Numerically optimized irrigation for wheat cultivation in semi-arid region
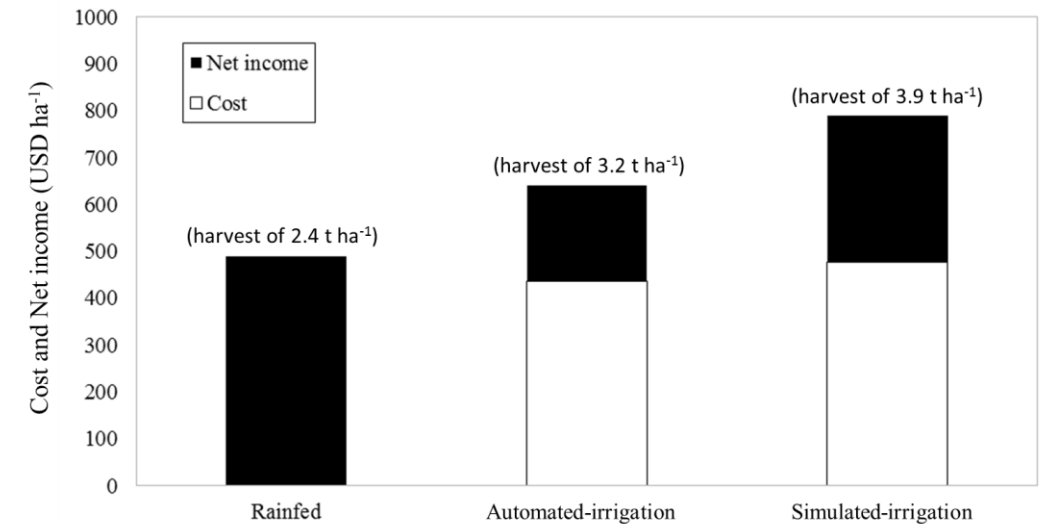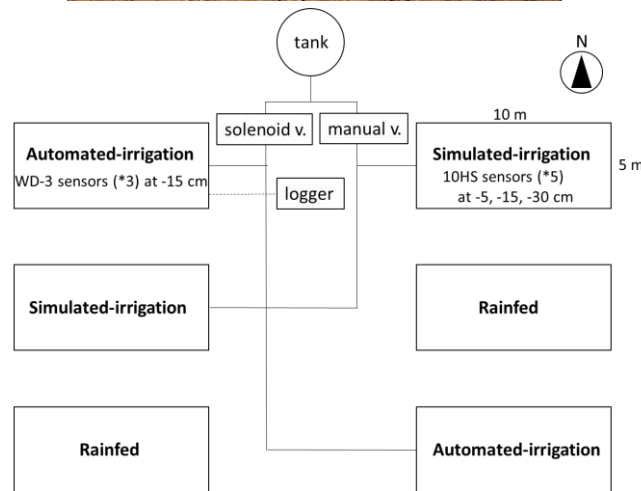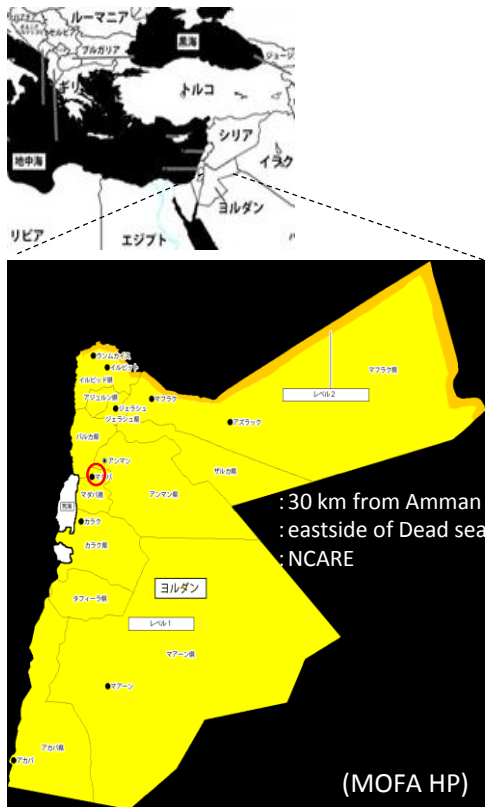
PD   I. SAKAGUCHI

: Numerical model of two-dimensional heat and mass transfer in soil including plant growth (WASH_2D)
: Weather information and forecast

⇨ Proposed methodology of determining irrigation depth optimized to maximize net income (**Simulated-irrigation**) and field experiments using the Simulated-irrigation

(Fujimaki *et al.*, 2014)

➡ Field experiment using the Simulated-irrigation in semi-arid region where effectiveness of the Simulated-irrigation is expected to be significant (Nov.2015-Jun.2016)

(MOFA HP)

: 30 km from Amman
: eastside of Dead sea
: NCARE

tank

solenoid v.   manual v.

Automated-irrigation
WD-3 sensors (*3) at -15 cm

Simulated-irrigation
10HS sensors (*5)
at -5, -15, -30 cm

10 m

5 m

N

logger

Simulated-irrigation

Rainfed

Rainfed

Automated-irrigation

Cost and Net income (USD ha^{-1})

■ Net income
□ Cost

(harvest of 2.4 t ha^{-1})   Rainfed
(harvest of 3.2 t ha^{-1})   Automated-irrigation
(harvest of 3.9 t ha^{-1})   Simulated-irrigation

: Increases in harvest and gross income in case of Simulated-irrigation
: Reduction of cost for irrigation water is required