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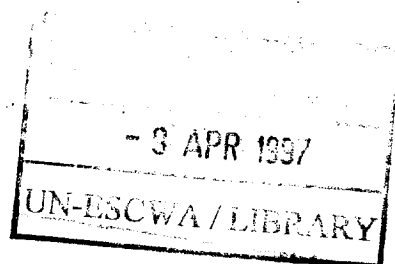


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Preliminary Findings on the Situation Resulting from
Floods that affected the People's Democratic Republic
of Yemen (29-30 March 1982)

1. As was confirmed by satellite pictures examined by UNDRO staff, unprecedented heavy rains fell continuously for 36 hours during the 29th and 30th of March 1982 and hit a vast area of about 300,000 sq kms extending in all the six Governorates (except small sections in the eastern and western parts). In many places the rain-fall exceeded 10" during this period and in Lahej it was 10.6". As a result of these heavy rains, the worst floods in living memory occurred and caused losses in human lives and animal resources as well as extensive damage to the irrigation, agricultural and public works in all the affected areas.
2. The tentative assessment of the damages caused by the floods have been reported by the PDRY Government in the following way:
 - (a) About 500 persons died.
 - (b) Approximately 300,000 persons were affected in one way or another, of which 50,000 persons were rendered homeless.

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(c) The two largest irrigation dams of Batais and Fuad, in the Abyan Governorate, were swept away by the floods along with most of the irrigation systems in Lahej, Shabwa and Hadremout Governorates were also seriously damaged. In addition, a large number of irrigation wells and pumping stations were destroyed.

(d) 25,000 houses were either totally destroyed or partially damaged.

(e) 50,000 heads of livestock were lost.

(f) The biggest bridge in the PDRY at Zingibar, linking Aden with 80 per cent of the country and of the population, was washed away completely.

(g) The main asphalted trunk road from Zingibar to Shukra and the Shukra-Ahwar road were breached in many places and about 50 kms became impassable for vehicles.

(h) The total damage has been estimated by the Government at about YD 330 million (US\$.960 million) (See breakdown Annex I).

3. His Excellency the President of the PDRY, Mr. Ali Nasser Mohamed, inspected immediately the affected areas and issued the necessary directives for the initiation and extension of emergency relief assistance to the flood victims. On the 2nd of April 1982, the President set up a High Level Disaster Committee consisting of the Ministers of Construction, Public Health, Agriculture and Agrarian Reform and Housing; the Deputy Ministers of Foreign Affairs, Interior, Finance and Planning; the President of the Popular Defence Committee and the Chief of Staff in the Ministry of Defence; and presided over

by the First Deputy Premier and Minister of Local Government to attend to the relief of distress and assess the damage. The Government mobilized its machinery and with limited resources reacted with the utmost speed to face the emergency situation. Army helicopters were used for the rescue and evacuation of displaced people and the dropping of relief materials and foodstuffs. Task forces were organized and sent to all Governorates to **reopen** roads, erect protection works and reestablish communications.

4. The situation was then investigated more thoroughly by the Government and the UNDP/UNDRO Resident Representative was invited to visit the flood-stricken areas. On 30 March 1982 the UNDP/UNDRO Resident Representative accompanied a group of senior Government Officials and overflow some of the affected areas in Abyan, Lahej and Aden Governorates in an army helicopter. On 1 April 1982, the Resident Representative sent his first messages to UNDR0, FAO and UNDP Headquarters informing of the disaster. On the same day the Government invited the heads of diplomatic and U.N. missions to survey the flooded areas by helicopter.

5. Both UNDR0 and UNDP reacted promptly and authorized their normal emergency cash contribution of US\$ 30,000 each for the procurement of immediate relief assistance. The UNDR0 fielded immediately its Co-ordination Officer, Mr. Hidetomi Oi, who arrived in Aden on 3 April 1982, to assess the emergency needs during the immediate emergency phase. The UNDP/UNDRO Resident Representative organized a local UN Inter-agency Committee composed of the country representatives of WHO, FAO and UNICEF. The PDRY Government, greatly facilitated the task of the U.N. officials by providing a total of eight helicopter trips which enabled them to survey the cut-off affected areas and assist in the assessment of flood damages and emergency relief needs. A dozen trips by land were also made.

