

## List of Some of Japanese Climate Adaptation Technologies by Sector

### Water sector (water disaster)

Company Name	Technology	Details of technology	URL
Hitachi Power Solutions Co.,Ltd.	DioVISTA/Flood	Our flood simulator supports evacuation planning and education for disaster-prevention. Our unique algorithm enables to simulate flood disaster quickly on your PC. User interface integrated on our original three-dimensional mapping system enables intuitive operation and visualization.	<a href="https://www.hitachi-power-solutions.com/en/products/diovista/">DioVISTA/Flood : Hitachi Power Solutions Co.,Ltd. : Hitachi (hitachi-power-solutions.com)</a>
FURUNO ELECTRIC CO., LTD.	X band Dual Polarimetric Doppler Weather Radar	<p>FURUNO, which maintains the leading market share in marine Radar now presents its two X-band, the single polarimetric WR110 and the dual polarimetric WR2120.</p> <p>The WR110 single polarimetric Radar is extremely efficient for normal rain observations. The WR2120 allows for even more sophisticated observations including particles classification and recovering signal intensity loss and attenuation caused by heavy rain. By creating a “Multi-Radar system” consisting of synchronizing several radars, it is possible to cover a wider area.</p> <p>Also when installed in the same area the Radars observation data can be combined, further increasing accuracy, providing vector Doppler velocities and enhanced 3 dimensional imaging.</p>	<a href="https://www.furuno.co.jp/en/products/meteorological-monitoring-and-analysing-system/">FURUNO's meteorological monitoring and analysing system   System Solution   FURUNO</a>
Japan Radio Co.,	Polarimetric Radar Rain Gauge	<p>The high-precision rainfall measurement becomes possible by using the phase information without the effect of radio wave attenuation through heavy rain area.</p> <p>Also, it is possible to guess the kinds of particles (raindrops, hails or graupels) based on the differential reflectivity of raindrops. By using the information obtained from this radar, rapid and effective countermeasures for disasters such as river floods in urban areas and flowing debris in mountainous areas can be</p>	<a href="https://www.jrc.co.jp/en/products/">Products   JRC (Japan Radio Co.,Ltd.)</a>

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		made.	
Unimation System Inc.	River Water Level Alarm System	The equipment continuously monitors water level of river and when a preset trigger level (6 levels of water level can be set) is reached, warning signals are instantaneously released by rotating warning lights, sirens and speakers, as well as by emails sent to pre-registered email addresses. Lead time of alarm can drastically shorten because the equipment sounds the alarm by itself. Moreover, the system lower cost than other alarm system because server is not necessary for the system.	<a href="http://unimation.co.jp">株式会社 ユニメーションシステム - 河川水位警報・冠水警報ユニット・浸水警報システムと省力化コントローラー (unimation.co.jp)</a>
eTRUST Co., Ltd.	Sensor network and cloud technology based remote monitoring system (Camera)	Deploy the monitoring stations to points where high disaster risk or need environment observation. The monitoring stations take pictures of the points and measure some parameters(water level, meteorological data, landslide and so on) periodically. The pictures and data are sent through network(Mobile phone, Internet or radio) to the server on cloud.  By accessing the cloud server, you can monitor the status of the remote location. If the data exceeds the threshold value, warning mail is sent automatically. The system helps early detection of disaster sign.	<a href="http://etrust.ne.jp/">eTRUST Corporate Site – http://etrust.ne.jp/</a>
TAKUWA CORPORATION	Water level gauge for river and lake	Useful in river flood prediction and warning systems, irrigation water management systems, etc., water and flood control are performed by automatic water level observation and real-time data. Accumulation of data helps future water resource management plans. The world's most accurate measurement is possible by Quartz-type water level gauge. With highest accuracy 0.01% F.S (Full scale)	<a href="#">SOLUTION   TAKUWA is leading company in flood control in Japan</a>
MEISEI ELECTRIC CO., LTD.	Compact weather instrument	Specific weather information can be easily obtained by installing POTEKA in specific regions. The data is accessible anytime and anywhere from the web. Seven types of weather element*) are observable through POTEKA. Combined with weather radar, you can easily monitor complete real time weather change.	<a href="#">Advanced observation system POTEKA   Meisei Electric</a>

