Schistosomiasis control in Africa: Organizational aspects of GTZ-assisted bilateral programmes in Madagascar, Malawi, Mali and the Peoples Republic of the Congo

Running title: Organization of schistosomiasis control

Authors:

U.K.Brinkmann*, R.Korte*, R.Baltes*, R.Rohde*, G.Schmidt-Ehry*,

B.Schmidt-Ehry* [ca. worker *]

*Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH.

About the authors:

Uwe K. Brinkmann, M.D., D.T.P.H., appointed lecturer for epidemiology and tropical medicine University of Hamburg, Höltystr. 17, 2000 Hamburg 76, W.Germany, until 1987 National Schistosomiasis Control Programme Mali, presently engaged in the promotion of primary health care through liver fluke control in North East Thailand;

Rolf Korte, M.D., D.T.P.H., appointed lecturer for nutrition University of Giessen, GTZ, Postfach 5180, 6236 Eschborn 1, Department head: Nutrition, Health and Population, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ);

Raphael Baltes, M.D., D.C.M.T., Flat 9, 49 Colebrooke Row, London N1 8AF, U.K., until 1987 Bilharzia Control Programme Malawi, presently London School of

Economics;

Richard Rhode, M.D., Dermatologist, Ederstr. 55, 5920 Bad Berleburg, W.Germany, Schistosomiasis Control Programme, Province of Mahajanga, Madagascar;

Gertrud Schmidt-Ehry, M.D., Gynecology and Obstetrics, B.P. 61691, Lomé, Togo, until 1986 Schistosomiasis Control Programme in the Niari Region, P.R.Congo, presently Maternity of Bé Project, Togo;

Bergis Schmidt-Ehry, M.D., FBL 161, GTZ, Postfach 5180, 6236 Eschborn 1, W.Germany, in charge of all schistosomiasis control projects at GTZ headquarter.

Please adress all correspondence and requests for reprints to Dr. R. Korte.

Summary

Since 1978 and in four African countries, the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), has given technical assistance to schistosomiasis control programmes. It was the goal of GTZ to help the partner countries to plan and implement control and to build institutions that would be able to achieve a measurable impact on schistosomiasis within five to eight years. The programme in Mahajanga Province, Madagascar, with a target population of about 150,000 people has started in 1984. More than 50% of villages have been covered and after a single intervention prevalence has remained below 16%. The national control programme of Malawi has started in 1974. It remained a pilot project until 1986. The programme is to cover the whole country and all seven million inhabitants. The treatment of cases diagnosed in fixed centres of the general health services are the main type of activities. Vertical type interventions are limited to the former pilot project. The national programme in Mali has started in 1978. About 100,000 persons have been covered and prevalence has been reduced by 50%. The maintenance phase will probably be reached in 1990. The national programme in the Peoples Republic of the Congo was started in 1979. During interventions about 400,000 examinations were carried out and 75,000 persons received antischistosomal treatment. It has reached the maintenance phase in 1986 after prevalence dropped to <10%. Mass chemotherapy was the most important strategy of control in all projects. In general, the results corresponded to the goals set by the programmes. Major problems arose in all projects from the insufficiency of basic health services to integrate schistosomiasis control due to a lack in infrastructure, finance and personnel. It is concluded, that it is not possible to prepare and implement schistosomiasis control in African countries with low per capita GNP's without external assistance.

Introduction

The analysis of schistosomiasis control programmes in Egypt, Brazil, the Sudan, Ghana, Morocco (Liese & Sachdeva 1986) and the Philippines (Blas 1986) has yielded important insights as to which elements were important for success. PAUL (1986) has named political commitment, resources and leadership as preconditions. Pilot projects allowed to test and adapt strategies (Liese 1986a, Paul 1986). Planning required the analysis of suitable epidemiological data (Mott & Davies 1986) although they were often not available (Atanga 1986). The clear statement of objectives and attempts to quantify the expected benefits aided in later appraisals of programme results in the general context of health development (Wheeler 1983). Schistosomiasis control is primarily a preventive action and should therefore be part of a country's public health system. Liese (1986a) and Liese & Sachdeva (1986) found that successful programmes were often largely autonomous and independently operating agencies. Discussions of a vertical versus a horizontal approach proved to be sterile since the best solution can be one or the other depending on the local situation. To ensure long term accomplishment, schistosomiasis control has to be integrated eventually into the general health services (Mott & Davies 1986) but the capacity and performance of them is crucial for an effective devolution of specialized agencies. Paul (1986) saw decentralization as the function of a programme to mobilize service and demand.