6. As a result of the initial survey it became apparent that flood destruction was considerable and that there were great needs for both relief and rehabilitation assistance. The Government requested UNDR0 to launch an international appeal for emergency aid. UNDR0 distributed two "Situation Reports" on 7 and 14 April respectively, which confirmed widespread damages. The UNDR0 reports outlined the relief efforts and the rescue operations undertaken by the Government. It also pointed out the country's limitations in resources to cope with a situation of that magnitude. Specifically, it reported that the evacuation centres established by the Government to accommodate displaced people were in urgent need for food, medicines, bedding and shelter. UNDR0 notably mentioned that, at that juncture, it was essential that the international community consider the cumulative devastating effects of the three consecutive floods in one year; namely, in March 1981, September 1981 and March 1982.

7. In response to the Government request for WFP emergency food aid and in view of the seriousness of the damage and distress caused, the Director-General of FAO approved on behalf of the World Food Programme 8,100 metric tons of wheat flour and 540 metric tons of edible oil to be distributed to 300,000 affected persons, during a period of 90 days as supplementary food rations. The total cost of this WFP relief aid is US\$ 3,512,400. It is worth mentioning, that the WFP provided emergency food aid from its existing food stocks in the country, on loan basis, from the early days of the catastrophe. UNICEF provided 375 tents and 2,600 blankets and arranged for their delivery by air at a cost of US\$ 115,000. WHO is in the process of shipping the most critically needed medicines.

8. The FAO Director-General also approved from FAO's own resources US\$ 400,000 for the rehabilitation of agriculture and livestock. FAO fielded a joint FAO/WFP Mission headed by the Chief of the FAO Office for Special Relief Operations, Mr. K.P. Wagner, to assist in the review of food and agricultural prospects in the immediate future and in the preparation of rehabilitation and reconstruction programmes for support by the international community. The FAO expressed its preparedness to approach bilateral and international donor agencies to assist in the earliest restoration of the agro-economic sector in the PDRY, on the basis of this Mission's report.

9. Many Bilateral donors also responded promptly and channelled aid in various forms. A preliminary list of aid pledges is attached (see Annex II).

10. On the basis of discussions held with the concerned Government authorities, field inspections undertaken, and documents made available, the FAO/WFP Mission has drawn up a number of projects for Abyan, Dhala and Ahwar areas for which emergency rehabilitation is critically required and for which international support is essential. The proposals are limited to cover rehabilitation activities which are not included in the ongoing weir and canal constructions initiated mainly under technical and financial support from the Soviet Union and the Kuwait Fund. The proposals also do not include weir and canal reconstruction which need further detailed engineering studies and design before reconstruction could start. The Mission was able to identify areas where immediate action is imperative:

(a) to reduce the risk of further flood damages due to the vulnerability of the Wadi and Irrigation system;

(b) to utilize flood water of the forthcoming seasons to the maximum extent for irrigation purpose, even before definite reconstruction is completed;

(c) to expand crop production area by increased utilization of ground water;

(d) to increase crop yields of the remaining crop areas by higher use of fertilizer and other production inputs;

(e) to install a water management and flood warning system for the Abyan Delta;

11. The list of priority rehabilitation project proposed by FAO include the following:

(a) Rehabilitation of crop production in the Abyan Dela (total estimated cost of US\$ 1,040,000);

(b) Abyan Delta: Survey, repair, extension and improvement of the canal network (total estimated cost US\$ 4,439,000);

(c) Abyan Delta: Extension and rehabilitation of groundwater irrigation (total estimated cost US\$ 993,000);

(d) Abyan Delta: Alternative methods of supplying the lower area (total estimated cost US\$ 882,000);

(e) Repair of the Diyyu weir (total estimated cost US\$ 3,365,000);

(f) Water control system for the upstream Bana Wadi (total estimated cost US\$ 194,900);

(g) Repair and improvement of irrigation structure of Dhala district (total estimated cost US\$ 1,214,000);

(h) Dhala District: restoration of pump irrigation system (total estimated cost US\$ 490,000);

(i) Emergency procurement of agricultural inputs for Dhala district (total estimated cost US\$ 419,000);

(j) Ahwar Delta: Expansion and stabilization of crop production through increased use of groundwater (total estimated cost US\$ 595,500.);

(k) Rehabilitation of potato seed production (total estimated cost US\$ 726,000);

12. The total estimated cost of the capital equipment and materials, spare parts, technical assistance and administrative staff, operational and miscellaneous expenditures required for the implementation of the above listed rehabilitation project proposals amount to US\$ 14,353,900.

