Using modern technologies in the design of small- scale irrigation schemes and in their monitoring and evaluation ( )

Application des technologies modernes dans la conception des aménagements hydroagricoles et leur suivi & évaluation (French)

Applying modern technologies in the design, monitoring and evaluation of village irrigation schemes (VISs) and floodplain depression ponds.

This practice involves applying modern technologies in the design, monitoring and evaluation of village irrigation schemes (VISs) and floodplain depression ponds.
To summarise, it involves the following technologies and procedures: 1) The application of total stations for topographical studies, which enables: the creation of a digital model of the study area to facilitate the study of topographical characteristics, differences in levels, depressions, mounds, etc.; georeferencing, which makes it possible to integrate the site and the proposed design into a geographic information system (GIS). This means other information sources like satellite imagery and aerial photography become available for use in the analysis. 2) The use of a high-precision global positioning system (GPS) for installation works. Once the scheme's study and design are approved, the use of high-precision GPS means that work to install the scheme will be particularly precise and will adhere to the irrigation and drainage network configuration as designed and approved in the scheme studies. 3) The use of georeferenced photography for monitoring and inspection. The programme has begun using georeferenced photographs to enable teams to inspect and supervise installations in situations where conditions for accessing sites are unfavourable. These photographs show the installations and display the data recorded for each shot, allowing dates and locations to be checked. 4) The use of satellite imagery (Landsat). A primary application of Landsat is to monitor and evaluate the farming activities of sites. Using the images, the value of the normalised difference vegetation index (NDVI) can be determined. With this indicator, it is possible to verify in which areas VISs are operational. Furthermore, the Landsat images improve analyses during the design stage, providing information on specific events such as heavy flooding or very low water levels.
A high-quality scheme is a prerequisite for making water management efficient and reducing production costs. Landsat: One important impact/effect was that the consultant on site was able to persuade donors of the feasibility of carrying out minimum-level monitoring despite the difficult security situation. This was crucial as the donors were faced with a difficult choice: on the one hand, the lack of security made it impossible to access the zone in order to carry out monitoring and supervision missions, which seriously threatened the continuity of the programme; on the other hand, donors were obviously very sensitive to the plight of the communities suffering occupation and armed conflict. Total stations and GPS: These two technologies allow users to ascertain the specific features of sites more accurately than is possible with 'traditional' approaches, which are more basic and less refined. The technologies enable the design of good-quality schemes by facilitating water management. It is important to highlight the fact that a good-quality irrigation scheme (which is well configured and laid out in terms of its irrigation network and facilities) reduces production

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costs (less pumping time needed).
Currently, only PMN/IPRODI are using this practice. The planning service providers were given introductory training on applying the technologies and set themselves up to provide sufficient data in their invoices and reports to allow coordinators to apply the modern technologies. The programme's coordination team is ready to share these technologies with its partners and has already delivered presentations to parties expressing an interest

Applying modern technologies in the design, monitoring and evaluation of village irrigation schemes (VISs) and floodplain depression ponds; the technologies enable the design of good-quality schemes by facilitating water management; a good-quality irrigation scheme (which is well configured and laid out in terms of its irrigation network and facilities) reduces production costs (less pumping time needed); feasibility of carrying out minimum-level monitoring despite the difficult security situation
The SLM Approach addressed the following problems: low quality schemes; lack of minimum-level monitoring due to the difficult security situation; water management problems;

- **SLM** : lack of minimum-level monitoring due to the difficult security situation; water management problems; Treatment through the SLM Approach: These technologies allow users to ascertain the specific features of sites more accurately than is possible with 'traditional' approaches, which are more basic and less refined. The technologies enable the design of good-quality schemes by facilitating water management. Feasibility of carrying out minimum-level monitoring despite the difficult security situation

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technical aspects were regular monitored by project staff through observations

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< 2,000
2,000-10,000
10,000-100,000
100,000-1,000,000
> 1,000,000

Precise annual budget:

Approach costs were met by the following donors: international: 100.0%

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the effects of successfully deploying these technologies contribute to creating good-quality schemes with few water management problems and moderate production and maintenance costs

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Did other land users / projects adopt the Approach?
Currently, only PMN/IPRODI are using this practice. The planning service providers were given introductory training on applying the technologies and set themselves up to provide sufficient data in their invoices and reports to allow coordinators to apply the modern technologies. The programme's coordination team is ready to share these technologies with its partners and has already delivered presentations to parties expressing an interest

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- the effects of successfully deploying these technologies contribute to creating good-quality schemes with few water management problems and moderate production and maintenance costs. (How to sustain/ enhance this strength: there is the matter of how the technologies presented will continue to be applied within a team. To ensure sustainability, appropriate IT capacities and, more specifically, expertise in GIS software packages are necessary. It is important for these capacities to be embedded institutionally, rather than held by certain individuals.)
- Landsat: One important impact/effect was that the consultant on site was able to persuade donors of the feasibility of carrying out minimum-level monitoring despite the difficult security situation. This was crucial as the donors were faced with a difficult choice: on the one hand, the lack of security made it impossible to access the zone in order to carry out monitoring and supervision missions, which seriously threatened the continuity of the programme; on the other hand, donors were obviously very sensitive to the plight of the communities suffering occupation and armed conflict.
- Total stations and GPS: These two technologies allow users to ascertain the specific features of sites more accurately than is possible with 'traditional' approaches, which are more basic and less refined. The technologies enable the design of good-quality schemes by facilitating water management. It is important to highlight the fact that a good-quality irrigation scheme (which is well configured and laid out in terms of its irrigation network and facilities) reduces production costs (less pumping time needed).

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- Since 2003, Landsat images have displayed stripes or horizontal bands (running west to east) with no data. This, of course, complicates the analysis of VIS polygons as much of their area falls under these stripes. Indeed, most VIS polygons situated in data-loss stripe areas (such as Diré) fall partially within a data loss area and partially without. It is possible to verify the presence of vegetation for these VISs, but it is not possible to estimate the area of cultivated land. However, we hope that Landsat 8 will provide fault-free images, just as Landsat 7 did from 1999 to 2003.

Editors

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https://qcat.wocat.net/km/wocat/approaches/view/approaches_2519/

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Technologies: Zoning for the application of irrigation system https://qcat.wocat.net/km/wocat/technologies/view/technologies_3299/

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (GIZ) -
- Irrigation Projects in the Niger Inland Delta (IPRO-DI)

- Manual of Good Practices in Small Scale Irrigation in the Sahel. Experiences from Mali. Published by GIZ in 2014.: http://star-www.giz.de/starweb/giz/pub/servlet.starweb
- A range of internal technical guides (GIZ):