

No. 18323

**INTERNATIONAL FUND FOR AGRICULTURAL
DEVELOPMENT
and
VIET NAM**

**Technical Assistance Agreement—*Tach Nham Irrigation
Project* (with schedule). Signed at Rome on 12 October
1979**

Authentic text: English.

*Registered by the International Fund for Agricultural Development on
26 February 1980.*

**FONDS INTERNATIONAL DE DÉVELOPPEMENT
AGRICOLE
et
VIET NAM**

**Accord d'assistance technique — *Projet d'irrigation de Tach
Nham* (avec annexe). Signé à Rome le 12 octobre 1979**

Texte authentique : anglais.

*Enregistré par le Fonds international de développement agricole le 26 fé-
vrier 1980.*

TECHNICAL ASSISTANCE AGREEMENT¹ (*TACH NHAM IRRIGATION PROJECT*) BETWEEN GOVERNMENT OF THE SOCIALIST REPUBLIC OF VIETNAM AND INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

Dated 12 October 1979

TA Grant No. 16-VN

TECHNICAL ASSISTANCE AGREEMENT

AGREEMENT dated 12 October 1979, between the GOVERNMENT OF THE SOCIALIST REPUBLIC OF VIETNAM (hereinafter called the Government) and the INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (hereinafter called IFAD).

WHEREAS the Government has requested IFAD, as part of its technical assistance operations, to arrange for assistance for the purposes of the Project hereinafter described; and

WHEREAS IFAD has agreed to arrange for such assistance upon the terms and conditions hereinafter set forth;

NOW, THEREFORE, the parties hereto hereby agree as follows:

Article I. THE PROJECT AND THE COOPERATING INSTITUTION

Section 1.01. The Project consists of the following three parts:

- Part A: carrying out soil investigations in the Thach Nham area, including the procurement and airfreighting of equipment to be used for this purpose;
- Part B: advising the Ministry of Water Resources on the selection of construction equipment to be used in the construction of the irrigation works in the Thach Nham area; and
- Part C: carrying out hydraulic model studies of the proposed design for the diversion structure.

Section 1.02. The Government and IFAD agree to appoint the Food and Agriculture Organization of the United Nations (hereinafter called FAO) as the Cooperating Institution for the administration of the technical assistance provided under this Agreement.

Section 1.03. Except as the Government and the Fund shall otherwise agree, FAO, as the Cooperating Institution, shall be responsible for:

- (a) Supervising the carrying out of the Project on behalf of IFAD;
- (b) Employing consultants for parts A and B of the Project;
- (c) Entering into a contract for part C of the Project with a specialized institution or firm experienced in the carrying out of the hydraulic model studies; and

¹ Came into force on 12 October 1979 by signature.

(d) Performing any other functions which may be assigned to it under this Agreement.

Section 1.04. Except where specifically provided in this Agreement, or requested by IFAD, unless the context otherwise requires, the Government shall directly furnish all information, and address all communications, to FAO on all matters referred to in section 1.03 above.

Section 1.05. Except as otherwise provided in this Agreement, FAO shall have the exclusive responsibility in respect of the matters referred to in section 1.03 above.

Section 1.06. Except as otherwise provided in this Agreement, FAO shall have the exclusive responsibility in respect of the matters referred to in section 1.03 above. Any action by FAO pursuant to its responsibility thereto shall be regarded and treated by the Government as the action taken by IFAD.

Article II. PROJECT EXECUTING ARRANGEMENTS

Section 2.01. (a) Unless IFAD and FAO shall otherwise agree, part A of the Project shall be undertaken by a consulting firm which shall supply a mission composed of (i) two soil specialists; and (ii) a soil chemist (if deemed necessary). Part B of the Project shall be undertaken by an experienced international contracting firm which shall supply a mission composed of a senior construction engineering specialist. Part C of the Project shall be carried out by an institution or firm experienced in carrying out hydraulic model studies.

(b) Wherever the term "mission" is used in this Agreement, it will refer to the missions that will undertake parts A and B of the Project, respectively, and to the institution or firm which will carry out part C of the Project.