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		*) temperature, air pressure, humidity, sun radiation, wind speed and direction, rain detector, precipitation With POTEKA database, weather pattern analysis, even at specific places, can be generated. More data will produce more accurate analysis.	
TOA Corporation	System Design and supply for Early Warning System based on Long Range Horn Array Speaker	Our unique technology enables manage sound directivity to deliver evacuation messages in the area where disasters like Tsunami, Flood and Landslide are foreseen. In addition, TOA provides the total sound systems including speaker deployment designing which deliver the effective information for the necessary place while avoiding the noise problems in the city area.	<a href="https://www.toa-global.com/">Solutions   TOA - Sound and Communication (toa-global.com)</a>
Weathernews Inc.	Comprehensive weather forecasting service utilizing AI	Global expansion of weather data provision and analysis service for corporations. "Weathernews" launches 5km mesh high resolution world weather forecast service (WxTech®), supporting overseas business development in DX era with highly accurate weather data using AI technology.	<a href="https://www.weathernews.com/">Weathernews Inc.</a>

### Water sector (water resource)

Company Name	Technology	Details of technology	URL
AGC Inc.	Ion exchange membrane	AGC Inc.'s water purification system, where water is purified and desalinated using ion exchange membrane, will ensure stable supply of water suitable for agriculture and drinking and contribute to better health and sanitation of the surrounding environment and residents.	<a href="https://www.agc.com/">AGC</a>
Suidou Technical Service Co., Ltd	Technology and products on water leakage inspection	<ul style="list-style-type: none"> <li>• Water leakage survey including detection and location of potential leaks from buried pipes by sound hearing using water leak survey equipment by investigators</li> <li>• Training for human resources development to reduce non-revenue water, including technology</li> </ul>	<a href="https://www.suidou-tec.co.jp/">Suidou Technical Service Co.Ltd (suidou-tec.co.jp)</a>

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		<p>transfer of water leakage investigation</p> <ul style="list-style-type: none"> <li>• Provision of L-sign &amp; L-Chaser, water leakage monitoring equipment</li> </ul> <p>In the adaptation business in developing countries, the focus is on technology transfer of intangible assets, such as knowledge, sound hearing technology, know-how, and processes for actually detecting leaks locally, rather than providing equipment.</p>	
SEKISUI CHEMICAL CO., LTD.	Rainwater storage system	Rainwater storage systems that enable recycling of rainwater by controlling the influx of rainwater to the sewage pipes and rivers at heavy rain, used as plastic materials to store rainwater in underground storage tanks for recycling or control of outflow.	<a href="#">SEKISUI CHEMICAL CO.,LTD</a>
Tohkemy Corporation	High-turbidity raw water-compatible water purification system	Tohkemy's high-turbidity raw water-purifying water purification system consists of a fiber filtration system (Acti Fiber) and a sand filtration system. With this device, it is possible to purify river water with a turbidity of more than 1000 NTU, which is often found in areas with a rainy season, to a WHO standard of 5 NTU or less.	<a href="#">TOHKEMY CORPORATION</a>
Mitsubishi Chemical Aqua Solutions Co., Ltd.	Producing safe drinking water from saline and highly-turbid surface water	<p>Water treatment System: The system is characterized by a customized design in combination of appropriate pre-treatment technology and membrane filtering technology according to the quality of raw water to enable safe drinking water to be secured irrespective of water source.</p> <p>Remote monitoring system "WeLLDAS": The system is loaded in the water treatment system and contributes to the optimization of maintenance and management operations by checking operation of the water treatment system, responding to changes in water quality, and utilizing accumulated data.</p> <p>Consistent management structure: The technology enables consistent operation ranging from the water quality analysis to maintenance and management.</p>	<a href="#">Mitsubishi Chemical Aqua Solutions Co., Ltd. (mcas.co.jp)</a>

