Climate

increased productivity (r_{update})

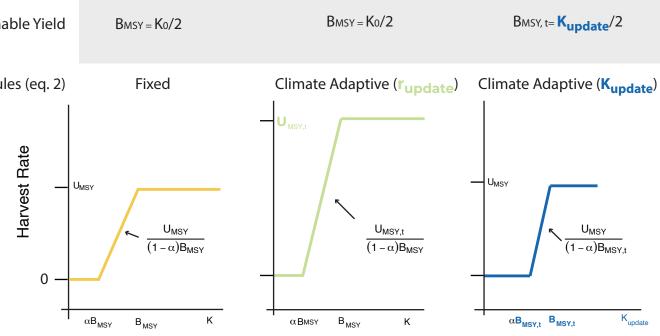increased carrying capacity (K_{update})

time-varying surplus production model (eq. 1)

$$B_{t+1} = B_t + r_t B_t \left(1 - \frac{B_t}{K_t}\right) - U_t B_t$$

	Fixed Managment	Climate Adaptive Managment	Climate Adaptive Managment
Harvest rate at Maximum Sustainable Yield U_{MSY}	$U_{MSY} = r_0/2$	$U_{MSY,t} = r_{update}/2$	$U_{MSY} = r_0/2$
Biomass at Maximum Sustainable Yield B_{MSY}	$B_{MSY} = K_0/2$	$B_{MSY} = K_0/2$	$B_{MSY,t} = K_{update}/2$

Harvest Control Rules (eq. 2)

Fixed

Climate Adaptive (r_{update})

Climate Adaptive (K_{update})

Harvest Rate

U_{MSY}

0

$\frac{U_{MSY}}{(1-\alpha)B_{MSY}}$

αB_{MSY} B_{MSY} K

$U_{MSY,t}$

$\frac{U_{MSY,t}}{(1-\alpha)B_{MSY}}$

αB_{MSY} B_{MSY} K

U_{MSY}

$\frac{U_{MSY}}{(1-\alpha)B_{MSY,t}}$

$\alpha B_{MSY,t}$ $B_{MSY,t}$ K_{update}

Biomass