13. At the time of writing we are already one step beyond the immediate emergency phase. Some of the preliminary works have already been started which mark the beginning of the rehabilitation and reconstruction phase. From its allocated US\$ 400,000, the FAO recruited a surveyor who is on site undertaking a topographical survey for the repair of irrigation weirs. A consultant (Hydrogeologist) is also on site carrying out a survey of the catchment area in Abyan Delta with a view to fix an early warning or off take control system. A senior irrigation consultant is also visiting the Abyan Delta for the elaboration of the suggested rehabilitation programmes. Two expatriate master mechanics sponsored by FAO will arrive in a matter of days to start repairing machinery in the Abyan Delta. Necessary spare parts for heavy duty equipment will be ordered in this connexion.

The FAO/WFP Mission discussed with the Government the question of future WFP food aid for rehabilitation. The mission agreed with the Government's proposals and recommended them for favourable consideration by WFP. These included:

(a) continuation of emergency food assistance (wheat flour and edible fat) for a further 90 days to those 50,000 persons whose houses were completely destroyed and who suffered 100% of loss/damage due to the floods, and lost their economic means and production areas;

(b) supply of lentils, dates or canned chicken, if DS Milk is not available, under the already approved Emergency Operation 1285, as well as to those persons referred to in (a) above.

(c) A quick action "Food for Work" project for the 60,000 workers who were affected by the floods.

The Mission further recommended that additional food for work operations, for those affected by the floods, could be provided under the rehabilitation and reconstruction projects proposed and under the existing WFP projects already being implemented in the country.

14. The preliminary findings indicate that the flood and its effects spread over all the Governorates, however, the most extensive destruction occurred in Abyan and Lahej Governorates. Investigations in all the Governorates are still underway. As a complement to the more general description in preceding paragraphs the following preliminary account provides additional but yet incomplete details and data on the magnitude of the damage more particularly in Abyan, Lahej, Aden and Shabwa Governorates.

15. Abyan Governorate: Population affected: 2,225 families whose houses have been totally damaged and are seriously affected (100% loss) and 15,000 families whose houses have been partly damaged and/or lost crop, livestock and farms (80-90 percent loss).

Abyan Governorate is among the most and widely flood-affected regions in the country. The floods caused major damages to the irrigation structures, state and co-operative farms, public and private property and productive tree plantations. The flood damage to the irrigation system in the Abyan Delta was by far the largest and most devastating in view of its consequential and multiplier effects and the time required to restore it, A brief description of the irrigation system in the Delta will situate the problem better. Water for the irrigation of the Abyan Delta Area, some 18,000 hectares(ha), is provided by the diversion of spates in the Wadi Bana. The greater part, 13,000 ha of the irrigated area lies on the left bank and is served by a canal network supplied by a main which takes off from the Batais Weir at the head of the Delta. The area on the right bank is supplied from the Ahbush Canal taking off at the Hayje Weir some 15 kilometres (km) down-stream namely the Diyyu and the Ghraib Weirs. In addition, there is the Makhzan Weir which serves a large area on the left bank in the lower Delta. The total capacity of the canals taking off from the Wadi is about 210 cubic metres per second. There is also a smaller area of 4,500 in ha at the east side of the Delta which is supplied from the Wadi Hassan. The weirs were all designed to pass floods of about 1,000 cumecs. Before the recent flood, this figure was judged to be the "bank full" capacity of the Wadi.

Note: Due to different estimation methods the figures given in paragraphs 15-20 of this report do not always coincide with those given in Annex I.