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Yamaha Motor Co., Ltd.	Yamaha Clean Water Supply System	The system purifies water through “Slow Sand Filtration” using sand and gravel. Physical dirt and rubbish in the surface water pumped up are removed through “Pretreatment Tanks” filled with sand and gravel. Photosynthesis by the algae which naturally forms inside the tanks increases the density of oxygen dissolved in the water and enhances water treatment by microorganism. The system’s requiring no coagulants or membranes enables self-sustained operation and maintenance by local community without the need for advanced technology and high costs for operation and maintenance.	<a href="https://www.yamaha-motor.com/clean-water-supply-system">Clean Water Supply System   Yamaha Motor Co., Ltd. (yamaha-motor.com)</a>
LIXIL	Affordable plastic SATO (Safe Toilet) series	LIXIL is working in Kenya on two other sophisticated projects. One is the Micro Flush Toilet System, which significantly improves the water efficiency of toilet and sewage systems. Another is the Green Toilet System, designed to treat human waste in an environmentally friendly way by separating liquid and solid waste. The solid waste is then treated with an organic enzyme to kill pathogens. Users are encouraged to complete the recycling process by bringing the solid waste to a nearby composting site and then using the compost to fertilize farmland.	<a href="https://www.lixil.com/sato">SATO - A better life. Every day. (lixil.com)</a>
Waqua Inc.	Small seawater desalination equipment	Our core technology is our proprietary reverse osmosis membrane (RO) containment vessel (patented). In order to realize a compact and lightweight desalination system, a reverse osmosis membrane containment vessel that can withstand high pressure was considered an issue.	<a href="https://www.waqua.co.jp/">小型海水淡水化装置   株式会社 Waqua</a>
Kubota Corporation	Wastewater Treatment Plant (Johkasou)	Kubota wastewater treatment plants, which have achieved 90% or higher BOD removal rate, deliver excellent treated water quality with BOD of 20 mg/l or less (in case influent BOD is 200 mg/l). Their compact body fits any installation place while providing powerful treatment performance comparable to a sewage system.	<a href="https://www.kubota.com/wastewater-treatment-plant">Wastewater Treatment Plant (Johkasou)   Products &amp; Solutions   Kubota Global Site</a>

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METAWATER Co., Ltd.	Package type ceramic membrane filtration system	A package-type ceramic membrane filtration system is a space saving, affordable water treatment system developed for small-size water treatment plants. While securing a safety equivalent to the conventional level, we will make proposals suitable for the needs of individual customers.	<a href="#">Water treatment solutions   Solutions   METAWATER</a>

## Agriculture sector

Company Name	Technology	Details of technology	URL
Mebiol Inc.	High-molecule film farming method	A sustainable agricultural technology for the production of safe and highly nutritious agricultural crops by applying the membrane and hydro-gel technology developed for medical and pharmaceutical purposes into agriculture. High-molecule films enable the cultivation of diverse agricultural crops such as fruits and leaf vegetables on the films. In March 2018, the technology was newly registered as the “Sustainable Film Farming” on the Sustainable Technology Promotion Platform (STePP) of the Tokyo Office of the United Nations Industrial Development Organization (UNIDO).	<a href="#">製品情報: アイメック®   Imec® (Film Farming) - Cultivation system to produce high nutritious vegetables - Mebiol Inc.</a>
Murata Manufacturing Co., Ltd.	Soil sensor	It uses small sensor units to precisely measure the condition of farmland and waterways, and combines this with unique monitoring tools to visualise and analyse the condition, prevent salt damage to paddy fields and orchards, improve salt and sulphuric acid pollution of farmland and waterway environments, and establish integrated management systems for fertilisers, crops and irrigation systems. In addition, the company has solutions for optimising water resources in drip irrigation using soil moisture sensors.	<a href="#">A Field Trial Utilizing a Soil Monitoring System to Visualize the Condition of Agricultural Land ~Promoting measures against salt damage in the Mekong Delta region in cooperation with Can Tho University, Vietnam~   Product News   Murata</a>

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			<a href="#">Manufacturing Co., Ltd.</a>
ListenField Co., Ltd.	Farming support services	Farming support services have been developed for individual farmers and agricultural enterprises, which can be used via smartphones and other devices. By integrating data from satellites, drones and field sensors, and utilising crop cultivation models and highly accurate growth forecasting algorithms, the service suggests to farmers the best time to plant and harvest crops. The system has been introduced in 30,000 farmers in five countries, mainly in Thailand, where there are concerns about serious flooding and drought, and it is assumed that the hurdles to introducing the system to developing countries facing similar challenges are low.	<a href="#">ListenField - innovative AgTech Start-Up</a>
EF Polymer Co., Ltd.	Organic superabsorbent polymer	Organic superabsorbent polymer (powder) made from crop residues. Each gram of polymer can absorb 100 ml of water. When spread on the soil, it can reduce irrigation water use by more than 40% and fertiliser requirements by more than 20% without affecting the soil or crops, and increase yields by around 20%. It is also 100% biodegradable, meaning it will decompose into the soil within a certain period of time. The cost is around 30,000-40,000 yen per hectare (10-15 kg).	<a href="#">EF Polymer 株式会社</a>
Kawashima Co., Ltd.	Compost plants	Compost Plant “RA-X”: A screw-shaped auto mixer that mixes organic waste material for even aeration and maintains aerobic fermentation at high temperature for effective production of high-quality compost. The device is affordable and easily maintained.  “BX-1”: An active microorganism feed that deodorizes and turns mud, sludge and animal wastes into compost. Its main ingredient is rice bran and it accelerates fermentation of compost while curbing odor during the fermentation process.	<a href="#">株式会社カワシマ (kawashima.jp)</a>