Section 2.02. The Mission that shall carry out respective parts of the Project shall have the terms of reference set forth in the schedule to this Agreement which may be amended as follows:

- For parts A and B: by agreement between the Government and IFAD in consultation with FAO and the consulting firm;
- For part C: by agreement between the Government and IFAD in consultation with the institution or firm and FAO.

Section 2.03. Part A of the Project is expected to commence in January 1980 and, except as the Government, IFAD and FAO shall otherwise agree, it is expected to be completed within 3 months. Part B is expected to commence in January 1980, and except as the Government, IFAD and FAO shall otherwise agree, it is expected to be completed within 2 months. Part C of the Project is expected to commence upon receipt of the necessary information from the Ministry of Water Conservation and is expected to be completed within 6 months thereafter.

Article III. RESPONSIBILITIES OF IFAD

Section 3.01. IFAD, acting through FAO, shall make reasonable efforts to secure the services of the consulting and contracting firms and/or institution referred to in section 2.01 of this Agreement.

Section 3.02. Subject to the provisions of section 3.03 hereof, IFAD shall provide a part of the costs that IFAD has agreed to apply towards the expenses of carrying out the Project. Such expenses shall consist of:

- For part A: cost of services of consultant under turnkey contract between FAO and the consultants;
- For part B: compensation, subsistence and other allowances for the expatriate member of the Mission and his costs of travel to and from his duty station;
- For part C: cost of services of specialized institution or firm under terms of contract between FAO and such institution or firm.

Section 3.03. The total cost to IFAD of the technical assistance, including fees to be paid by IFAD to FAO to be provided under this Agreement, shall not exceed the amount of Special Drawing Rights (SDR 278,989).

Article IV. RESPONSIBILITIES OF THE GOVERNMENT

Section 4.01. The Government shall make available for the purposes of FAO and the Mission, free of charge, such services, facilities and equipment as shall be reasonable and FAO shall consider appropriate for the carrying out of each part of the Project.

Section 4.02. The Government shall provide suitable local counterparts to cooperate with and assist the Members of the Missions in the carrying out of their respective parts of the Project.

Section 4.03. The Government shall cooperate with IFAD, FAO and the Missions to ensure that each part of the Project is carried out as promptly and as effectively as possible and shall issue to its officials, agents and representatives all such instructions as may be necessary or appropriate to achieve this object.

Section 4.04. (a) The Government confirms that the members of the Missions shall have the status of experts performing a mission for IFAD, and shall be accorded the following privileges, exemptions and immunities so far as is necessary for the effective exercise of their functions:

- (i) Immunity from personal arrest or seizure of their personal baggage;
- (ii) In respect of words spoken or written or acts done by them in the performance of their official functions, immunity from legal processes of every kind, such immunity to continue notwithstanding that the persons concerned are no longer employed on missions for IFAD;
- (iii) For expatriate personnel the same facilities in respect of currency and exchange restrictions and in respect of their personal baggage as is afforded to officials of international agencies and experts on official missions; and
- (iv) Inviolability of all papers and documents relating to the work on which they are engaged for IFAD, and for the purposes of their communications with IFAD and FAO.

(b) The Government shall exempt from (or bear the cost of) any taxes, duties, fees, levies and other impositions levied under its laws and regulations or the laws and regulations in effect in its territories or of any political subdivision or agency thereof in respect of:

- (i) Any payments made to the members of the Missions (including payments made to a consulting firm and its personnel) in connection with the carrying out of their respective parts of the Project;
 - (ii) Any equipment, materials and supplies brought into the territories of the Government for the purpose of carrying out the Project and which, after having been brought into such territories, shall be consumed therein or subsequently withdrawn therefrom; and
 - (iii) Any personal effects of the members of the Missions which, after having been brought into the territories of the Government, shall be consumed therein or subsequently withdrawn therefrom upon departure of the members of the Missions.
- (c) The Government shall:
- (i) Make arrangements for the members of the Missions and their families promptly to be provided with any necessary entry and exit visas, residence permits, foreign exchange permits, and travel documents required for their stay in Vietnam; and
 - (ii) Facilitate clearance through customs of any equipment, materials and supplies required for the Project and of the personal effects of members of the Missions.

