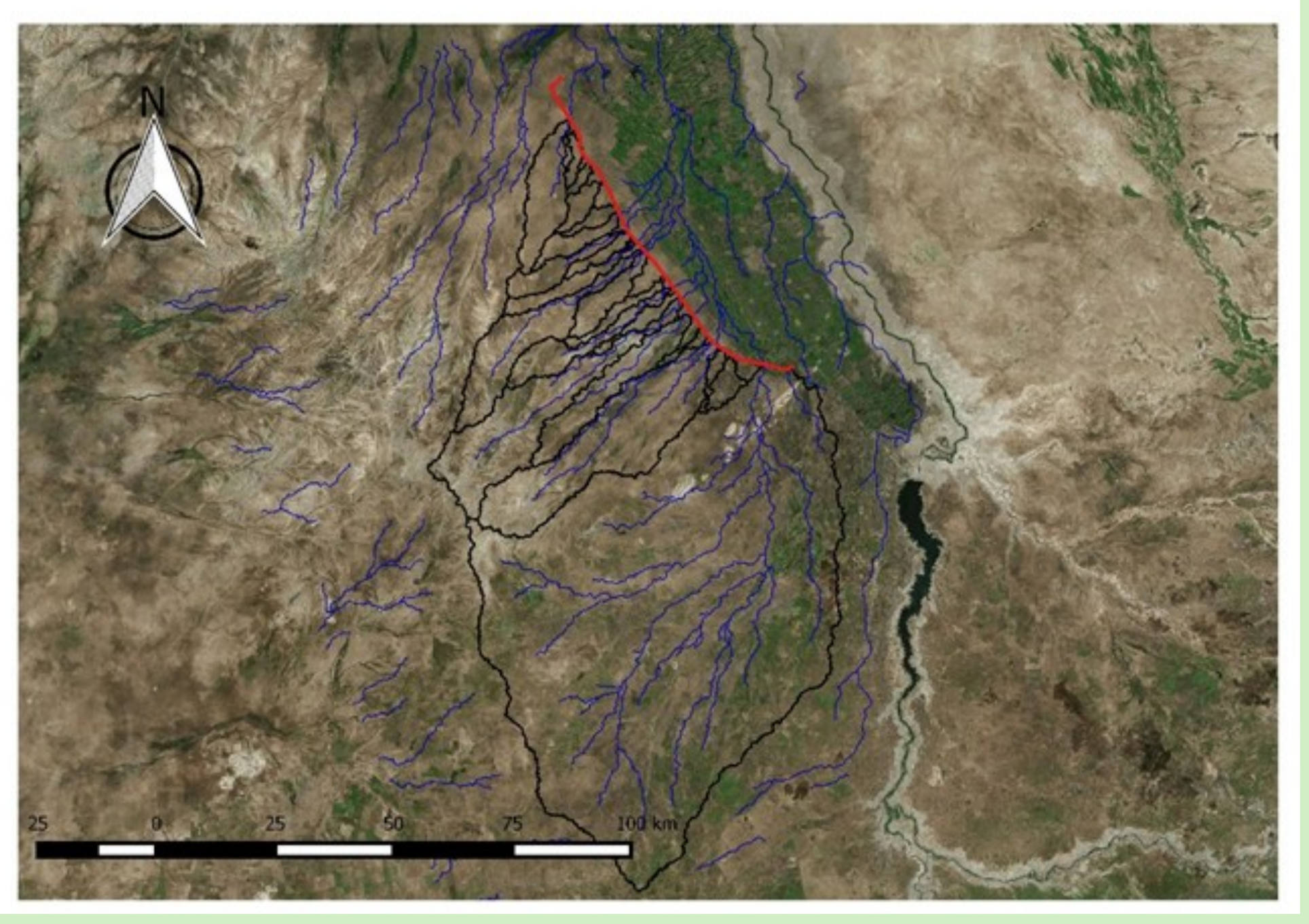


HRC Hydraulics Research Center **Study of Sabir Branch Protective Drain. New Halfa Irrigation Scheme**
 مركز البحوث الهيدروليكية

Research team: Almutaz A. Abdelfattah, Abu Obeida B. Ahmed, Usama G. Mohammed, Mohammed Y. Abbas, Yasir A. Mohamed.