Company Name	Technology	Details of technology	URL
Farmdo Group	The Solar Farm® technology	The combination of agriculture and solar Generation by Solar Farm®, or “Hybrid Agriculture” contribute to renewable energy supply, local agriculture production and sales, and food self-sufficiency ratio. Development of solar panels that can maximize the power generation by appropriate transmittance and double-sided power generation. Use of IoT and sensors for controlling farming that can adapt to climate change in regions with different climates. Hydroponics is effective in places where topsoil is lost due to heavy rainfall or where salinization has occurred, and water-saving agriculture can be pursued. The company is also practicing a laborsaving agricultural method in Japan by combining drop irrigation system, coco peat growing medium (solar growbag), and weed prevention sheets, and seek to diffuse this technology overseas.	<a href="#">Farmdo   Business information - Solar farm</a>
Routrek Networks, Inc.	ZeRo.agri®, an autonomous drip irrigation system that utilizes IoT and AI	A drip irrigation system that automatically controls irrigation and fertilizer management by acquiring soil moisture and solar radiation data, using IoT and AI. The system consists of the ZeRo.agri® main device combined with various sensors, and a Web UI where one can check the irrigation and fertilization status as well as sensor information. An AI-based cloud system connects the main device and Web UI, and optimizes the supply amount and concentration of liquid fertilizer. Based on the information acquired by the environmental sensors, the AI estimates the daily transpiration amount required by the crops, and irrigates and fertilizes through the drip tube, enabling highly accurate management that is difficult to achieve manually, and minimizing the amount of water and fertilizer used. (Target values for automatic control can also be manually set based on the farmer’s own experience, and the history of these setting changes will lead to further improvements in the accuracy of AI.) Automatic control using AI will also contribute to yield stabilization, quality improvement, and labor saving.	<a href="#">AI 灌水施肥システム ZeRo.agri(ゼロアグリ)   灌水施肥をスマート化 (zero-agri.jp)</a>



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JAPAN CONSERVATION ENGINEERS & CO., LTD.	A plant-activating material agent with high concentrations of fulvic acid	Fujimin, a plant-activating material agent with high concentrations of fulvic acid, has been developed. Fulvic acid has the efficacy to increase the efficiency of plant mineral absorption and promotes the efficiency of soil and plant fertiliser absorption, activation of photosynthesis and adjustment of nutrient balance. It can restore farmland devastated by salt damage and excessive fertiliser, and in Japan it has been used to restore farmland damaged by the tsunami (salt damage).	<a href="http://jce.co.jp">Home « 国土防災技術株式会社 (jce.co.jp)</a>
OPTiM Corporation	Latest technology for smart agriculture	AI (deep learning technology) analyses aerial images of fields taken by drones and detects pests and growth conditions at an early stage, enabling pesticide spraying and fertiliser application only where necessary. In addition, by digitising weather, water level, pest and growth data, etc., a system has been developed that recommends cultivation methods according to environmental and growth conditions, as well as advanced disease forecasting technology using AI.	<a href="http://optim.co.jp">AI・IoT・Robotics を使って "稼げる農業"を実現する   オプティム 農業 ×IT (optim.co.jp)</a>
Ac-Planta Inc.	Biostimulant material	Developed Skeepon, a biostimulant material that increases tolerance to environmental stresses such as drought, heat and salt damage. Biostimulants are a technology that enhances plants' natural immunity and improves their resistance to cold and heat. The acetic acid contained in the product improves the heat and drought resistance of plants, enabling a reduction in the number of irrigations and water consumption (water saving), quality maintenance and waste reduction. The project was adopted by the Ministry of Agriculture, Forestry and Fisheries (MAFF) and is being demonstrated in India.	<a href="http://ac-planta.com">アクプラント株式会社 (ac-planta.com)</a>
Remote Sensing Technology Center of Japan	Facilitating countermeasures against climate change through Big Data	The observation equipment (sensors) loaded on satellites, applied with the remote-sensing technologies that enables remote observation of the Earth's surfaces, provides users with the data collected from satellites, aircrafts, automobiles, observation towers, ships and buoys and makes contributions	<a href="http://restec.or.jp">TOP   Remote Sensing Technology Center of Japan (restec.or.jp)</a>

