

Solar - powered Water Circulator



C&C SOLUTION

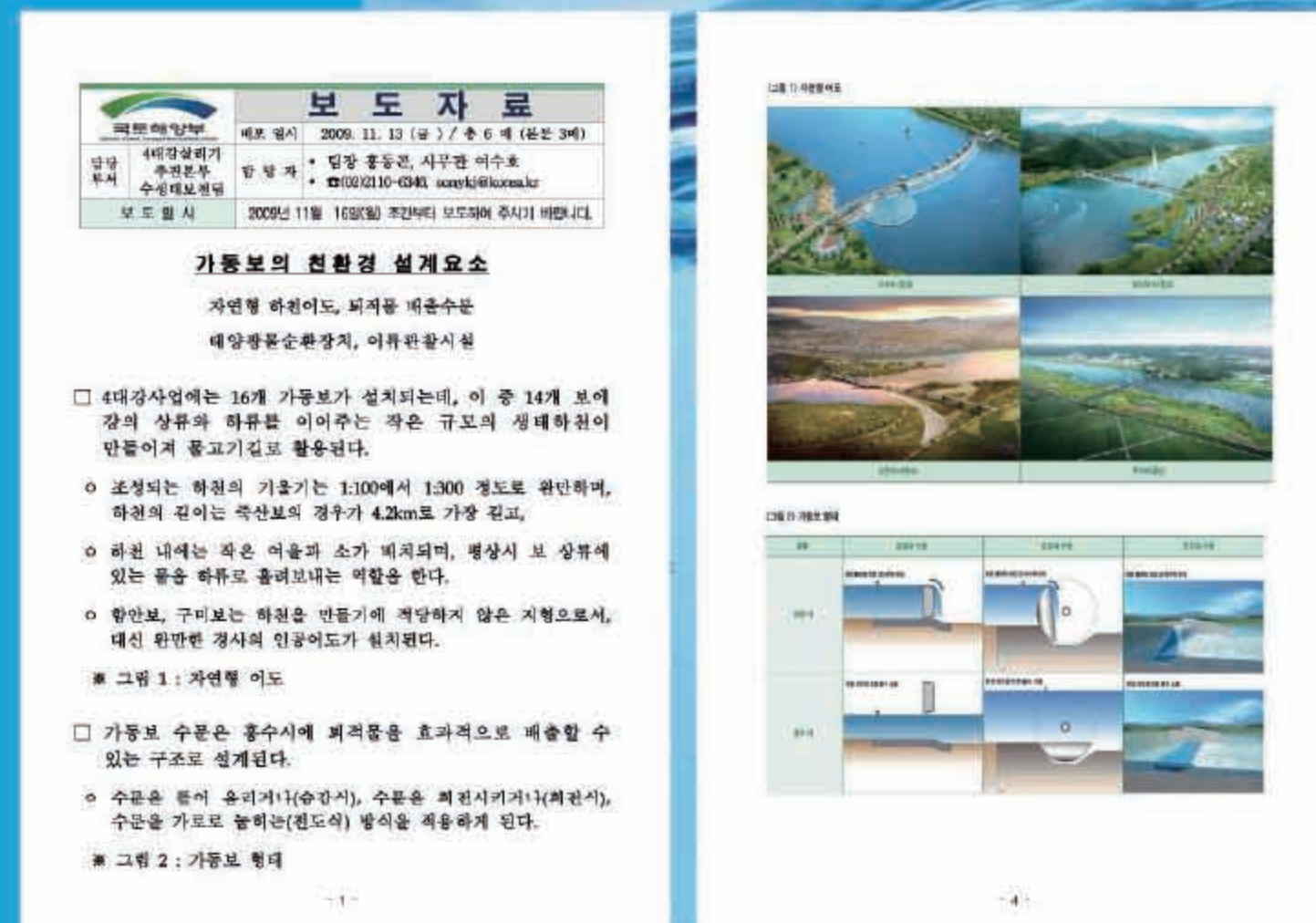
Selected as "Example of eco-friendly design"

4 River Restoration Project by Ministry of Land, Transportation and Maritime Affairs

- News release by Ministry of Land, Transportation and Marine Affairs (09.11.30)

- Solar-powered Water Circulator selected as eco-friendly design element of movable weir

Han River Basin / Yeongsan River Basin / Nakdong River Basin / Daegu Regional Environmental Office



