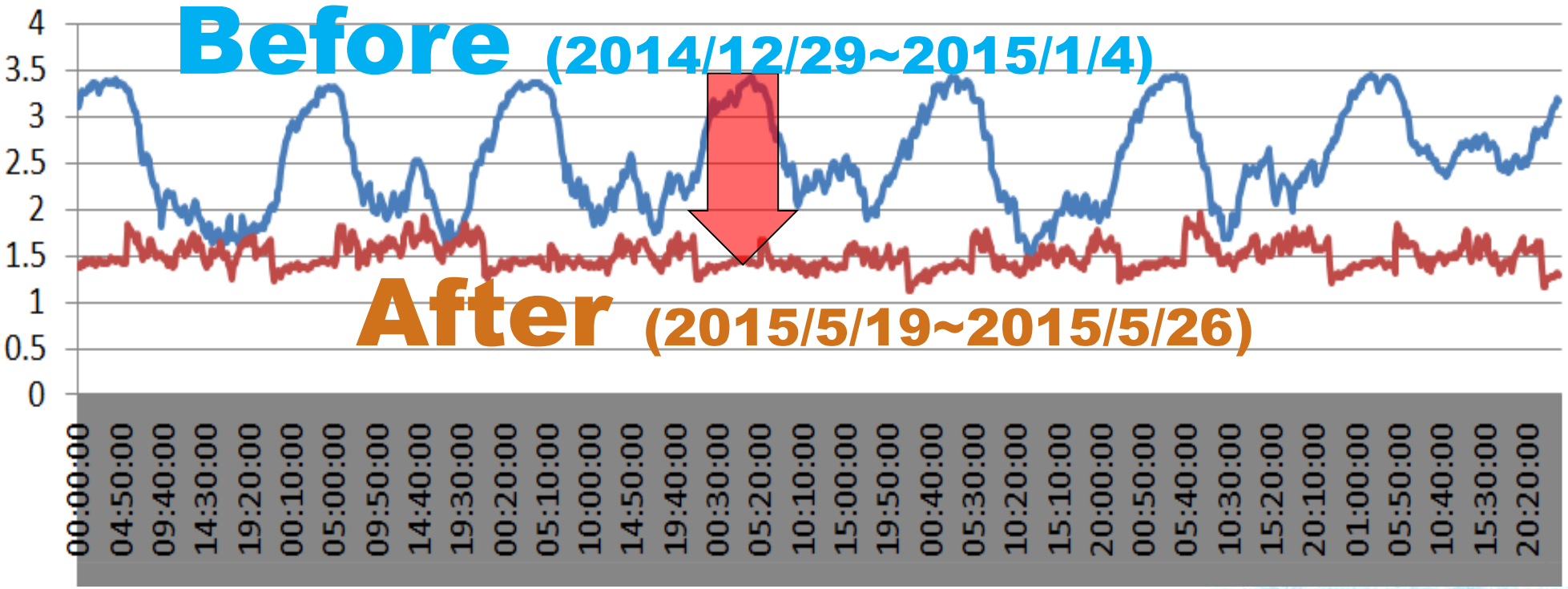
Nanfang'ao test 1 results
(before and after)