Between 29 and 31 March 1982, the flood peak in the Wadi Bana is estimated to have reached between 6,000 and 7,000 cumecs which is equivalent to a return period of 1 in 3,000 years. The Wadi bed widened by 800 meters and deepened by 2-4 meters over a 35 Kms. stretch, washing away 3,000 hectares of cultivated land. The Batais weir which had already been severely damaged in the flood of September 1981, and was being reconstructed by the Soviet-Yemeni team, was again completely destroyed. The construction camp was swept away together with extensive Wadi training works designed to protect the village of Batais. Further downstream, the Hauja weir was seriously damaged, and outflanked on the left side by a scour channel about 125 m wide, 5m of the 107 m wide crest was destroyed and the nose of the guide wall which trains water past the headworks of the canal, collapsed. The wadi bank was also breached on the right side through a cut 140 m wide, and the resulting floods swept away the banks of the Ahbush canal over a distance of 3Km. The canal structures in this reach also collapsed. Severe bank erosion has taken place for about one Km upstream and 3Km downstream of this weir. The damage at the next weir, Diyyu comprised the destruction of the left abutment and the scouring of a by-pass channel, 460m wide on the left bank. The left abutment has collapsed. The nose of the guide wall at the canal head regulator

has subsided. The third weir at Makhzan was swept away and the wadi bed eroded to some 1.5m below the sill of the main canal head regulator. The last weir, at Ghraib has been completely outflanked. The above damage to the irrigation system in the Abyan Delta has been estimated at YD 11,132,500 (US\$ 32,456,268) representing 10 per cent of the total damage in the Governorate (as described in the part of the report). In addition to the damage to the irrigation structures, there has been extensive destruction to the State and Co-operative farms in the Governorate. 11 state farms and all the Co-operative farms suffered wide damages which included: the washing away of 20,799 feddans; complete inundation of 15,037.5 feddans; the major part of which was cultivated by vegetables, grains, fruits and fodder; spoilage of 53,893 Kg. of stored seeds and spare parts; destruction of 309 houses, 264 wells and 339 pumps, etc. The damage to state and co-operative farms has been estimated at YD 34,513,624 (US\$ 100,622,810) representing 31 per cent of the total damage. The floods caused to public and private property which has been estimated at YD 36,138,733 m (US\$ 105,360,760) representing 33 per cent of the total damage mentioned under this heading. This includes destruction of 3,603 houses; destruction or partial damage of 42 schools (103 class rooms), one hospital and 12 health units, loss of about 22,000 heads of livestock resources, damage to 317 km of asphalted and earth roads; the complete destruction of two major bridges at Zingibar and Fuad and other subsidiary bridges; damage to the domestic water and electricity networks and Government's buildings.

In addition, the floods washed away large areas of plantations with a loss of 53,200 coffee trees and 38,957 other trees. This damage has been estimated to cost about YD 15,960,000 (US \$ 46,530,612 m) representing 14 per cent of the total damage reported on in this section. The remaining balance of the damage in Abyan which has been estimated to cost YD 12,959,051 m (US \$ 37,781,490) and represents about 12 per cent of the total damage, has been calculated by deducting 50 per cent of the value of total agricultural production during 1982 and 1983. It is expected that 50 per cent of the agricultural land will be deprived from the spate water due to the damage that occurred to the irrigation system in the Delta which cannot be repaired before at least one year. The flood damage in Abyan Delta as described above, has been estimated at YD 110,703,908 (US \$ 327,751,918).

16. Shabwa Governorate: Population affected: 1,975 families whose houses and/or property have been totally damaged (100 per cent loss) and 6,000 families whose houses have been partly damaged and/or lost crops, livestock and farms (70 - 80 per cent loss).

Like the other affected regions, the Shabwa Governorate has been severely hit which resulted in extensive damages that have been estimated at YD 71,450,000 (US \$ 208,309,038). This is broken down into as follows:

(a) Estimated damage to public and private buildings is about YD 13,000,000 (US \$ 37,900,875);

(b) The washing away of and damage to agricultural machinery estimated at YD 2,100,000 (US \$ 6,122,449);

(c) Loss of approximately 8,000 heads of livestock estimated at YD 900,000 (US \$ 2,623,907);

(d) Complete destruction and partial damage of 309 bore holes and open wells and 331 agricultural pumps estimated at YD 3,000,000 (US \$ 8,746,356);

(e) Washing off of 3755 citrus trees, 551 dates trees, 9215 Qat trees and 1406 other trees - estimated at YD 3,479,996 (US \$ 10,145,761);

