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C. GOBERNADOR DEL ESTADO DE DURANGO, MEXICO
CC EJIDATARIOS DEL EJIDO LA VICTORIA, P.N., DGO., MEXICO

P R E S E N T

Hereby we send the report of the analysis of the net present value (NPV) of the study referred to the CONSTRUCTION OF A DAM AT "THE VICTORIA" Ejido, IN THE REGION OF "EL SALTO", IN THE STATE OF DURANGO, MEXICO.

In this analysis the costs and benefits received by the owners of the land, where the dam is to be built, were compared. Scenarios were analyzed considering the inclusion of subsidies and government transfers to the ejidatarios if necessary, to encourage their cooperation, by allowing to build the dam on their land and accepting to perform actions for the maintenance and conservation of protective vegetation in the microbasin, for the 60 years comprising project. Results led to conclude that THE SCENARIO THREE is the most advisable from the public point of view, since with this proposal the benefits are spread to a wider number of stakeholders (water for inhabitants of the city El Salto, and water and monetary benefits for the ejidatarios), even though the NPV OF THE INCREMENTAL BENEFIT with the SCENARIO THREE (from a private point of view) is negative (**\$ -12'226,335.38**)

Such SCENARIO THREE implies the following:

SCENARIO THREE: **BENEFITS** for the Ejidatarios INCLUDE:

1. There are 4,359 households in El Salto, each paying \$27.54/month to La Victoria per water services (from year 2 to 60),
2. Payment for hydrological services (subsidied by the government) \$300/ha/yr in 706 ha for the first 6 years.

SCENARIO THREE: **TOTAL COSTS** INCLUDE: In **this case the costs are assumed by the Ejidatarios and by the government.**

- Maintenance of the forest \$300/ha/yr in 706 ha, paid by the ejidatarios (years 1 to 60)
- Dam's construction \$20,000,000 (assumed), paid by the government (year 1)
- Annual dam's maintenance \$330,285/yr, paid by the government (years 2 to 60)

Please notice that in this proposal a great deal of the costs are paid by the government.

Best regards

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FINAL REPORT OF:
**NET PRESENT VALUE'S ESTIMATION FOR THE PROJECT: CONSTRUCTION AND OPERATION OF A
DAM IN THE EJIDO LA VICTORIA, IN THE REGION OF EL SALTO, IN THE STATE OF DURANGO,
MEXICO.**

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Regarding the construction of a dam in a micro basin of 730 ha in the ejido La Victoria, to supply water to the population of El Salto, Dgo., two estimations of the INCREMENTAL BENEFIT, based on the Net Present Value were made, considering in both estimations a planning horizon of 60 years and a discount rate of 4% per year. The calculations were made in an Excel spreadsheet (see the ANNEX), and the corresponding main results were as follows:

ESTIMATION 1: Refers to: Estimating the net present value (NPV) of the INCREMENTAL BENEFIT in the comparison of SCENARIO ONE (current situation -without project) and SCENARIO TWO (with the project, but WITHOUT INCLUDING DAM's COSTS OF CONSTRUCTION and MAINTENANCE, assuming that these costs will be paid by the government, and therefore not directly by the stakeholders).

Under ESTIMATION 1, the NPV of the INCREMENTAL BENEFIT was estimated to be \$15'047,078.36 (NPV positive).

Therefore, under Estimation 1 the project IS VERY ATTRACTIVE to AND PROFITABLE for the ejidatarios of La Victoria.

ESTIMATION 2: Considers the estimation of NPV of the INCREMENTAL BENEFIT in the comparison of SCENARIO ONE (current situation -without project) and SCENARIO THREE (with the project, but considering that the Ejidatarios (direct beneficiaries for selling the water services) WOULD PAY THE COSTS for construction and maintenance OF THE DAM).

Under ESTIMATION 2, the NPV of the INCREMENTAL BENEFIT was estimated to be

\$ -12'226,335.38 (NPV negative)

Therefore, under this estimation the project WILL NOT BE ATTRACTIVE OR PROFITABLE to the ejidatarios of La Victoria, unless the government pays a large portion of the costs, as was assumed in SCENARIO TWO.

EXPLANATION:

SCENARIO ONE **BENEFITS** for the Ejidatarios INCLUDE:

1. STANDING TIMBER: $\$500/\text{m}^3 * 15\text{m}^3/\text{ha} * 706\text{ha}$ (every 10 years)
2. AGRICULTURE: $24\text{ ha} * 1.5\text{ton}/\text{ha}/\text{yr} * \$6,000/\text{ton}$ (YEARS 1 TO 60)
3. LIVESTOCK: 90 livestock heads at $\$3,500/\text{head}$ (every 5 years)

SCENARIO ONE **COSTS** for the Ejidatarios INCLUDE:

1. Forest maintenance $\$100/\text{ha} * 706\text{ha}$ (years 1 to 60)
2. Agriculture cost $\$3,000/\text{ha} * 24\text{ha}$ (years 1 to 60)
3. Livestock cost $\$50/\text{head}/\text{yr}$ (years 1 to 60)

SCENARIO TWO **BENEFITS** for the Ejidatarios INCLUDE:

3. There are 4,359 households in El Salto, each paying $\$27.54/\text{month}$ to La Victoria per water services (from year 2 to 60),
4. Payment for hydrological services (subsidied by the government) $\$300/\text{ha}/\text{yr}$ in 706 ha for the first 6 years.