- PRV outlet pressure



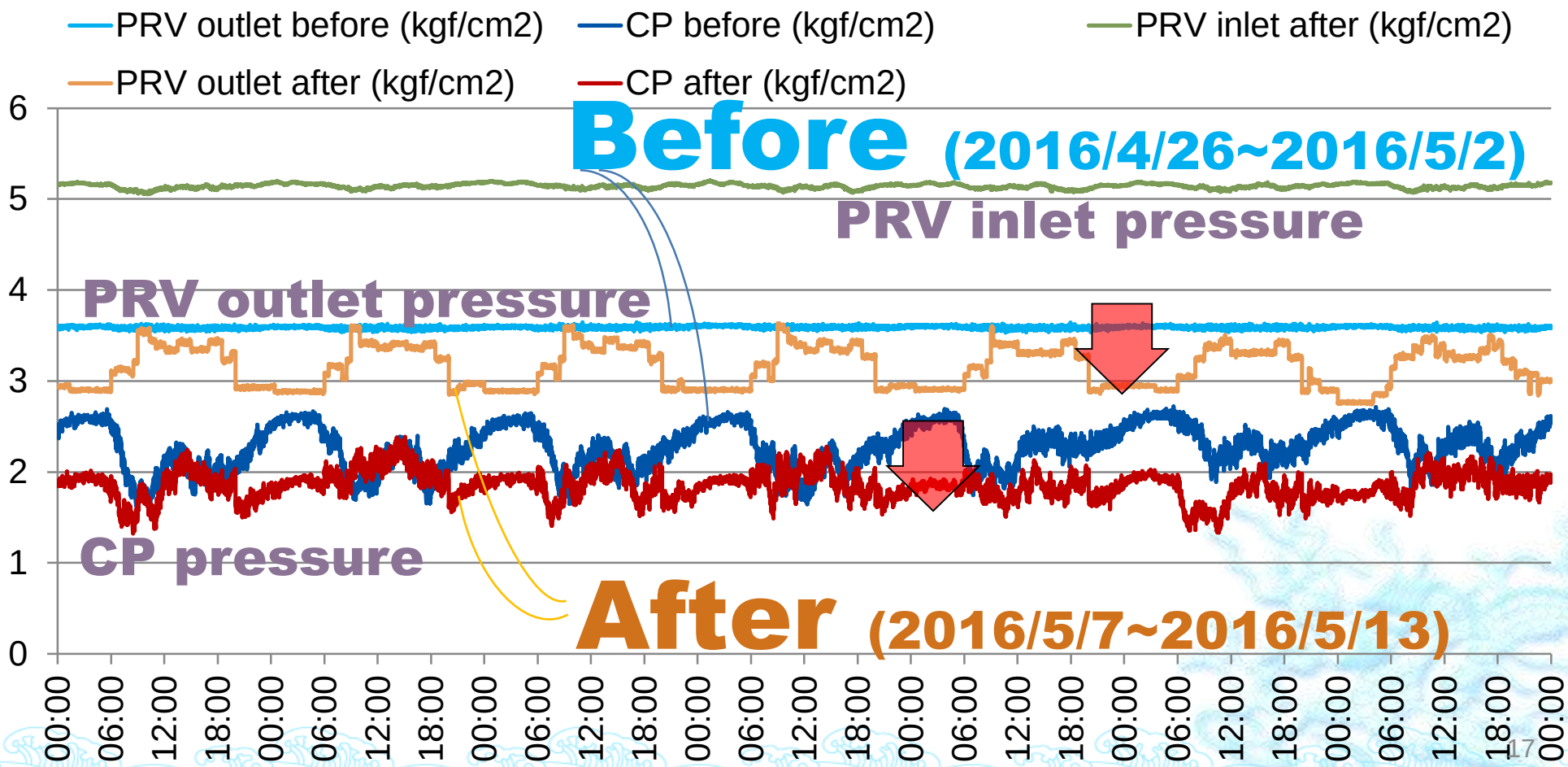
Nanfang'ao test 1 results
(before and after)