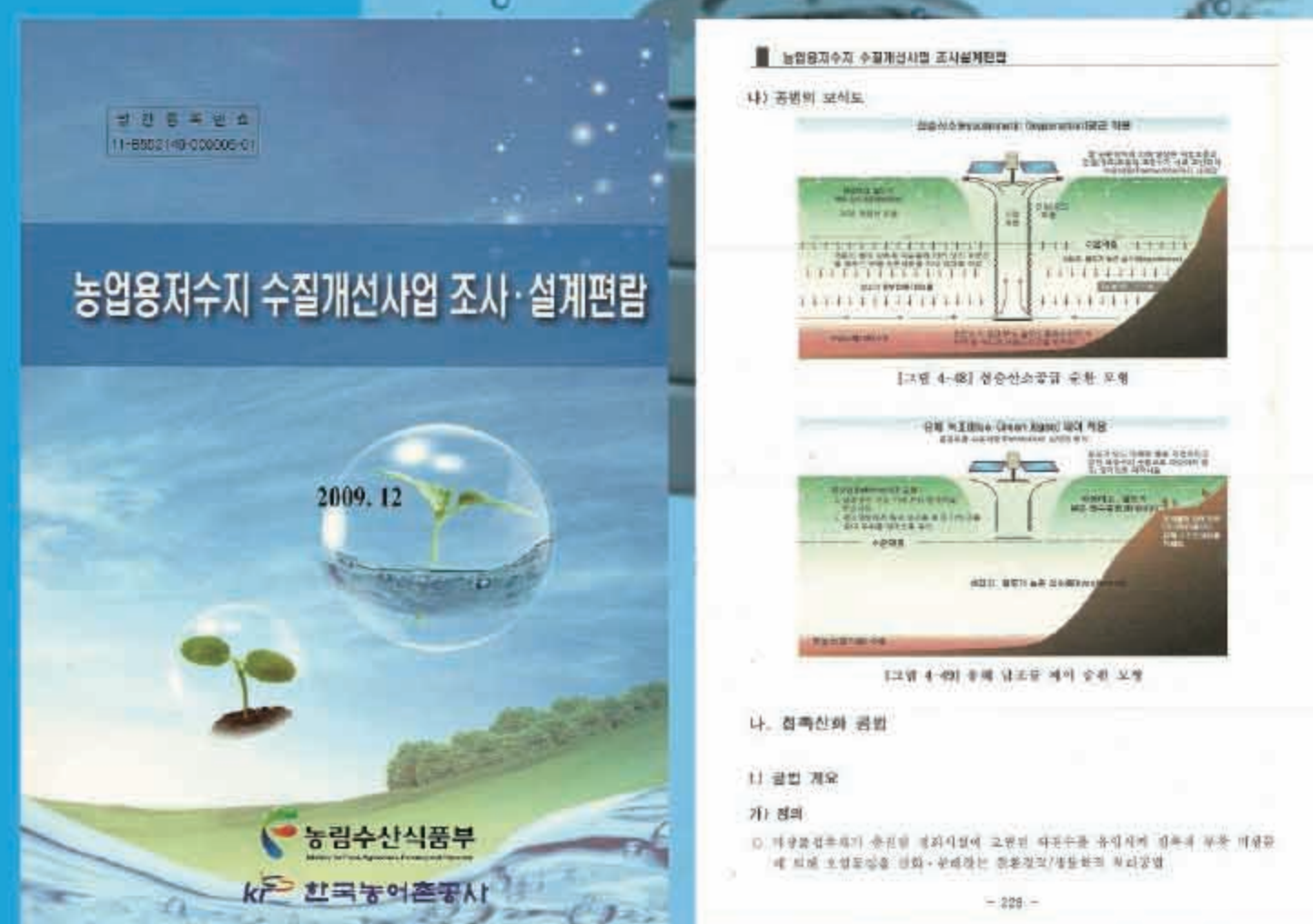
Included in the Water Improvement Project Manual

