$$S_t = -\beta_{SA} SA - \beta_{SI} SI - \mu S, \tag{1}$$
$$E_t = \beta_{SA} SA - \beta_{SI} - (\sigma_A + \sigma_I) E, \tag{2}$$
$$A_t = \sigma_A E - M_{AR} A, \tag{3}$$
$$AR_t = M_{AR} A, \tag{4}$$
$$I_t = \sigma_I E - MI, \tag{5}$$
$$H_t = \gamma MI - (1-\omega)\chi H - \omega\psi H, \tag{6}$$
$$R_t = (1-\gamma) MI + (1-\omega)\chi H, \tag{7}$$
$$D_t = \omega\psi H. \tag{8}$$