- critical point pressure at Nan'an Junior High School



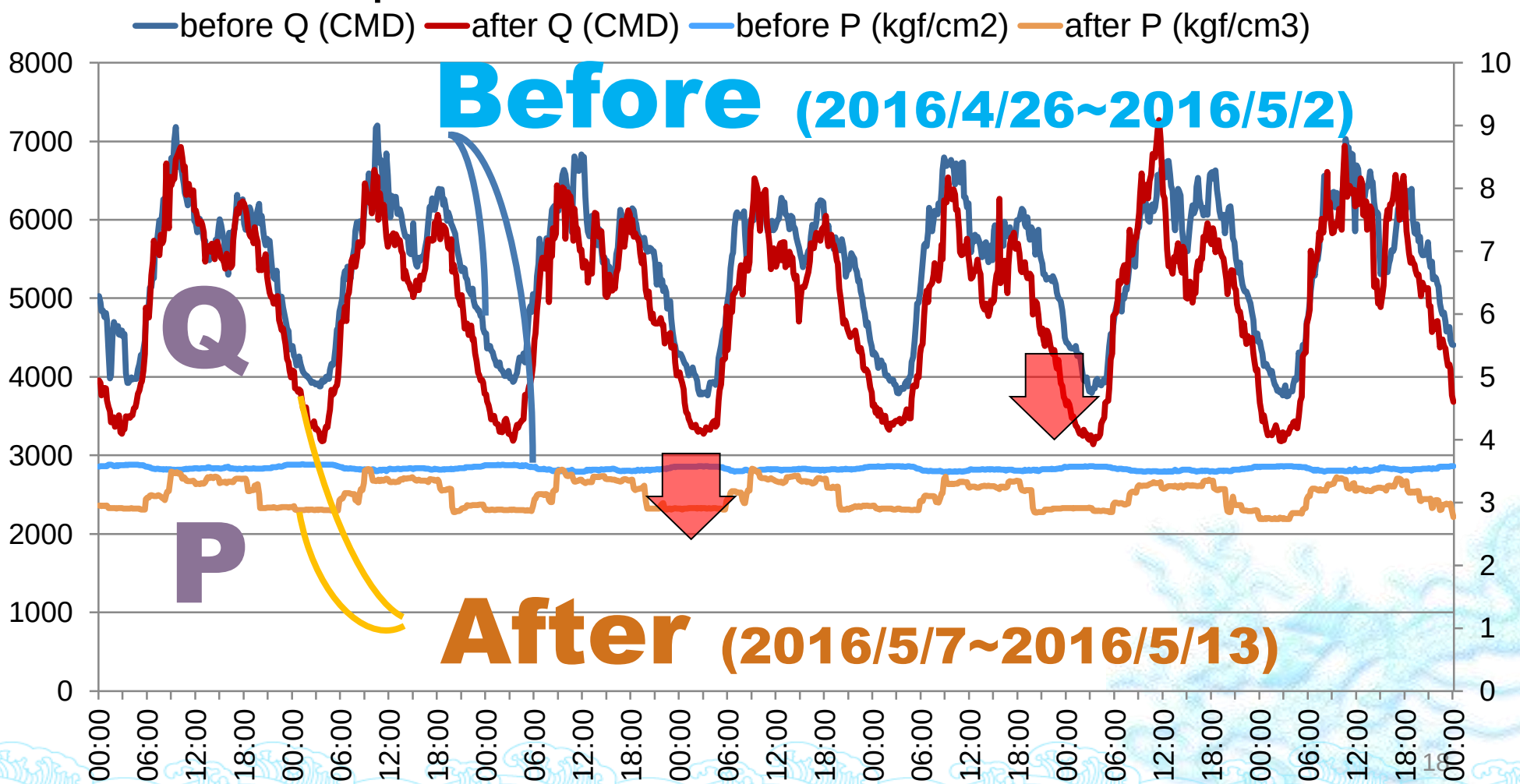
Nanfang'ao test 2 results
(before and after)

- critical point pressure at Nan'an Junior High School



Nanfang'ao test 2 results
(before and after)

- PRV outlet pressure and flow



Nanfang'ao test 2 discuss

Test around 1 week

Total water use
5,470➔5,040CMD
7.87%↓

MNF
3,750➔3,141.6CMD
16.2%↓

Discuss

Saving water

Cons

Mobile communication

Benefits

Conclusion

Pilot project worked well

Reduce the leakage

Smooth pressure and fit the needs

Thank you for your attention

Better Water

Better Life