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<https://en.wikipedia.org/wiki/Environmental_impact_of_irrigation>

<http://nation.com.pk/business/23-Sep-2012/trained-human-resource-vital-to-benefit-from-alternative-irrigation-techniques>

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Need of smart irrigation

* Reduce human labor – By automating the irrigation man power will get reduced, instead of humans, kits will be there to read the crop situation.
* Agricultural productivity increase – By having measured amount of water whenever soil needs will protect yield from getting wasted either from over watering or lack of water.
* Waterlogging – Soil may not be water logged when exact amount of water will be provided whenever soil need.
* Soil salinization – Salinity of soil will remain persistent when correct amount of water is supplied, as increase in salinity will also be harmful for crops.
* Ecological damage – Environment will be benefited after all when number of crops will increase eventually.
* Socioeconomic – Social or economic factors will increase gradually as yield increases, profit rises.
* Literacy – Rate of literacy may rise as farmers will get educated to monitor kits.
* Save water – Reduction in water consumption as minimal water will be supplied on need of soil.
* Environment protection – Greater number of crops will protect environment from pollution as well as from inflation and dependency of crops to other countries.
* Energy saving – Reduction in energy consumption as kits will be able to control power.
* Healthy crops – Healthier the crops would be as correct amount of water will be given.
* Scientific methods – Scientific calculations will be applied to the sensor to give predictable readings.
* Justified water use – By the help of flow sensor water will totally be justified by having how much amount to supply to a certain place.
* Farmers’ lifestyle standard increase – Farmers will be paid high as having quality crops and increment in quantity of yield.
* Efficient weather prediction with alerts – Rainfall detectors and others like them will be able to predict weather through efficient programming.
* Increase in GDP – Broadest quantitative measure of a nation's total economic activity will definitely be increased as yield rises.

**Remote monitoring**

* Data from gauges and sensors (soil moisture, pressure, environmental, etc.)
* Status of farm gates and building doors (open/close)
* Status of irrigation valves
* Status of pumping equipment
* Live video of operations
* monitoring of greenhouses, livestock enclosures, and storage facilities
* Audible or other alarms

**2. Remote control**

* Opening and closing valves & gates
* Turning on and off lights, pumps, heaters, etc.
* Guiding robotic vehicles

**3. Information transfer**

* Automatic incorporation of environmental data into decision support systems and Crop models
* uploading maps to variable rate application equipment
* Weather, market, & operational information to remote locations & vehicles
* Real-time information such as DGPS correction signals

**4. Communication**

* Text, graphical, voice and video messages can be sent between operators

**5. Asset tracking**

* Position of irrigation systems
* Location of farm vehicles
* Location of livestock

**6. Remote diagnosis**

* remotely located technicians and specialists can access, monitor and control on farm

assets with the permission of the local manager

**Problem encountered in smart irrigation**

Cost – The product maybe cost effective as having number of customized modules and sensors will be attached, but it might be way too expensive for local farmers as they are not even able to run their lives that easily so how would they be able to purchase such kits for automation.

System installation – Installation of systems will be one of the barrier as farms here are not that sophisticated.

Convincing the customer/farmers –Satisfying a farmer will be one of the hectic part as people here are not ready to accept and leave their traditional farming.

WLAN availability – There might me many places in Pakistan where there would be no availability of GPS and web providers’, so it could be problem.

Standardization

Integration with existing water supply system – Water pipes used in farms are quite large, having a lot of diameter so special water sensors will be made available, technical parameters will be increased and this will increase budget.

Outliers – There might be possibilities of having sensor reading beyond limits or maybe corrupted.

Sensor data calibration according to crops – Details will be required wherever the kits will be fitted so that sensor will get control accordingly.

**Comparison between Existing Irrigation Technology and Smart Irrigation**

**Control Technology:**

a. Existing irrigation controllers are based on fixed schedule. Farmers,

Municipalities and commercial owners of green areas typically set a watering

schedule that involves specific run-times and days, and the controller executes

the same schedule regardless of the season or weather conditions. From time to time a technician may manually adjust the watering schedule, but such

adjustments are usually only made a few times during the year, and are based

upon the technicians perceptions rather than actual watering needs. Smart

irrigation control technology is based on everyday climate criterion and actual

water need of plant. In this technology irrigation occurs when the water is

required by plant. It supplies only that amount of water to the plant as plant

needs.

b. In conventional irrigation control technology, irrigation is done in the way in

which large amount of underground or surface water is wasted. In smart

irrigation control technology irrigation is done in a manner in which there is

very little chance of water wastage.

c. The simple irrigation control technologydon’tconsider the plant productivity

which is not based on efficient irrigation. It is based on perception of

technician. The smart irrigation control technology consider all the aspects of

plants related to water irrigation. It is based on efficient irrigation.

d. Smart irrigation control technology is easily deployable and can be controlled

manually or automatically without physical presence at the system or field. In

existing technology these kind of facilities are not easily available.

e. With respect to features and life of smart irrigation controller the cost is

acceptable for every kind of farmers, municipalities and commercial green

area authorities.

4. Conclusion

New irrigation electrical control technologies could improve irrigation efficiency,

promoting water conservation and reducing the environmental impacts. The

objectives of this project were to avoid wastage of water and increase irrigation

efficiency by using a PLC based irrigation system with the help of soil moisture

sensor. It also improves the traditional irrigation system enabling the irrigation system

to have high efficiency and low water usage. The existing irrigation system being

tedious, time consuming and very wasteful in water usage. The PLC based sprinkler

irrigation system gives the best feature than the traditional one. to time a technician may manually adjust the watering schedule, but such

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