SCENARIO TWO **COSTS** for the Ejidatarios INCLUDE:

1. Maintenance of forest $\$300/\text{ha}/\text{yr} * 706\text{ha}$, paid by the ejidatarios (years 1 to 60). This is assuming that the Ejidatarios invest in the maintenance of the forested areas, a larger amount in SCENARIO TWO ($\$300/\text{ha}/\text{yr}$) than they would be willing to invest in SCENARIO ONE ($\$100/\text{ha}/\text{yr}$); because in SCENARIO TWO they receive payments for water services (which does not happen in SCENARIO ONE).

SCENARIO THREE **BENEFITS** for the Ejidatarios INCLUDE:

1. The same benefits as in SCENARIO TWO.

SCENARIO THREE **TOTAL COSTS** INCLUDE: In this case the costs are assumed by the Ejidatarios and by the government.

- Maintenance of the forest $\$300/\text{ha}/\text{yr}$ in 706 ha, paid by the ejidatarios (years 1 to 60)
- Dam's construction $\$20,000,000$ (assumed), paid by the government (year 1)
- Annual dam's maintenance $\$330,285/\text{yr}$, paid by the government (years 2 to 60)

IMPORTANCE OF OUR STUDY FOR POLICY MAKING

Our analysis is relevant for the authorities of several dependencies as it points to the needs of the community in El Salto, the inhabitants of Ejido La Victoria and the natural resources of Pueblo Nuevo. The previous results of surveys show the importance of water provisioning services for inhabitants of both El Salto and Ejido La Victoria, the latter having less access to a constant provision, having to extract water directly from natural water run offs. From daily activities, there is a degree of pollution in the natural water flows.

Scenarios one and two have strong implications for the government as there is the assumption that the government will pay for the construction of a dam and maintenance. Scenario one provides a smaller amount given to landowners for maintenance of the forest while scenario two provides a larger amount, but the benefits in both cases are greater than the costs. Scenario two reflects the willingness of El Salto inhabitants to pay an additional amount for water provisioning service.

Overall, the construction and maintenance of the dam benefits all stakeholders. The government will invest in this project while other stakeholders cover the costs of forest and soil maintenance creating a great social benefit for both communities. Without government investment in dam construction and maintenance, the project is not attractive and the costs of forest maintenance cannot be covered as the difference between the willingness to pay and willingness to accept cannot be covered.

CONCLUSION:

From the above description it is clear SCENARIO THREE is the most realistic, because it includes all of the costs incurred to construct the dam and give the corresponding annual maintenance, which is paid by the government. Besides, it includes the payments for forest maintenance made by the ejidatarios, which were increased from \$100/ha/yr in SCENARIO one to \$300/ha/yr in scenarios two and three).

Under those circumstances from the private point of view SCENARIO THREE is not viable IF THE EJIDATARIOS HAD TO PAY FOR THE CONSTRUCTION AND MAINTENANCE OF THE DAM, since there is a negative net present value of **\$ -12'226,335.38, when comparing the TOTAL COST with the BENEFITS TO THE EJIDATARIOS.**

However, from the public point of view this SCENARIO THREE is still the most convenient, given the undeniable need of increasing the supply of water to the inhabitants of El Salto. Therefore, the government decided to go ahead with the investment in the project of constructing the dam, but the construction and maintenance costs were not charged to the ejidatarios, but will be given as government subsidies.

Moreover, the government gave an incentive (transfer payment) to the ejidatarios equivalent to payments of \$300/ha/yr for hydrological services, in 706 ha, at least for the first 6 years of the project.

Therefore, in conclusion THE SCENARIO CHOSEN WAS THE SCENARIO THREE, were the NPV OF THE INCREMENTAL BENEFIT for the ejidatarios of La Victoria would be **\$ -12'226,335.38 (NPV negative) if they had to pay for the construction and maintenance of the dam, but in the reality, since is the government who will pay for these two cost concepts, the NPV of the incremental benefit for the ejidatarios will be \$15'047,078.36 (positive), as can be seen in Estimation 1 (above), making it attractive the cooperation of the Ejidatarios with the government and with the population of El Salto, by allowing the construction of this dam in their forest land.**