Korea Rural Community Corporation

- Manual of water improvement for agricultural use

- Features, effects & advantages of technology recorded in detail

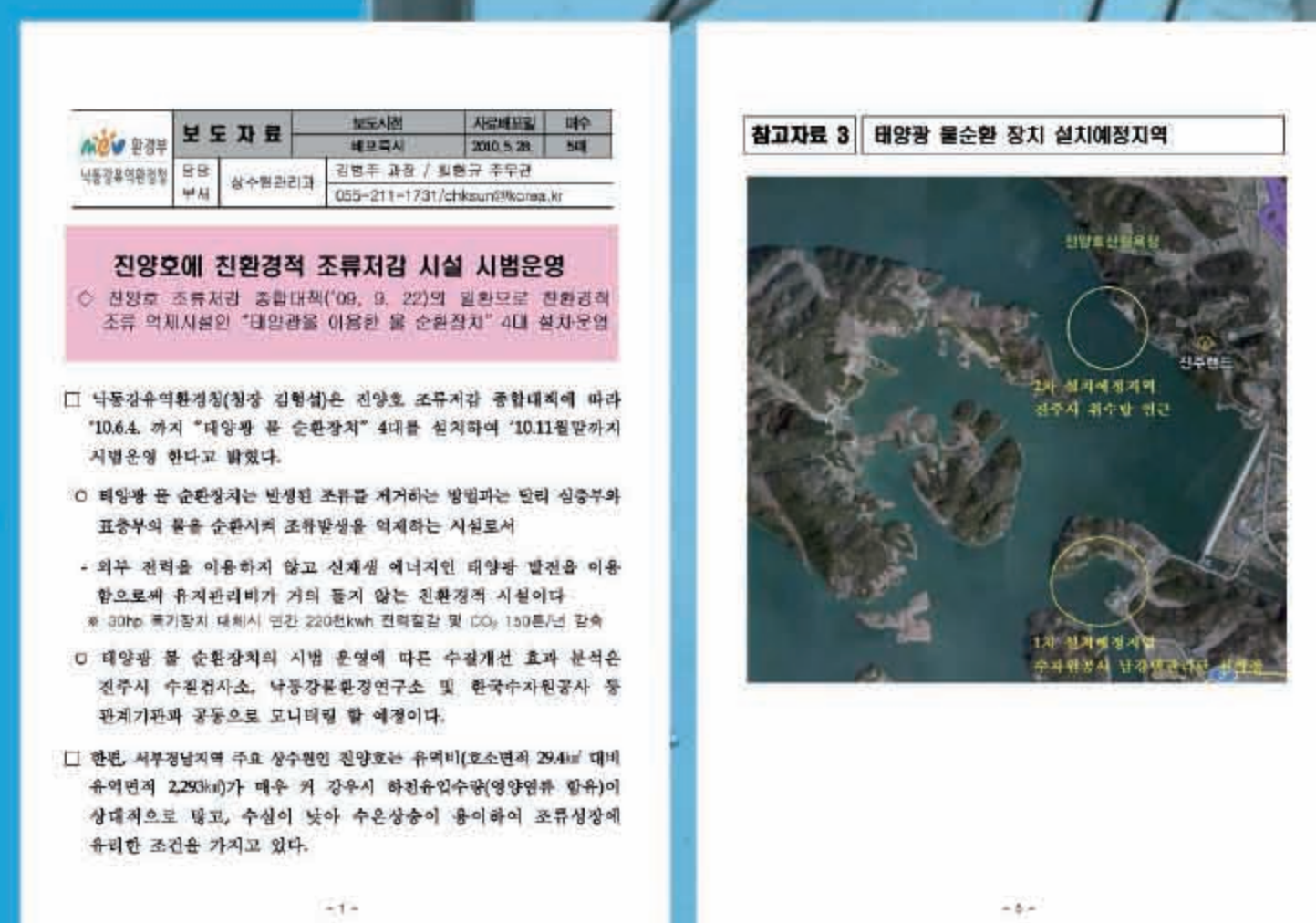
- Applied to the design by persons in charge



Applying to "Eco-friendly algae reduction plan"

Nakdong River Basin Environmental Office of Ministry of Environment

- 4 Solar-powered Water Circulators being test-operated as eco-friendly reduction facility according to Jinyangho Lake Algae reduction comprehensive plan