(f) Complete destruction and partial damage of 4 schools and kindergartens and 8 health units - estimated at YD 200,500 (US \$ 584,548);

(g) Damage to irrigation structures estimated at YD 13,622,724 (US \$ 39,716,397);

(h) Washing off of 85,230 feddans of reformed lands and damage of 52 private schemes - estimated at YD 13,000,000 (US \$ 37,900,875);

(h) Damage and erosion of protective structures and fortifications around cities, villages and agricultural lands - estimated at YD 12,575,00 (US \$ 36,661,808);

(i) Losses in agricultural production due to the floods' washing off and inundation of: 2140 feddans of fodder crops, 688 feddans onion, 3088 feddans of sesame, 683 feddans of potato and 4348 feddans of grains, estimated at YD 8,273,280 m (US \$ 24,120,350);

(j) Damage to 110 Km. of asphalted and improved roads and the complete destruction of one bridge estimated at SYD 1,500,000 (US \$ 4,373,178).

17. Lahej Governorate: Population affected: 3,380 families whose houses have been totally damaged and are seriously affected (100 per cent loss) and 20,000 families whose houses have been partly damaged and/or lost crops, livestock and farms 80 - 90 per cent loss).

In Lahej Governorate the floods severely hit Dhala, Tuban, Radfan, and Yefa Districts and caused devastating damages as these areas are among the main agricultural regions in the country.

The damages that occurred in Dhala district included the demolition of approximately 2,000 houses, loss of 5,000 heads of livestock resources, washing away of irrigation structures and agricultural machinery, and the complete ruination of 400 acres of cultivated lands. These damages have been estimated at YD 8,428,110 (US \$ 24,571.749).

In Radfan District, the damages have been estimated to include: demolition of 220 houses, complete and partial destruction of private shops with their stocks, 5,800 acres of cultivated lands were swept away, loss of 200 heads of livestock and damage to irrigation structures.

18. Hadramout Governorate: Population affected: 1,100 families whose houses have been totally damaged and are seriously affected (100 per cent loss) and 4,000 families whose houses have been partly damaged and/or lost crops, livestock, and farms (40 - 50 per cent loss).

The heavy flood severely hit Seiyun District and Tarim Centre. The asphalted road between Tarim and Seiyun has been greatly damaged.

19. Aden Governorate: Population affected: 520 families whose houses have been totally damaged or seriously affected and 2,000 families whose houses have been partly damaged and/or crops, livestock and farms (50 - 60 per cent loss). On 29 March 1982, the level of rains that hit the Aden Governorate was reported to be the highest ever recorded, resulting in heavy damages. At Hiswa, an area between Mansoura and Asha'ab towns in the Aden Governorate, the floods swept away 11 cars and killed several persons.
20. El-Mahra Governorate: Population affected: 800 families whose houses have been totally damaged and are seriously affected (100 per cent loss) and 3,000 families whose houses have been partly damaged and/or lost crops, livestock and farms (30 - 50 per cent loss).

Concluding remarks

The PDRY has demonstrated significant ability in firmly pursuing economic development despite the many resource constraints under which it operates and which include: a low per capita GNP (latest estimate made by the World Bank in December 1981 of the per capita GNP is US \$ 317 in 1978 and US \$ 424 in 1980), small population base (1.9 million), harsh natural conditions and absence of significant natural resources. These resources constraints will inevitably continue to influence future development. The PDRY belongs to the United Nations identified group of least developed countries. The planned investment requirements within the framework of the Second Five Year Development Plan are envisaged at YD 508.2 million (US \$ 1,481,600).

Basically, the country is deficient in foodgrains and therefore depends largely on imports to meet its needs. PDRY imports about 75 per cent of its cereals requirements. The country's commodity imports reached US \$ 650 million in 1980. Imports of foodstuffs remained the principal category and accounted for 31 per cent of the total commodity imports.

Judging from the above background information and considering the magnitude and extent of the floods, it is obvious that the burden would be greatly beyond the capacity of the country. The total damage which has been estimated at YD 330 million (US \$.962 million) comes close to the cumulative amount of the Government development budgets for the remaining 4 years of the Plan 1982-1985 estimated at YD 394 million (US \$ 1.149 million).

