

1. There is a problem obtaining sufficient electronic diagnostic equipment and spare parts before the modernization is implemented. The irrigation project authorities are not committed to maintaining their canal infrastructure, as evidenced by a quick field tour that clearly indicates extensive deferred maintenance. This is especially common in some projects in which donors fund the automation and the government has no commitment to maintaining it. An annual maintenance budget of at least 15% of the cost of PLC-based automation components is a good starting point. There is not a clear, advanced delineation of responsibilities among the designers, builders, operators, SCADA, integrators (see Glossary), and others. The irrigation project managers want to use inexpensive PLCs and sensors, regardless of the requirements and capabilities. There is a rush to design and install a large modernization project within a few years, although the project staff does not have adequate experience with modernization concepts, much less with modern SCADA and automation equipment. The project managers want to invent, develop, or construct their own sensors and actuators. Instead, all the planning and design meetings are limited to designers and high-level irrigation project officials and economists. This lack of maintenance is due to the lack of accountability and financial transparency, lack of a maintenance plan, and other reasons. Budgets are inadequate to sustain the automation project. The people who ultimately operate and maintain the new system are not brought into early and continued discussions as important participants. There are unreasonable expectations of massive water conservation and easy operation. There is not a clear understanding that there will inevitably be setbacks with implementation. There are no qualified local integrator companies or organizations in the area. There is no well-defined operational objective. Hardware manufacturers promote a system based on available hardware. There is a high turnover rate among irrigation project staff. The designers have little or no experience with modern irrigation system design. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16.