Environment & Energy Tech 2013



2013 Water Management Symposium & Fair



2014 Water Management Symposium & Fair



ENTECH HANOI 2014



Environment & Energy Tech 2014



K-Water Demonstrations on Algal Bloom-Removing Technology

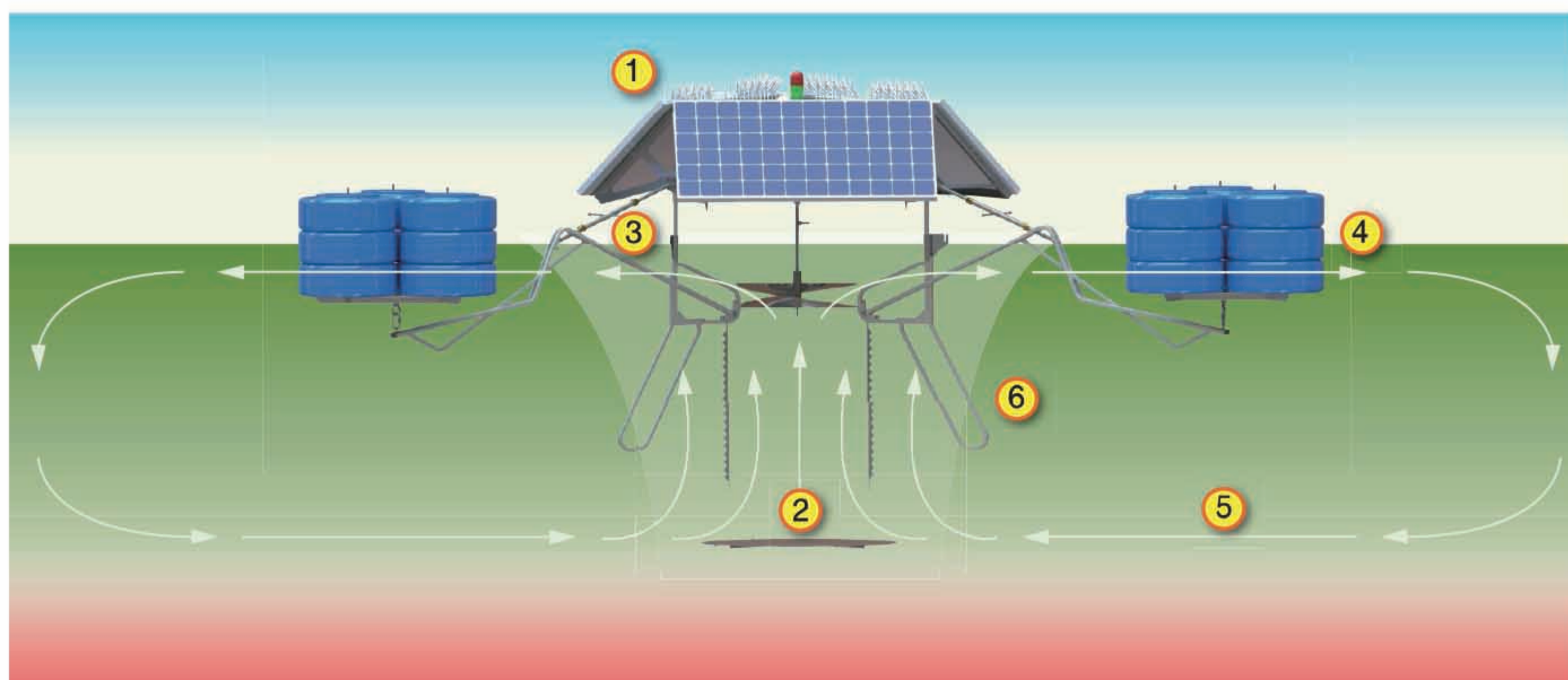
- Toxic Algae Control
 - Toxic Water Plant Control
 - Oxygen Supply into deep layer

Core Function

Core Technology

- Environment-friendly technology by solar energy use
- Economically feasible in terms of facility & maintenance costs
- Easy installation & automatic unmanned operation for 24 hours

Technological principle



1 Rotates motors producing the necessary electricity by renewable solar energy.

2 Transfers water which is on the cold lower layer and lacks dissolved oxygen to the surface layer by rotating the impeller connected to motor & axis consistently.

3 The widespread current is formed from the transferred water in the shape of near laminar flow through the distributing plates.