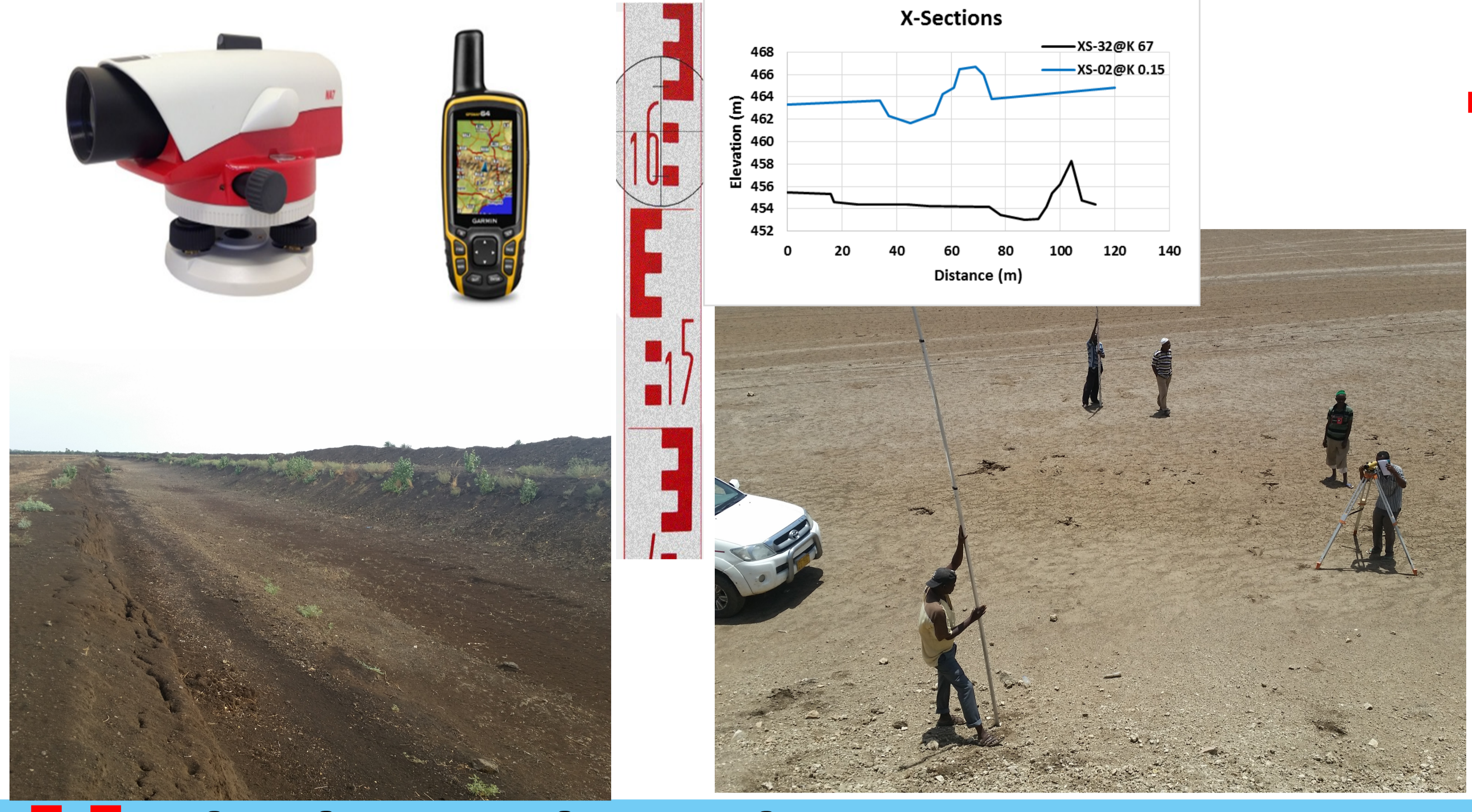
Introduction:

This study is intended to investigate the flooding problems of Sabir Branch Protective drain, where every year floods flowing from Albutana plateau threatens New Halfa Irrigation Scheme and also inundate villages near the Protective Drain. The methodology that has been applied in this study was divided into four stages:



Assessment of the problem:

- Identification of flood sources.
- Evaluation of existing condition of the drain x-section and embankments.
- Identification of human interventions in the drain.
- Evaluate the existing condition of the bridges.

