Investigating and providing information on the positive amenities, services and goods provided by irrigation systems

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Multifunctionality of irrigated agriculture and rural areas

Prevent landslides
Prevent soil erosion
Recharge GW aquifer
Preserve views of rural areas
Flood prevention
Handling down culture
Healing and relaxing people
Stabilise river flows
Providing habitats for creatures (Ecosystem)
Place to experience learning and education
Prevent soil erosion
Flood prevention

In addition to the above,
- Place for medical care, nursing care, and welfare
- Decomposing organic matter
- Promoting rural development

Other use of irrigation water for local community

Washing
Cooling
Breeding fish
Snow extinguishing

Domestic use
Other use of irrigation water for local community

Fire Prevention

Securing living condition

Multifunctionality of irrigated agriculture

Enhancing capacity building

Renewable energy

Hydro power

Cooking! (boiled eggs)

Enjoy bathing!

Hydro power using irrigation pond and the usage of generated electricity

Renewable energy

Hydro power

Generated electricity is used for labor saving

Live view camera

View through smart phone

Renewable energy

Solar power

Solar power panels over canal

Solar power panels floating on a regulation pond

Amenities, services, and goods provided by Irr Sys

<table>
<thead>
<tr>
<th>Item</th>
<th>Category</th>
<th>Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flood prevention</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>2. Landslides and soil run-off prevention</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>3. Stabilization of river flows</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>4. Recharging groundwater</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>5. Providing habitats for creatures (aquatic)</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>6. Preserving views of rural areas</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>7. Handing down culture</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>8. Handing down health</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>9. Place to experience learning and relaxation</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>10. Place for medical care, nursing care, and welfare</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>11. Healing and relaxing people</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>12. Decomposing organic matter</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>13. Domestic water use</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>14. Securing living environment</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>15. Enhancing social capital</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>16. Renewable energy</td>
<td>A</td>
<td>O</td>
</tr>
</tbody>
</table>
Water use for cultivation management (Vegetables and taro - a case study of Tottori)

<table>
<thead>
<tr>
<th>Purpose of Irrigation</th>
<th>Crop</th>
<th>Crop growth (mm)</th>
<th>Cultivation management (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Japanese radish</td>
<td>0</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>Green onion (winter)</td>
<td>0</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Green onion (spring)</td>
<td>103</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>Taro</td>
<td>0</td>
<td>896</td>
</tr>
</tbody>
</table>

6 months (from April to September) Rainfall: 835 mm, ET$_{ref}$: 737 mm

In the coastal irrigation districts (sandy soil), most of irrigation water is used to prevent sand blow by wind.

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Water use for cultivation management (Japanese shallot, Tottori)

Farmers irrigate to their fields not only for crop growth but also for easy seeding and preventing sand blow.

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Water use for cultivation management (Tea plantation and orchards, Shizuoka and Wakayama)

Tea plantation and orchards

Conventional method: rainfed + solid fertilizer

New method: drip/sprinkler with liquid fertilizer

$\Rightarrow$ Promote quick growth of trees

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Water use for cultivation management (Frost protection by sprinkler - Entre rios, Argentina)

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Summary

- Amenity, services, and goods (ASG) provided by irrigation system are summarized based on Japanese cases, mainly paddy rice irrigation.
- Irrigation systems provide ASG to fields, rural areas, and basin (rural area + city).
- Hydro power and solar power have been disseminated as recently recognized goods.
- Water use for cultivation management can not be ignored to save labor costs and increase productivity.

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Future step

Need to add more info about amenity, service, and goods provided by irrigation systems, especially, in arid and semi-arid regions.

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The Basic Law on Food, Agriculture, and Rural Areas (1999) notes that agricultural lands not only "function as places for food production, living and resting, they also fulfill a variety of other roles and multifunctionality."