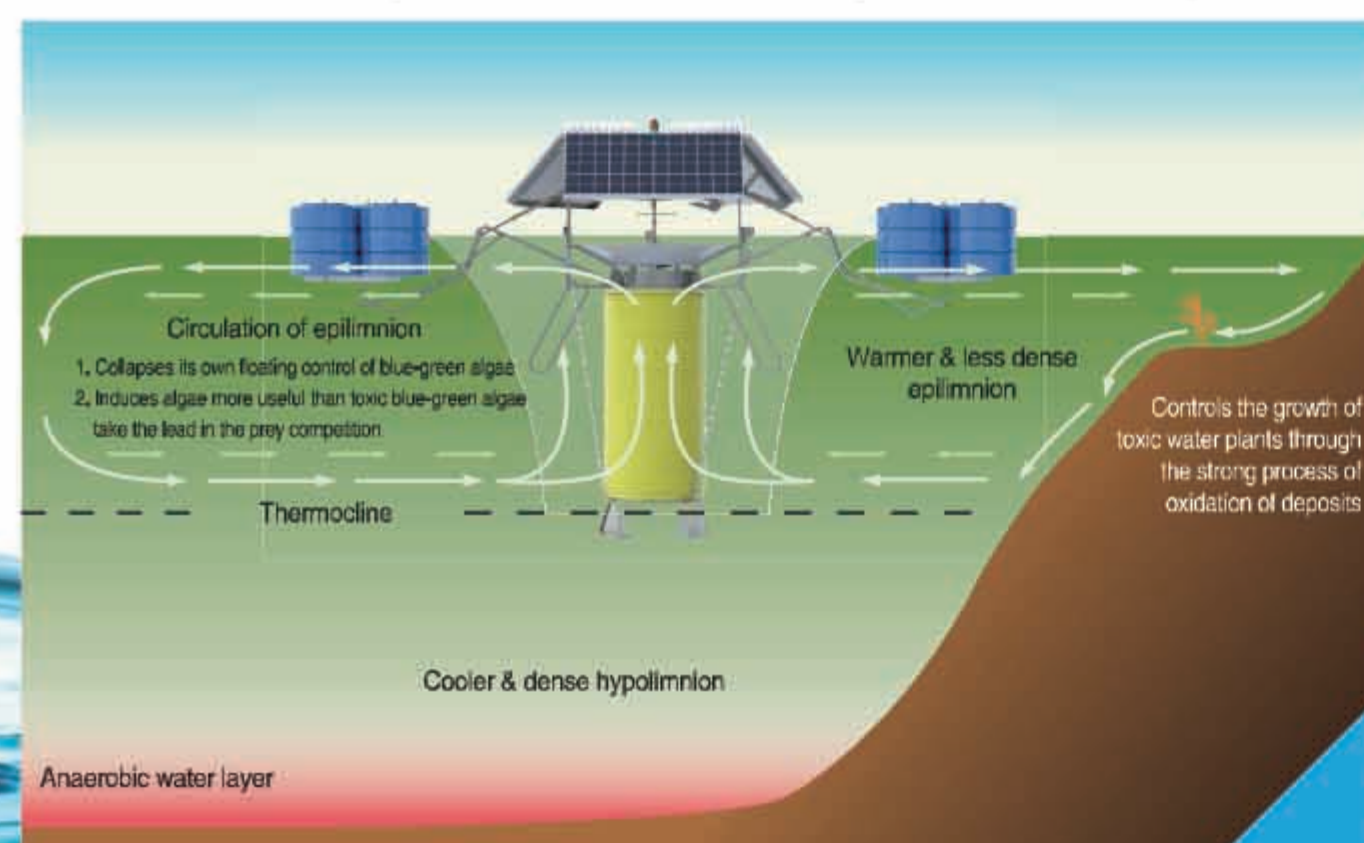
4 Water running widely in a circle is provided with sufficient dissolved oxygen in the air and its constant flow & circulation makes toxic algae's habitat destroyed.

5 Water running into the lower layer supplies the sufficient oxygen necessary for microbes to do the self-purification and controls the elution of heavy metals & nutrient salts and odor by resolving the anaerobic state which is short of dissolved oxygen due to the water deterioration.

6 Supplies the sufficient dissolved oxygen 24 hours for 365 days and controls the growth of blue-green algae to maintain clean water & healthy aquatic ecosystem

