Evaluation Abstract

Supporting irrigation development in a CEB member state

The present evaluation sheds light on the results of the long-standing involvement of the Council of Europe Development Bank (CEB) in the irrigation sector. As part of the CEB's sector of action "improving living conditions in urban and rural areas", the CEB approved a total of 32 loans between 1985 and 2002 to part-finance a large number of irrigation networks and several dams in one of its member countries. The Bank collaborated with the state water agency in charge of developing water resources in the country. The projects were implemented by the agency's local directorates. The objectives of the projects were quite homogenous across the portfolio: (i) diversify and increase agricultural output, in order to create labour opportunities and improve farm incomes; and (ii) curb the trend of rural depopulation. The CEB-financed projects were implemented nation-wide and enshrined in a large national rural development programme to modernize farming practices and improve rural infrastructure.

Total investment costs for the irrigation projects in the country amounted to an estimated USD 4.65 billion. Final CEB disbursements stood at 1.01 billion. The CEB loans resembled in many ways a budget-support programme for the state agency, as the CEB loans served to even out fluctuations in government budget allocations and thereby to partially offset implementation delays associated with the limited availability of local funding for irrigation sector development.

The majority of the CEB-financed irrigation systems are open canal systems, usually with a lined main conveyance canal in trapezoidal shape, serving secondary and tertiary irrigation networks, also of open type. Between 1985 and 1994, almost all CEB-financed projects included the construction of a dam to create a water reservoir. Due to concerns of potential negative environmental impacts of dams, and potential reputational risks for the Bank, the CEB decided to discontinue financing large dams (higher than five meters), so that later projects financed irrigation networks only. Many early projects allowed supply from rivers by gravity, but the more recent projects relied on pumping to make water accessible to farmers. In contrast to gravity systems, the operation of pumping systems requires energy to pump the water upwards. Energy costs have risen sharply since the privatization of the domestic electricity market in 2001.

After construction, operation and management responsibilities for the irrigation systems were transferred from the state agency to water user associations (WUA). WUAs operate on the principle of participatory irrigation management and provide for a high degree of farmer involvement, both directly and through elected representatives. WUAs are fully responsible for maintenance and operation of the irrigation system under their control and are financially autonomous; the state agency serves as the advisory body and controlling institution.

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The evaluation combines the findings of a desk review of the entire portfolio of CEB co-financed projects with the results of a socio-economic field assessment carried out in one large CEB-financed irrigation system supported by two loans. Given its size, said irrigation system is divided into six smaller units ("sub-systems") of which three were visited by the evaluation mission. The findings of the socio-economic field assessment serve to illustrate the results of the CEB-financed irrigation investments but cannot be extrapolated to the entire portfolio. Whilst some CEB-financed irrigation projects display similar technical characteristics to the irrigation system chosen for the field assessment, the range of social effects is so vast and varied (since they are a function of many external variables such as topography, climate, soil quality, agricultural context, etc.) that it cannot be assumed they would yield similar results. In light of the different levels of availability of data and the sectoral nature of this report, the projects are not rated, as is normally the practice for EVD.

Relevance. The developmental objectives of the CEB loan operations were highly relevant and in line with both the CEB mandate of improving living conditions in rural areas as well as the national agricultural policy at the time, which aimed to increase agricultural productivity and incomes in the rural economy to curb migration from rural areas to urban centres. From today's perspective, an assessment of the alignment of social/economic objectives of the proposed projects with environmental requirements would be an additional concern at project identification stage. Issues such as efficiency of water usage in irrigation system design, choice of on-field irrigation technology and, more generally, water resource management were partly taken up in the later projects, but were not of concern in the older ones. The project design did not include measures to ensure farmers' buy-in or support schemes to help farmers adapt their production technologies to irrigation. The CEB financed irrigation-projects were planned, designed and built without verifying users' interest; training or extensions services were not systematically provided by the Ministry of Food, Agriculture and Livestock. As a consequence of the lack of incentives and/or capacities, not all farmers made adequate use of the infrastructure provided to them.

Effectiveness. CEB disbursements resulted in a net irrigation area of about 545 000 hectares, benefitting more than 170,000 farmers. Site visits indicate that construction quality was generally satisfactory. However, low usage of the infrastructure weighs on the social effects of the investments. An indicator widely used in the country to measure the usage intensity of irrigation infrastructure is the irrigation ratio, defined as the ratio of areas that are actually being irrigated to the area equipped with irrigation. In 2012, irrigation ratios stood at 56% in the CEB-financed irrigation projects alone, a result which is broadly in line with the national average (62-64%), itself rather low and an indication that the crop areas *actually* irrigated are a lot smaller (e.g. around 300 000 ha in 2012). While the underlying reasons for low irrigation ratios are difficult to determine, the lack of ex-ante final beneficiary consultation in the design phase and prior to project approval certainly played a role, as did the high energy costs of pumping systems and the generally rising socioeconomic discrepancies between rural and urban areas. The CEB-financed irrigation systems are operated and maintained by a total of 66 WUAs. Two out of the three irrigation sub-systems visited during the field assessment were well-operated and maintained 20 years after construction of the facilities. Local stakeholders suggested, nonetheless, that the responsibilities of the state agency and the WUAs with respect to implementing and, in particular, financing of maintenance works are not always clearly defined.

