(A)

ESTIMATING AGRICULTURAL WATER CONSUMPTION

livestock drinking

$$V^{(\text{per kg})}_{H_2O} \approx \frac{f\ \text{L}}{\text{person} \times \text{day}} \times \frac{\text{person}}{50\ \text{kg}}$$

$$\approx 10^{-1}\ \text{L} / (\text{kg} \times \text{day})$$

$$m_{\text{livestock}} \approx f \times 10^{12}\ \text{kg}$$

$$V^{(\text{total})}_{\text{livestock}} \approx \frac{10^{-1}\ \text{L}}{\text{kg} \times \text{day}} \times \frac{f \times 10^{2}\ \text{days}}{\text{year}} \times f \times 10^{12}\ \text{kg}$$

$$\approx 10^{14}\ \text{L / year}$$

irrigation

$$A_{\text{agriculture}} \approx f \times 10^{13}\ \text{m}^2$$

$$\Phi_{\text{irrigation}} \approx 10\%$$

$$A_{\text{irrigation}} \approx 0.1 \times f \times 10^{13}\ \text{m}^2 \approx f \times 10^{12}\ \text{m}^2$$

$$V^{(\text{m}^2)}_{\text{irrigation}} \approx 1\ \text{L} / (\text{m}^2 \times \text{day})$$

$$V^{(\text{total})}_{\text{irrigation}} \approx f \times 10^{12}\ \text{m}^2 \times \frac{1\ \text{L}}{\text{m}^2 \times \text{day}} \times \frac{f \times 10^{2}\ \text{days}}{\text{year}}$$

$$\approx 10^{15}\ \text{L / year}$$

(B)

$$V^{(\text{total})}_{\text{agriculture}} \approx V^{(\text{total})}_{\text{livestock}} + V^{(\text{total})}_{\text{irrigation}} \approx 1 \times 10^{15}\ \text{L / year}$$