Blue - Green Algae Control

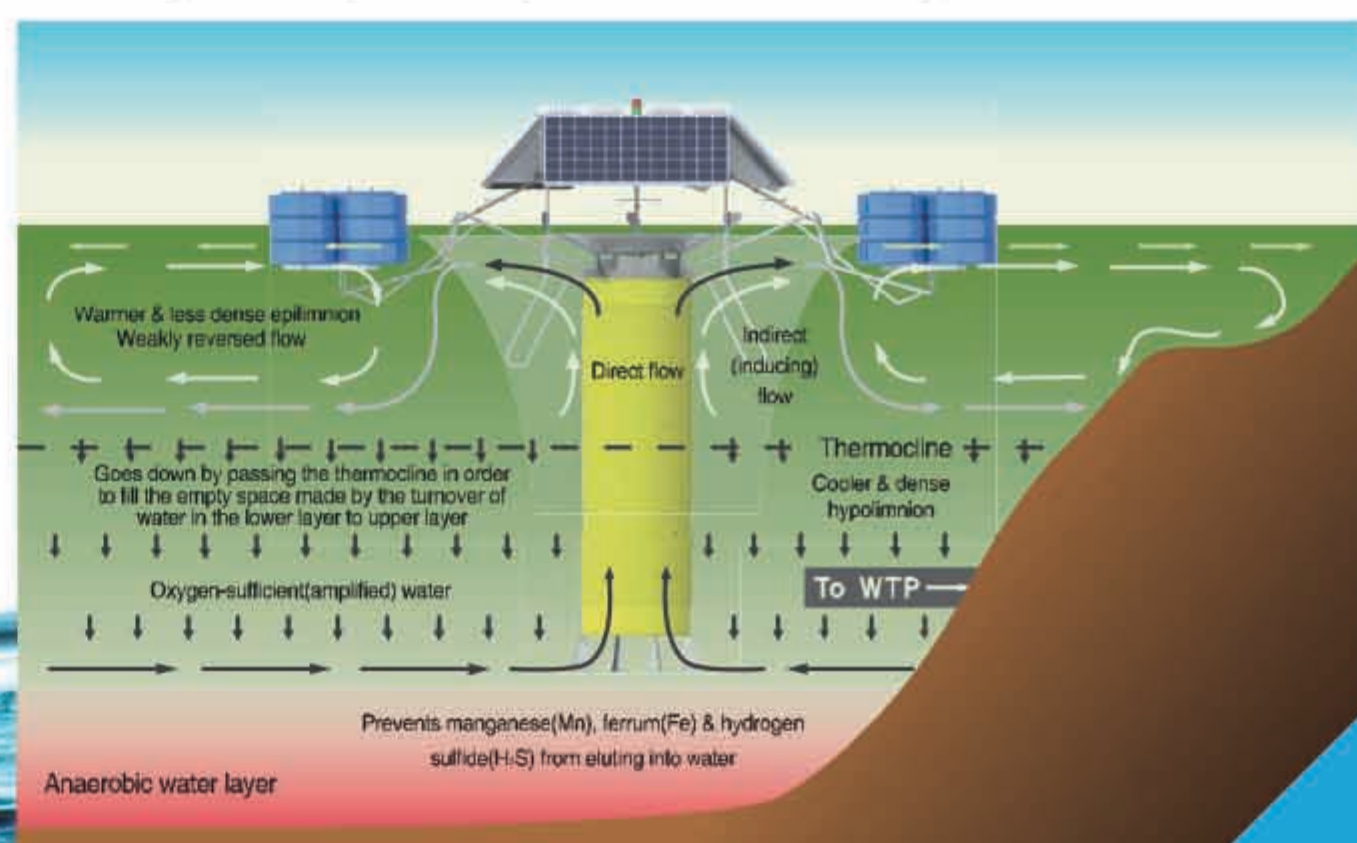
Warmer & less dense water in the epilimnion doesn't go down by circulation through direct and powerful current. Instead, it spreads out to the long distance.



Inlet-gate, positioned in the upper of Thermocline

Hypolimnetic Oxygenation

Epilimnion & Hypolimnion, stirred and mixed through the direct flow and indirect (induction) flow generated by the Solar-powered Water Circulator, go down into the thermocline.

