APPENDIX D
ECONOMIC ANALYSIS

D-1. Economic Justification Determination. The economic analysis for every type of FCCE-funded emergency assistance will be conducted in accordance with ER 1105-2-100, Appendices D and E. Some of the key points of these principles are discussed as follows:

a. Sunk Costs. Costs for all previous work on the project, including previous PL 84-99 rehabilitation, are sunk costs and will not be used in the economic justification.

b. Discount Rate. Economic justification analysis will use the current Federal discount rate for water resources evaluation.

c. Level of Detail. The benefits of project rehabilitation are determined by comparison of the with and without project conditions. The economic analysis will be prepared in level of detail commensurate with the complexity of the project. Also in the analysis, the greater the effect a particular benefit item has on project justification, the greater the level of detail of its evaluation. It is not intended that the analyses for rehabilitation projects be exhaustive, but should provide sufficient data to document the steps used in formulating the proposed plan of rehabilitation.

d. Period of Analysis. The same period of time over which all project costs and benefits are analyzed is used for all alternatives. The period of analysis for rehabilitation work should not exceed the remaining physical life of the entire project. Any exception to the above will require justification in the PIR.

(1) Federal Projects. The economic life of federally constructed projects shall be the shortest time period determined by the following criteria:

(a) Fifty years.

(b) The degree of protection afforded by the project.

(c) The anticipated remaining life of the project assuming ordinary maintenance without major component rehabilitation (e.g. pumping plants, earth fill levees, riprap protection, etc.)

(2) Non-Federal Agricultural Projects. Ten years, or the degree of protection provided, whichever is less.

(3) Non-Federal Urban Projects. Use same criteria as for Federal projects, d.(1) above.

e. Price Level. All costs and benefits used in a feasibility analysis must be expressed in the same price level. Data initially based on different price levels must be converted to the selected project analysis price level using an appropriately documented price index for the items in question. Many indices are available, such as Construction cost index, Engineering News Record Construction cost index, etc.

f. Specific Data. The following specific methodology applies NED Benefit/Cost Analysis to the PL 84-99 rehabilitation program. The result of each step will be presented in the report.

(1) Determine the area protected by the project being rehabilitated.

(2) Inventory land use, crops, and structures existing in the project area. The inventory may be done by census or, if that is not feasible or cost effective, by statistically appropriate sampling. This inventory is the basis for future damages and damages avoided. Historical and inspection report data may provide valuable assistance in determining nonrecurring damages (see paragraph f(4) and Figure D-1 below).

(3) Determine and display property damaged from historical floods. Historical data and public records are valuable tools in establishing parameters used in determining project rehabilitation. Data may also be obtained from various sources including newspapers and city, state, and Federal offices. See various samples in Figure D-2.

(4) Estimate the average annual damages for conditions without Federal rehabilitation, using the standard stage-damage-frequency integration techniques. Estimate the average annual damages with the proposed rehabilitation using the same techniques. All flood-related property damage may be used in the present flood event. However, if property is completely destroyed during the present flood event and will not be replaced in kind, damage will be considered to be non-recurring and not included in average annual damage calculations. The analysis and description of the "without project" condition should address the benefits associated with the remaining level of protection.

(5) Determine land use with the project. If different from that without the project, then compute any increases in net income attributable to the project; e.g., where the project permits farming of land not farmed in the without condition (be sure to deduct any induced flood losses from average annual benefits).

(6) Determine project capital and maintenance costs by standard techniques and analyze. Present average annual costs and benefits as shown in Figure D-3.

g. Checks. The following checks will always be applied to ensure economic viability and the results thereof displayed in the format shown in paragraph titled "Presentation" below.

(1) Check to see if the first cost of protection (or of the repairs) exceeds the value of property protected. The cost of protection should not exceed the value of the property to be protected. The value of property to be protected will be determined by use of real estate appraisals, comparable sales, tax records, etc., and will be presented by type of property as shown in Figure D-3.