The extensive damage to the irrigation systems in the main agricultural regions of Abyan, Hadramout and Lahej will reduce the agricultural production in 1982 by 50 per cent and at the best possible will delay the next cropping season until April 1983 in most of the affected areas. Being a food deficient country and with this year's harvest already destroyed, assistance in food will continue to be urgently required.

Due to the reduced agricultural production, the increased import of food and the necessity to import construction materials, capital equipment to replace the damaged equipment and spare parts, a considerable negative effect on the balance of payment will be inevitable and is likely to persist over a longer period of time. It should also be noted that the seriously affected rural population (50,000 persons) have totally lost their economic and production means and hence their source of income.

As it can be seen from the above, despite the aid pledged, a major effort is still required to promote among the international community an adequate flow of material and financial assistance in order to help the country to recuperate from the devastating effects of the disaster and restore its production capacity. It is too early to evaluate the full impact of the disaster on the national economy. A more thorough and comprehensive assessment of the situation has been initiated by the Government and will undoubtedly reveal a final but already at this stage distressing picture.

This note, which is intended to summarize and consolidate the information and data available at this time, acknowledges the magnificent and able support received from the Government officials concerned as well as from members of the UNDRO and FAO/WFP missions, all of whom allowed the ~~secretariat~~ to share their findings.

Brief Summary of the Damages resulting
from Flood Disaster during March 1982

	Aden Governorate D. Yemen	Lahej Governorate D. Yemen	Abyan Governorate D. Yemen	Shabwa Governorate D. Yemen	Hadremout Governorate D. Yemen
1. Irrigation	-	21,000,000	49,500,000	19,500,000	536,000
2. Soil Erosion	-	36,000,000	63,200,000	28,000,000	389,000
3. Roads and Bridges	1,500,000	2,500,000	15,863,000	1,500,000	929,000
4. Animals	-	2,000,000	1,125,000	900,000	-
5. Machinery	100,000	2,500,000	3,430,000	2,100,000	102,500
6. Houses	100,000	25,500,000	22,175,000	14,500,000	550,000
7. Other Data (General)	10,000	1,250,000	1,980,000	1,700,000	-
8. Wells and Pumps	-	1,727,500	3,375,000	3,000,000	160,000
9. Other Entities (Electricity, Water, Telephones)	95,000	300,000	350,000	250,000	-
Total	1,805,000	92,777,500	160,998,000	71,450,000	2,666,500

Grand Total: 329,697,000 Dinars

Preliminary list of donors who pledged aid for
the March 1982 flood in PDRY

United Nations system

WFP : US\$ 3,512.400 (8.100 T Flour, 540 T oil)
FAO : US\$ 400,000 (Technical assistance, spare parts)
UNDRO : US\$ 30,000 (250 beds, 1,000 blankets)
UNDP : US\$ 30,000 (465 mattresses, 500 blankets, 300 sets
stoves)
UNICEF : US\$ 115.000 (395 tents, 2.600 blankets)
WHO : Medicines

Governments and voluntary agencies

Libya : Team of Specialists, food, tents, medicines
Saudi Arabia: US\$ 5.2 million, 654 tents, 2400 cartons milk,
650 cartons oil, 450 bags sugar, 300 bags rice
Kuwait : 364 tents, 32 tons food, clothes, medicines
Qatar : US\$ 1.5 million
Algeria: 35 tents
U.A.E. : US\$ 3.0 million (amount not confirmed)
USSR Red Cross: Amount not yet communicated
USSR : Reconstruction of Batais dam
France : 1,000 T wheat
Fed. Rep. of : 10,000 blankets, 50 tents for 12 persons each, team
Germany: of 11 specialists, (value US\$ 300,000)
Sweden : 5,000,000 Swedish Kroner (under consideration by
SIDA through Swedish Save the Children Federation)
Ethiopia: Not specified as yet
Syria : 700 tents, food, blankets
Switzerland: Technical assistance team for reconstruction of
public works and Zingibar Bridge
OXFAM : Under consideration. Amount not announced yet
Japan : US\$ 250,000 (handed over to Yemeni Red Crescent)
EEC : US\$ 300,000
German Dem. Rep.: Amount not announced yet
Hungary: About US\$ 50,000

Note: The above information is not exhaustive and is subject to
confirmation.