Efficiency. The CEB-financed irrigation projects faced considerable implementation delays and cost-overruns. It should be emphasized that the most severe implementation problem – chronically limited contributions from the internal government budget – lay clearly outside the sphere of influence of the state agency. Another major concern was the narrow scope of feasibility studies and environmental impact assessments of the irrigation projects. The establishment of a Technical Assessment & Monitoring Directorate in 1995 at the CEB

helped mitigate these issues. The implementing agency has reportedly considerably improved its operational efficiency in the last years. Monitoring by the CEB as well as the implementing agency was mainly focused on physical results and the technical performance of the irrigation infrastructure; there is room for improvement regarding reporting and monitoring of social results. In light of the high variability in investment costs, an average per-unit cost analysis would not have been meaningful. Overall, technical efficiency of the irrigation projects is relatively low, as surface irrigation methods, which waste a considerable amount of water, are applied on around 80% of land irrigated by the projects, while the CEB Technical Assessment & Monitoring Directorate's mission have stressed the importance of water saving technologies. Analysis of the cost-efficiency of the investments suggests that the irrigation sector continues to require substantial subsidies from the government. Available evidence suggests that the government has not systematically recovered investments costs since only a fraction of WUAs operating the CEB-financed infrastructure make yearly cost recovery payments to the state agency. A model-type comparison of the long-term economic costs of irrigation water provision with water fees paid in the irrigation system investigated as part of the field assessment suggests that water fees levied from farmers may not always be sufficiently high to fully cover operation and maintenance costs. Water fees depend on the type of crop that is grown. The analysis suggests that, in the pumping irrigation system in that province, water fees for profitable crops (such as fruits or sunflower) are sufficient to cover operation and maintenance costs (including energy costs) of the irrigation system; by contrast, the fees paid by farmers who continue to grow lower-value crops (such as wheat) are substantially too low. WUAs that run sub-systems that require bigger heights of pumping naturally face more problems to cover their operation and maintenance costs. A very guarded assessment of farmers' payment capacity suggests that it may be too strong a hardship for farmers to pay higher fees – unless they change their production technology. It has thus to be assumed that subsidies fill the financing gap for irrigation infrastructure.

Impact. As part of the evaluation, the medium to long-terms results of the establishment of irrigation were investigated in a large (66 000 hectare) irrigation system in that province. The impact evaluation revealed that during the first years after introduction of irrigation, farmers had to cope with crop failures and significant financial losses, for lack of training/extension services on irrigation techniques. Thereafter, incomes of farmers improved considerably due to the cultivation of more demanding crops, and new employment opportunities arose. In one sub-system, a true commercial agriculture developed around the production of sunflower as the main commercial crop, triggering considerable spill-over effects on the rural economy - for example, rising numbers of machinery traders and traders of other agricultural inputs and growth in storage and packaging centres. In these areas, the introduction of the irrigation system contributed to curbing the trend of rural depopulation, though it has not reversed it. At the same time, the establishment of irrigation infrastructure has had some indirect negative effects: unsustainable cropping patterns, surface irrigation methods and excessive use of pesticides and fertilizers have triggered negative environmental effects such as erosion, salinization and soil depletion. Generally speaking, the field assessment highlighted the complexity of the chain of effects of establishment of an irrigation system. Interestingly, at the same geographic location, the impacts differed considerably, depending on the topography, land consolidation activities, willingness of farmers to make complementary investments, and management capabilities of the WUAs.

Sustainability. The sustainability of irrigation systems depends crucially on the capacity of the WUA to generate sufficient financial resources for maintenance. Indicative evidence collected in the course of the evaluation paints a highly heterogeneous picture regarding the financial sustainability of the CEB-financed projects: some WUAs are on the brink of collapse, others are doing fine. Available evidence suggests that,

generally, WUAs' collection rates tend to be satisfactory, but water pricing continues to be a matter of concern for sustainability. The introduction of administrative minimum irrigation tariffs applicable to all WUAs, has improved their operating environment, since they are assured minimum income levels. Analysis of the economic costs of water provision in one CEB-financed irrigation system suggests that the financial sustainability of irrigation systems can only be assured if farmers adapt their cropping patterns to irrigation. As long as farmers continue to grow lower-value crops and do not shift to higher-value crops, the financial sustainability of the irrigation systems remains at risk. Low irrigation ratios and high energy costs also weigh on financial sustainability. Water scarcity constitutes a substantial environmental sustainability risk for some of the CEB-financed irrigation systems: some of the irrigation systems cannot or can only partially be operated, for lack of water availability. In the last years, the government has increasingly set incentives and taken measures (subsidies, interest-free loans, penalties) for farmers to switch to more water-saving technologies. More efficient irrigation technologies are being installed in areas with high climate vulnerability and water scarcity, as in the case of a local water basin.