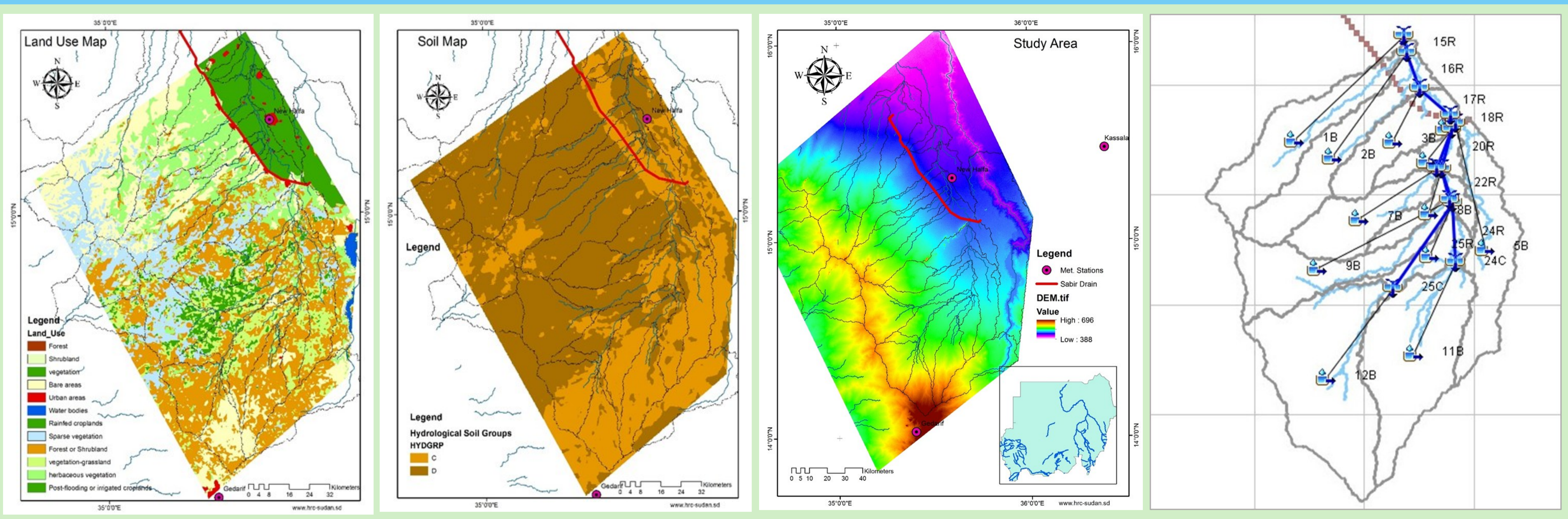
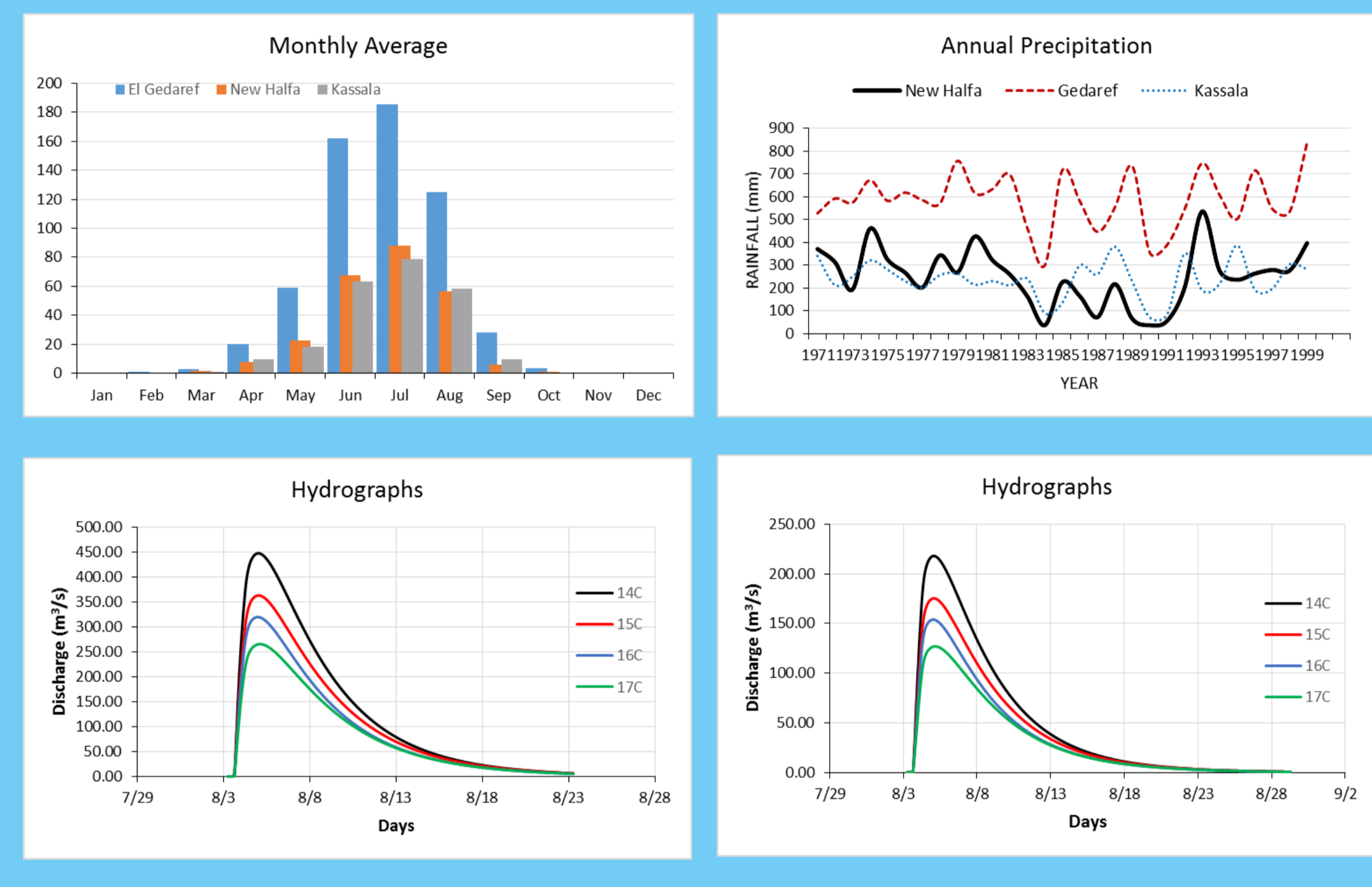


Topographical Survey:

38 x-sections have been surveyed using automatic levels and GPS. Comparison between existing and designed x-sections and longitudinal profile to identify any changes.

Hydrological study :

- ◆ Rainfall daily data have been analyzed for El Gedaref and New Halfa stations from 1971 to 1999.
- ◆ 90 m resolution SRTM DEM has been used for Topographical analysis and generation of catchments characteristics.
- ◆ SCS-CN method has been used with HEC-HMS to estimate peak discharges.
- ◆ Peak discharges has been estimated in 4 points along the drain profile.



Results and Recommendations:

- ➔ Existing drain x-section is enough to pass only 20% of the estimated peak discharge, nevertheless increasing the bed width of the drain more than 14 m is not recommended due to the limited span of the bridges. And also because it requires excavating large amount of soil which is very costly.
- ➔ Existing bridges x-sections are very small for the estimated discharge, therefore a box culvert with 3 openings (2X2) is recommended in each bridge.
- ➔ Extending the drain by 6 km towards the north to divert flood water away from the scheme.
- ➔ Recommend to construct water harvesting structures starting from the upper catchment to reduce the amount of floods and benefit from the harvested water in agriculture and water supply, and these structures can be in a form of contour bunds, check dams or water spreading dams.