Section 4.05. To enable IFAD and FAO to carry out effectively their responsibilities and functions under this Agreement, the Government shall fully respect and accord to IFAD and FAO and their personnel the status, immunities, exemptions and privileges as set forth in the Convention on the privileges and immunities of the specialized agencies of the United Nations.¹

Article V. REPORTS; POST-PROJECT MATTERS

Section 5.01. The Government, IFAD and FAO shall exchange views with respect to the Missions' final reports and the implementation thereof. Copies of each report shall be furnished to IFAD, the Government and FAO.

Section 5.02. IFAD may use any reports prepared by the Missions for such purposes as IFAD shall reasonably determine, but shall not release such reports for public information except at the request, or with the consent, of the Government.

Section 5.03. IFAD's willingness to participate in financing the Project does not commit IFAD to assist in the implementation of recommendations contained in any reports of the Missions or to extend financial or further technical assistance to the Government with respect thereto.

Article VI. SUSPENSION AND TERMINATION

Section 6.01. The Government may at any time in writing request IFAD to terminate any part of the Project, and IFAD may at any time, whether or not any such request shall have been received, suspend or, after consultation with the Government and IFAD, terminate any part of the Project if any circumstances arise which interfere with the successful carrying out of any part of the

¹ United Nations, *Treaty Series*, vol. 33, p. 261. For the final and revised texts of annexes published subsequently, see vol. 71, p. 318; vol. 79, p. 326; vol. 117, p. 386; vol. 275, p. 298; vol. 314, p. 308; vol. 323, p. 364; vol. 327, p. 326; vol. 371, p. 266; vol. 423, p. 284; vol. 559, p. 348; vol. 645, p. 340; vol. 1057, p. 320, and vol. 1060, p. 337.

Project in the manner and upon the terms contemplated in this Agreement or with the accomplishment of the purpose thereof. In the event of any such termination or suspension, the parties shall consult with each other concerning the appropriate steps to be taken and any further action which it may be necessary or desirable to take with respect to the Project.

Article VII. MISCELLANEOUS

Section 7.01. Subject to the provisions of sections 1.03 and 1.04 of this Agreement, the officials responsible for the implementation of this Agreement shall be:

- (a) For IFAD, the Assistant President, Project Management Department;
- (b) For the Government, the Director of Planning Department of the Ministry of Water Conservation (Bo Thuy Loi) or any officer(s) authorized by the Government in writing notified to the Fund.

Section 7.02. Any action required or permitted to be taken under this Agreement on behalf of the Government may be taken by the official designated in section 7.01 or any person thereunto duly authorized in writing by him.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be signed in their respective names and delivered at the principal office of IFAD as of the day and year first above written.

Government of the Socialist Republic of Vietnam:

By: NGUYEN ANH VU
Authorized Representative

International Fund for Agricultural Development:

By: A. AL-SUDEARY
President

SCHEDULE 1

PART A

1. *Introduction*

Previous soils work in the Thach Nham area has been carried out to produce basically a pedological map. Information required for land capability classification, particularly for irrigated crops, is insufficient. Hence, there is a requirement for an irrigable land suitability classification map before decisions can be made on the next phase of project preparation.

The review of the previous soil studies indicates that while the overall density of soil investigations is adequate (one profile pit every 40 hectares), the depth of inspection at 1.2 meters is insufficient for irrigation studies. A large amount of chemical data has been produced but the important soil physical aspects—infiltration rate, subsoil hydraulic conductivities and water holding capacity—have been neglected. Many of the soils in the study area are reputedly sandy and, if this is correct, seepage losses from the water distribution system and deep percolation losses under the ricefields would result in a low water application efficiency, a possible limit on the area which could be irrigated and an

inevitable rise of the groundwater table. Evidently, there are at least three different soil provenances in the area: residual soils on granite, alluvium and the poorly drained southern region. The problems, and therefore the investigations, needed for these may be quite different and should be dealt with accordingly.

2. Location

The project area is located about 100 km south of Danang, in the coastal region of [the] central part of the country (15° N, 109° E). Quang Ngai is a main city situated centrally in the project area. The main highway (Route No. 1) and railway line from Hanoi to Ho Chi Minh City pass through the project area.