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		across such fields as forestry management, water resource management, food safety and security, disaster observation, and national land management.	
Sompo Holdings, Inc.	Weather Index Insurance	Weather Index Insurance is an insurance product that pays out a contractually predetermined insurance amount when a weather index – such as temperature, wind speed, rainfall, or hours of sunshine – fulfills certain conditions regardless of actual losses. It enables a rapid claim handling and contributes to an immediate disaster restoration without a site investigation for a loss assessment.	<a href="https://www.sompo-hd.com">Sompo Holdings (sompo-hd.com)</a>

## Transport sector

Company Name	Technology	Details of technology	URL
Kawasaki Geological Engineering Co., Ltd.	Earth Doctor	Monitoring System: Exploration and measurement technologies, prediction technology of incline disasters, various analysis technology, prediction technology of incline disasters, assessment technology of potential outbreak of incline disasters using AHP (Analytic Hierarchy Process). Early Warning System: Design technology of landslide evacuation warning system leveraged on various measurement devices. Bundling of Disaster Prevention and Mitigation Technologies: The technologies above bundled with helicopter laser measurement, satellite image processing and other geomorphic analysis technologies offered by its partner, Nakanihon Air Service Co., Ltd. as well as the GIS (Geographic Information System) technology for general management of the aforesaid.	<a href="https://www.kge.co.jp">川崎地質株式会社 (kge.co.jp)</a>
Kokusai Kogyo Co., Ltd.	Technical slope disaster management	To counter slope disasters, Kokusai Kogyo has introduced both physical infrastructure initiatives such as river works (sabo dams), and ‘soft’ initiatives such as real-time measurement system and hazard mapping as well as the organization of the administrative structure required for early	<a href="https://www.kkc.co.jp">Our Business   Kokusai Kogyo Co., Ltd. (kkc.co.jp)</a>

Company Name	Technology	Details of technology	URL
		warning/evacuation systems and the drafting of manuals.	
Nippon Koei Co., Ltd.	Methodology for prevention of soil surface erosion with soil algae (BSC methodology)	In the initial stage of vegetation succession, soil surface is covered by a sheet of algae, moss and lichens, namely Biological Soil Crust (BSC). This formulated BSC makes soil condition preferable for vegetation growth. It can be observed that grasses and trees come out, following formulation of BSC. BSC method applies this phenomenon by spraying BSC material (BSC-1), mixed with water onto slopes, and it enables to shorten time period of formulation of BSC by two weeks to one month and accelerate natural vegetation succession.	<a href="#">Our Businesses   NIPPON KOEI (n-koei.co.jp)</a>
ECOSYSTEM Inc.	Functional paving materials made from waste roof tiles and bricks	ECOSYSTEM contributes to reducing urban flooding and the heat island effect by paving the ground with waste roof tiles and bricks that have permeability and water retention properties.	<a href="#">K-Ground System K-Ground Project (eco-system.ne.jp)</a>
ZEN Co., Ltd Japan Prolong Limited Company	Waterproofing and Extending the Service Life of Buildings with Concrete Repair Materials	The Ever Prolong method, developed by ZEN and Japan Prolong, densifies the concrete surface by penetrating it with Ever Prolong material. By densifying, the concrete structure becomes waterproof and its surface protection function is strengthened, thus extending the service life of buildings.	<a href="#">エバープロロング工法 TOP   日本プロロング株式会社 (jprolong.net)</a>
Japan Conservation Engineers & Co., Ltd.	Strengthening the resilience of mountain roads through capacity building on slope disaster prevention	Japan Conservation Engineers (contributes to the development of climate resilient mountain roads, by supporting the capacity building of local road maintenance related companies (including consultants and EPC contractors) and conducting the design and implementation of slope disaster prevention measures together	<a href="#">Home « 国土防災技術株式会社 (jce.co.jp)</a>