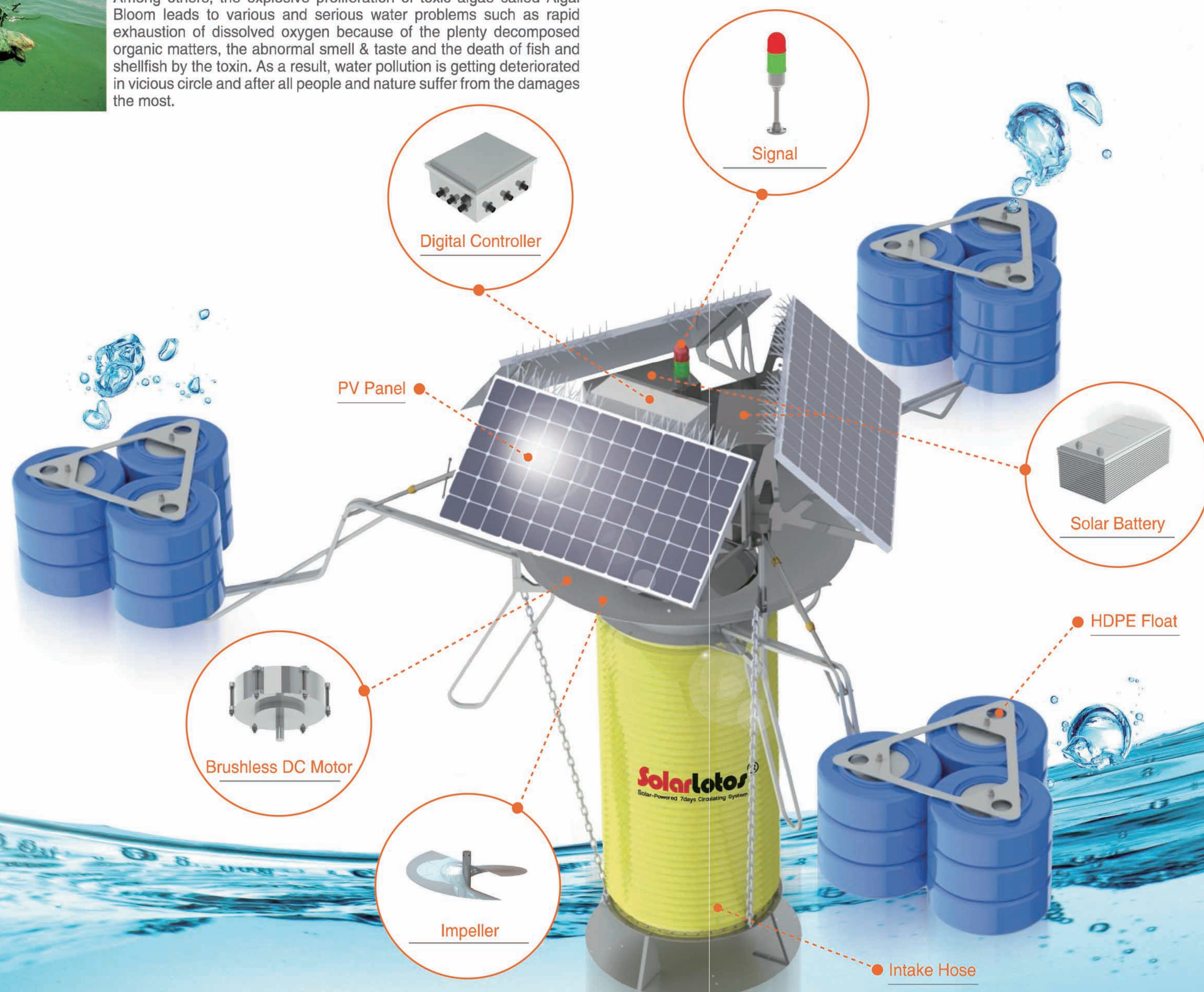


MODEL	The total flow rate		Harmful algae control		In depth, oxygen supply	
IDO 10	10m ³ /min	14,400m ³ /day	38,000m ²	220m	4,000m ²	80m
IDO 50	50m ³ /min	72,000m ³ /day	190,000m ²	500m	16,000m ²	150m



The recent drastic increase in population, urbanization and industrialization deteriorate water pollution problems. They are getting worse by the over nutrient-eutrophication in the most dams and reservoirs. Among others, the explosive proliferation of toxic algae called Algal Bloom leads to various and serious water problems such as rapid exhaustion of dissolved oxygen because of the plenty decomposed organic matters, the abnormal smell & taste and the death of fish and shellfish by the toxin. As a result, water pollution is getting deteriorated in vicious circle and after all people and nature suffer from the damages the most.

Solar-powered Water Circulator makes water current last for 24 hours for 365 days in the stagnant waters such as dam & reservoir by using solar energy so as to control the outbreaks & growth of toxic algae (HBGA) as well as contributes to developing sustainable & eco-friendly green technology which aims to create healthy aquatic ecosystem and to improve water quality by supplying the sufficient dissolved oxygen all the time to the bottom layer, lack of DO caused by the water quality deterioration, and even to the whole waters.



Applicable Area



Water management of dam, reservoir, lake, pond, etc.



Improvement for water & lower layer quality of brackish water zone, farm, port, etc.



Water quality management of water supply, water tank & water supply dam into the large-scale urban and small villages



Circulation of aeration tank, settling tank & agitation tank in the sewage disposal plant

Clean Water! Healthy Aquatic Ecosystem!

Eutrophied stagnant waters (Inflow of nitrogen(N) & phosphorus(P))
+
Horizontal vertical water circulation 24 hours for 365 days of **Solarlotos®**

Destroys algal inhabited environment

Prevents the outbreaks of toxic algae (toxic blue-green algae)

Allows to grow useful algae like diatom, green algae, etc.