3. Background

The project would provide irrigation supplies by diversion from Tra Khuc River to 41,400 ha of land which at present is rainfed or partially irrigated. The proposed cropping pattern and projected crop yields are shown below:

	Area (ha)	Cropping intensity (%)	Yield (t/ha)	
			Present	Projected
Paddy	25,650	242	1.6	3.0
Field crops	3,900	200	1.3	2.4
Sugarcane	8,200	100	30	80
Tree crops	3,650	100	Various	
TOTAL	41,400			

The above increase in yields is expected to be achieved through assured supply of water for irrigation and improved farm practices including partial mechanization and optimal use of farm inputs.

The Investment Centre of the FAO has compiled two reports for project identification purposes—a Reconnaissance Report dated March 1979 and a Preparation Progress Report dated June 1979—which may be consulted for more detailed project data.

4. Work required

Further soil studies are needed to check the overall accuracy of the present 1:100,000 scale reconnaissance soil map and to collect additional information to reclassify and convert the existing soil map into one showing irrigable land suitability.

The proposed additional work required would be:

- (a) To check the present 1:100,000 scale reconnaissance soil map by an adequate number of random field observations;
- (b) To carry out soil surface infiltration tests on the principal soil types (minimum 10 sites) in both the natural and puddled states;
- (c) To measure the subsoil infiltration rate when horizons of a distinctively different texture, and hence permeability, are encountered at sites located in (b) above; about 10 investigations are envisaged;
- (d) To carry out a limited number (minimum 10) of hydraulic conductivity tests to ascertain horizontal permeability;
- (e) To describe the characteristics of the soil strata by manual boring to a depth of 5 meters at a minimum of twenty selected sites;
- (f) To measure the water table depth in local wells, obtain local information on fluctuation of water table depth and on the type of deep strata encountered during construction (sand, gravel, rock), collect water samples for measurement of salinity and pH;

- (g) To utilize the information collected in the field and, by interpretation of aerial photographs and use of the 1:25,000 contour map sheets, prepare a dual land classification map at 1:50,000 scale showing land suitability for irrigated crops including rice;
- (h) To prepare a comprehensive technical report to accompany the map.

The following subjects would be included:

- Results of field studies and formulation of the irrigable land suitability classification;
- A review of the calculated water requirements in relation to planned river diversion;
- The need for canal lining;
- The capacity and capability of the Vietnam Ministry of Agriculture to undertake the next phase of the investigations—semidetailed soil and land classification studies to internationally accepted standards;
- The requirements, if any, for expatriate technical assistance and equipment needed to carry out these semidetailed studies;
- Recommendations and technical specifications for the semidetailed phase.

PART B

1. Location

The project area is located about 100 km south of Danang in the coastal region of [the] central part of the country (15° N, 109° E). Quang Ngai is a main city situated centrally in the project area. The main highway (Route No. 1) and railway line from Hanoi to Ho Chi Minh City pass through the project area.

2. Project features

The following is a brief description of the main project components for which the expert will select and specify construction equipment and recommend appropriate construction methods.

3. Headworks (estimated cost US\$ 22 million)

The headworks consist of a concrete diversion dam, founded on relatively sound gneissic rock, to be constructed across a 300 m wide gorge on Tra Khuc River. The river carries low flows for about nine months with a minimum discharge of about 20 m³/s and flood flows for about three months with an estimated maximum discharge of about 17,000 m³/s (P = 1%). The dam will have a maximum height of 25 m with a 200 m long ungated ogee crest spillway flanked on either bank by undersluices and a canal head regulator. Diversion of low flows is considered feasible through a culvert under the dam for closure of the deep channel section.

Construction of the headworks involves the following approximate quantities of works:

- Excavation: earth, 192,000 m³; rock, 348,000 m³;
- Fill: earth, 90,000 m³; rock, 60,000 m³;
- Concrete: 6,000 m³;
- Stone masonry: 10,000 m³;
- Drilling for grouting and drainage: 10,000 m³;
- Steel work in gates and hoists: 28,000 tons;
- Reinforcement steel: 11,000 tons;
- Cement: 28,000 tons.