This evaluation was justified from an accountability perspective but it also presents ample opportunities for drawing lessons on what worked, what didn't, and why - **lessons** that can be applied to future CEB-financed irrigation projects, including:

- The growing importance of environmental concerns (both with respect to water resource management and conservation, as well as the mitigation of negative effects on soil) which indisputably need to be explicitly addressed when identifying new irrigation investments;
- Identifying the most appropriate financing mechanism to ensure that financing is not disconnected from construction planning, along with measures to mitigate, where do-able, timing and sequencing risks;
- Awareness of the complex chain of effects associated with irrigation development activities, which calls for a more holistic approach (encompassing, *inter alia*, agricultural extension services, credit facilities, technical support, training, and other farmer incentive schemes) as a means of securing buy-in from the targeted final beneficiaries and thereby increasing financial and economic sustainability of the irrigation infrastructure;
- Making efficient use of scarce public resources by targeting subsidies and other public transfers on the basis of detailed farm economics and production analyses; and on the macro level, in a context of increasingly scarce water resources and limited public funds, steering financial flows to those areas of high social need where the returns generated will be most efficient;
- Inclusion of a capacity building component in project design in cases where relevant and possible for the CEB (e.g. a longstanding involvement in a particular sector in a given country); not only does this provide high visibility for the Bank, but it also ensures better quality and success of project implementation.

On the basis of the findings of the evaluation and field assessment, the following **recommendations** have been formulated for consideration and follow-up by the **CEB**:

- **Reinforce the appraisal framework.** Agriculture is now a sector where the CEB can intervene and, given its predilection for hard infrastructure, it might be increasingly solicited to finance irrigation projects. In this perspective, the Bank should draw up a framework to define its expectations and requirements regarding both quality of project proposals and the justification of their social relevance. Said framework would clearly set out the issues to be examined at the project design and appraisal stages; establish the safeguards to be applied; and spell out what evidence of ex ante analysis should be undertaken by the Borrower in order to ensure final beneficiary buy-in and sustainability and, where relevant, determine subsidy needs.
- **Strengthen institutional capacity in financial and economic analysis.** Given

the Bank's strong engagement in large infrastructure projects and, potentially, irrigation infrastructure, consideration should be given to building up the CEB's institutional capacity for a more rigorous approach to measurement of financial and economic rates of return of said infrastructure, including whether the introduction of cost-benefit or cost-effectiveness analyses should be systematically included in project appraisal. While the CEB has a short history of such types of analyses, it could adopt measures to acquire the capacity and tools therefor; such studies could be done either directly by the Bank or commissioned to external experts, but will require resources in both cases.

- **Upscale recourse to technical assistance.** The CEB should consider supporting its partners by providing technical assistance funding, where needed, for feasibility studies, farm economics analyses, target group and beneficiary surveys, subsidy analyses and any other ex-ante investigation that appraising such operations may require.
- **Expand visibility and reporting.** Irrigation projects have numerous social, economic and environmental effects. On these, the CEB could mobilize adequate resources in order to build up and communicate on the social added value of the operations it finances. To this end, there is a crucial need for indicators on which the social performance of CEB-funded operations can be assessed. By limiting monitoring to planned and actual physical output and technical performance, no valid conclusions about social performance can be drawn.
- **Timely counterpart financing.** In order to mitigate the risk of time and cost overruns, more diligence is required at the appraisal/approval stages in establishing the timeframe for implementation. Moreover, close and regular cooperation with co-financiers, implementing partners, other stakeholders, is needed in order to ensure that counterpart financing is provided in a timely manner and that contingency plans are triggered if a source fails to fulfil its commitments.

The following **recommendations** specific to this overall irrigation portfolio are tabled for consideration and follow-up by the **Borrower**. These refer to the need to update the strategy and implementation of this long-lasting programme. Three key measures are suggested:

- **Accompanying measures.** Plan for and implement accompanying measures to the physical infrastructure (extension services, credit facilities, technical support, training, and other incentive schemes) to ensure effective and efficient use of the infrastructure provided.
- **Stakeholder coordination.** Ensure coordination between the different stakeholders involved in all aspects and at all levels of the implementation process.
- **Ex ante analyses.** Carry out ex ante final beneficiary surveys to ensure buy-in, as well as other analyses (cost-benefit, production systems, financial capacity, etc.) to ensure sustainability and determine subsidy needs.