Allows to feed

Increases 2nd yield (e.g. : zooplankton, fish)

Reduces Chlorophyll a, pH, total phosphorus(TP)

Improves the water transparency & bio-diversity

Reduces nitrogen(N), BOD flowing into the lower layer (deposit soil)

Aerotropism of lower layer(deposit soil)

Controls the elution of soluble phosphorus(P), ferrum(Fe), manganese(Mn) & hydrogen sulfide(H₂S)

Boosts nitrification (NH₄⁺ to NO₃⁻)

Improves the fish spawning environment

Controls the toxic water plants by restricting the ammoniacal nitrogen into lower layer(deposit soil)

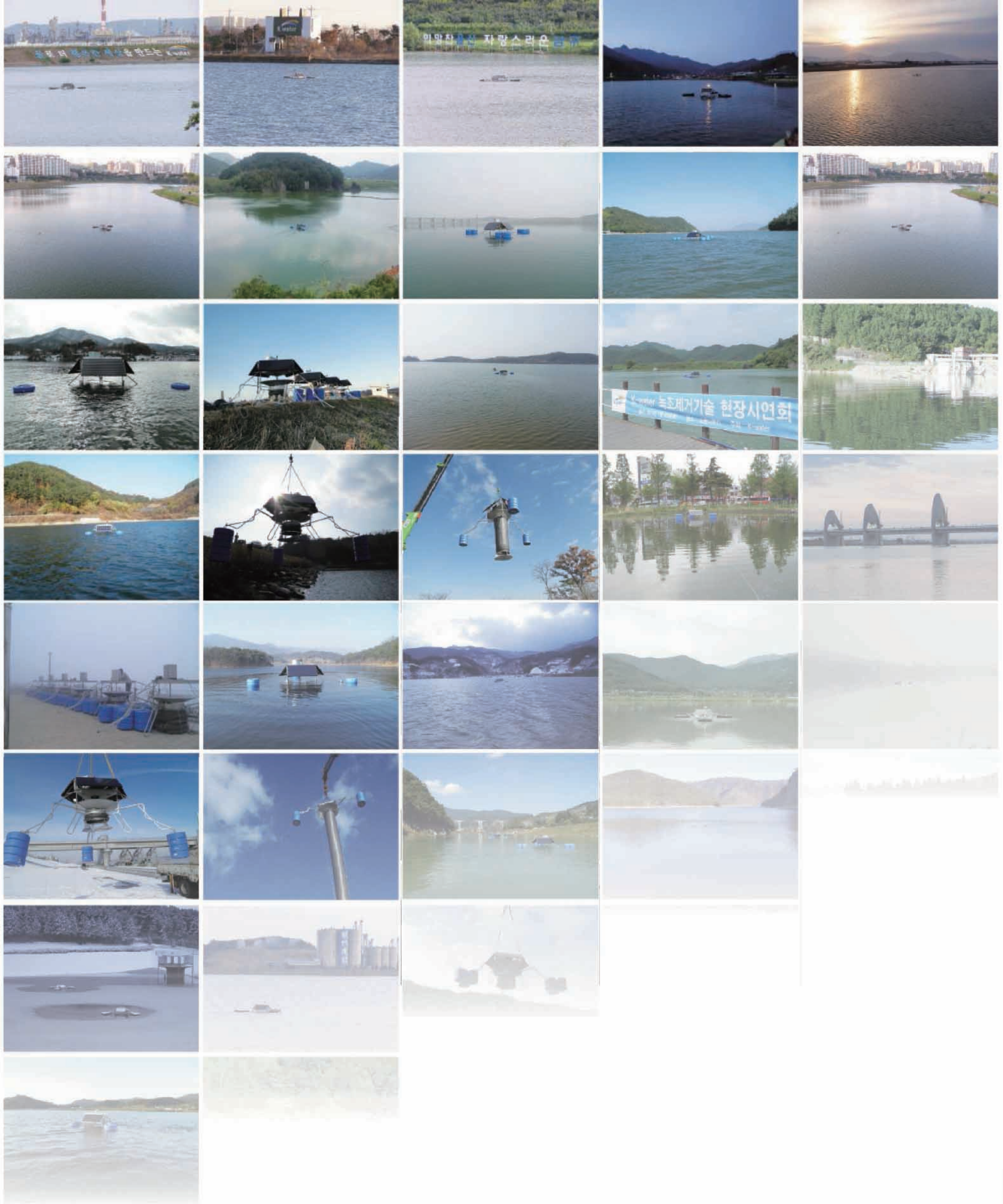
Reduces seasonal fish death en masse



Before



After



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