Some natural gravels and sands are available within distances of 10 to 15 km, but much of the concrete aggregate requirements are expected to be met from crushed rock.

Irrigation canals and drains

Two main canals—North Canal and South Canal—and a system of branch canals and drains are to be excavated. It is expected that some portions of the canals will be excavated in permeable sandy soils and will have to be lined with clay.

4. *Work required*

Under the Technical Assistance expected to be provided by International Fund for Agricultural Development, the services of a Civil Engineering Construction Expert are required to assist in the selection of construction equipment and for recommending construction methods appropriate to the construction of a concrete diversion dam and excavation of irrigation canals briefly described in paragraph 3.

The expert should have a specialized experience, preferably as a member of a contracting firm of international repute, in the selection, procurement and use of modern construction equipment for construction of similar irrigation projects. Field experience in developing countries is considered desirable.

The expert would visit the project area to acquaint himself with the site conditions, evaluate available infrastructure for construction and consult with project officials. Following the visit, the expert would submit a report containing his detailed recommendations in regard to the following:

- (i) Type, size, number and estimated cost of construction equipment to be imported for construction of the headworks and main canals, including initial supply of spare parts and consumables; specifications of the recommended equipment will be provided in sufficient detail to enable preparation of tender documents for international competitive bidding;
- (ii) Specifications of concrete formwork and scaffolding including recommended parts of formwork which is suited for fabrication in Vietnam; type designs of formwork to be fabricated will be provided along with list and cost of materials and fabrication facilities to be imported;
- (iii) List and cost of workshop equipment and maintenance facilities for maintenance and repairs of the equipment, including site storage facilities for spares, fuel and lubricants;
- (iv) Estimated annual requirement and cost of fuel, lubricants, spare parts and equipment replacement until completion of the project works;
- (v) Detailed recommendations for the construction method to be employed and construction scheduling for optimum utilization of the construction equipment;
- (vi) Recommendations in regard to training of personnel to be engaged in the management, operation and maintenance of the construction equipment.

The total period of employment of the expert, including travel time and report writing, is expected to be 4 (four) to 6 (six) weeks.

PART C

Location

The project area is located about 100 km south of Danang in the coastal region of central part of the country (15° N, 109° E). Quang Ngai is a main city situated centrally in the project area. The main highway (Route No. 1) and railway line from Hanoi to Ho Chi Minh City pass through the project area.

The headworks consists of a concrete diversion dam, founded on relatively sound gneissic rock, to be constructed across a 300 m wide gorge on Tra Khuc River. The river carries low flows for about nine months with a minimum discharge of about 20 m³/s and flood flows for about three months with an estimated maximum discharge of about

17,000 m³/s ($P = 1\%$). The dam will have a maximum height of 25 m with a 200 m long ungated ogee crest spillway flanked on either bank by undersluices and a canal head regulator. Diversion of low flows is considered feasible through a culvert under the dam for closure of the deep channel section. The peak flows for the return periods of 1,000 and 10,000 years are estimated as 24,100 and 31,800 m³/s respectively. The structure is, however, designed to pass a 100 years frequency flood of 16,900 m³/s, allowing a freeboard of 1.2 m below the top of the abutment and canal regulators. A flood of 1,000 below the top of the abutment and canal regulators by 2.5 m, resulting possibly in considerable damage to the structures, canals and agricultural area.

The river channel is formed in relatively sound gneiss overlain by a thin layer of sand and gravel. The rock is considered to be generally non-erodible. However, high velocity jets, which could be formed under conditions of poor flow distribution, could possibly result in some erosion downstream of the weir.

5. *Work required*

A three-dimensional model would be constructed at an appropriate scale and operated to study the following characteristics for discharges ranging between 17,000 and 31,800 m³/s:

- (a) Water levels upstream and downstream of weir with probable effects of overtopping on the safety of canal headworks;
- (b) Flow pattern and velocity distribution to evaluate risk of erosion downstream of the weir including proposals for protection measures, if required;
- (c) Silt ejection capability of undersluices and recommendations regarding operation of canal intakes during floods.

A detailed report would be required giving result of the model studies and making recommendations arising from the studies.