(2) The value of cropland will be separately presented by each crop. Annual benefits per acre should bear a reasonable relationship to the value of cropland. Benefits per acre in excess of 5% of the market value should be carefully reviewed to ensure against over estimation. The effect of crop rotation will also be considered.

(3) The average annual benefits for cropland should not exceed the net income of such land. Net income is defined as the market value of producers' outputs less the market value of the producers' input, exclusive of the cost of the intermediate goods or services. The following sources of information are acceptable: Farm budget data or reports prepared and made available to the public by other local, state and Federal agencies dealing with farm income information. All significant deviation from farm production data furnished by the U.S.D.A and/or Bureau of Reclamation must be explained in detail.

h. Other. Identify the number of project beneficiaries (e.g., number of farms, number of residences receiving flood protection); identify the magnitude of benefits received by any single beneficiary if these benefits exceed 25 percent of total benefits.

i. Presentation. The example in Figure D-3 illustrates the "check" requirements for agriculture-type damages. This information will be included in the appropriate paragraph and/or appendix of the Project Information Report.

August 1977 flood

Residential	Damage	Value
House and contents	$ 44,200	$ 90,200
Outbuilding and contents	14,900	40,700
Irrigation well*	21,500	21,500
Metal silo*	39,720	39,720
Grain bin*	9,900	9,900
TOTAL	$130,220	$202,020

June 1983 flood

Residential	Damage	Value
House and contents	$ 59,200	$124,500
Outbuilding and contents	25,100	60,500
TOTAL	$ 84,300	$185,000

*Property which is destroyed and will not or has not been repaired after reviewing historical damages will not be used in calculating average annual damages.

FIGURE D-1. Land Use of Area Protected

May 1935 - 25,230 CFS	
Residential damage	$ 75,918
Agriculture damage	42,729
Other damage (commercial/industrial)	34,700
TOTAL DAMAGE	$153,347
August 1977 - 15,700 CFS	
Residential damage	$129,800
Agriculture damage	120,210
Other damage (commercial/industrial)	66,400
TOTAL DAMAGE	$316,410
June 1983 - 27,500 CFS	
Residential damage	$ 84,300
Agriculture damage	271,000
Other damage (commercial/industrial)	121,900
TOTAL DAMAGE	$477,200

FIGURE D-2. Damages from Historical Floods

Tchula Creek levee in Tchula County provides protection to 1,000 acres from a five-year flood event. The land use within the protected area is 40 percent improved pasture, 40 percent woodland, and 20 percent soybeans. The area contains four residential properties with estimated average structural value of $7,500 and content values estimated at $2,500 each, or estimated value of $10,000 per property. The analysis is based on present price levels and current discount rate. Annual benefits for the rehabilitation work are listed below:

I. Average Annual Damages Prevented:

Agricultural Crops	$ 6,400	
Soybeans (200 acres)		5,200
Pasture (400 acres)		1,200
Residential Structures	400	
Total Average Annual Benefits	$ 6,800	

II. First Cost $ 24,000

III. Annual Cost

Interest and Amortization at 6-3/8% (5-year economic life)	$ 5,700
Operation & Maintenance (verify cost)	300
Total Average Annual Cost	$ 6,000

IV. The following checks were performed:

1. Total value of property protected

Residential (4 at $10,000)	$ 40,000
Pasture (400 ac at $600/ac)	240,000
Soybeans (200 ac at $1,500/ac)	300,000
Total	$580,000

2. Value of Cropland

Crops	Value	x 5%	
Soybeans	$1,500	$75	$5,200/200= $26 (less than 75)
Pasture	$600	$30	$1,200/400= $3 (less than 30)

3. Net Farm Income

Net Farm Income/Acre (from Tchula County)

	Crop Farm Budget Sheets	Benefits/Acre
Soybeans	$95	$26 (less than $95)
Pasture	$6	$3 (less than $6)

4. Distribution of project benefits: Three out of the four residences each obtain 30 percent of the total benefits while the fourth residence obtains the remaining 10 percent.

FIGURE D-3. Check Requirements for Agricultural-type Damages

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