In schistosomiasis control, cost is always a crucial issue (Mott 1987) even relatively large budgets proved to be insufficient (Polderman 1986) and many nations would not be able to launch a programme without external assistance (Kumwenda 1986). Most countries in which schistosomiasis is a health priority possess sufficient technical expertise in pathology and biology, however disease control programmes require also specialized skills in epidemiology and

management that are not easily found among the members of the medical profession in most countries. Mott & Davies (1986) listed a number of typical managerial problems in schistosomiasis control. Key issues were the lack of personnel support, of equipment, of transport and of antischistosomal drugs. Programmes may benefit from intersectoral cooperation as the example of the alteration in the design of small dams in Mali has shown (Brinkmann & Steingruber 1986) but often there is not even the necessary dialogue (Jordan 1986b).

Since 1978 and in four African countries south of the Sahara, the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, has given technical assistance to schistosomiasis control. As in other projects aiming at the improvement of health services, it was the intention of GTZ to keep with the principles of the primary health care philosophy in this field. With regard to policy and strategies of control, GTZ maintained a close link to WHO. This was expressed in a document reporting a joint meeting with WHO and representatives from several African countries (Brinkmann et al. 1984). In the programmes it was the goal of GTZ to help the partner countries to plan and implement control and to set up regional or national institutions that would achieve a measurable impact on schistosomiasis during a period of five to eight years. More specifically GTZ seconded advisory personnel and provided equipment to assist in the adaptation and definition of strategies, the evaluation of techniques, the formulation of planning documents and the organization and management of institutions charged with the execution of schistosomiasis control. This has made it necessary to concentrate on aspects of operations research from an early stage of the projects (Korte, Korte et al. 1986, Brinkmann et al. 1988a). The description of the experiences with the organization and management of four schistosomiasis control programmes may show common problems as well as to which degree it was necessary to develop

solutions specific to the conditions of particular countries or regions. It may contribute to an area of schistosomiasis control that is still insufficiently documented according to Jordan (1986a).

Schistosomiasis control in the Mahajanga Province, Madagascar

Evolution of the programme

In the areas of two agricultural development programmes in two districts of the province of Mahajanga Schistosoma haematobium is transmitted and constituted a health problem of high priority. There had been earlier attempts to control schistosomiasis mainly through mollusc control but for a number of reasons these programmes had been discontinued. With the introduction of praziquantel it became feasible to envisage schistosomiasis control through mass chemotherapy delivered by basic health services. Some experience had been gained in other parts of Madagascar but there had been no pilot project directly preceding the Schistosomiasis Control Programme in Mahajanga Province, which was started 1984. From the beginning the programme was part of the provincial health service, carried out by rural health units and supervised by a regional advisory team. Activities began with the formulation of a regional strategy and the adaptation of methods for health education, diagnosis and chemotherapy (Rohde et al. 1985, Rohde 1986, Braun-Munzinger & Rohde 1986a,b). After that systematic parasitological surveys and treatment campaigns have progressively covered the project area.

Programme design

The intervention area of the project is defined by the districts Marovoay (4,612 km^2, 85,000 inhabitants) and Port Bergé (7,720 km^2, 68,000 inhabitants).

The general prevalence of S. haematobium infections and the prevalence of intense infections (excretion of more than 50 eggs per 10 ml of urine) is to be lowered to a level that can be maintained by the rural health service in the whole area.

The programme consists of an advisory team with facilities for laboratory work, data processing, administration and field work. It is attached to the office of the Director of Provincial Health Services. Planning, the development of control strategies and methods is done in cooperation with central health services. Control is executed by district health services supervised by the programme team. The organigramme is depicted in figure 1.

Schistosomiasis control is to be achieved in three phases. The preparatory phase from 1984 to 1985 served to define goals, develop a strategy adapted to regional conditions and to test and improve the methods for health education, diagnosis, mass treatment and sanitation. During the intervention phase since 1986 all accessible villages in the project area are to be covered by at least one parasitological survey and a mass treatment. The maintenance phase will probably start from 1988. The responsibility for schistosomiasis control will then rest entirely with the rural health services.

The strategies for active interventions rely primarily on mass chemotherapy with praziquantel and include health education and a limited programme to improve village water supplies. The type of mass chemotherapy in villages depends on the prevalence of S. haematobium as found during a baseline sample survey. If prevalence is above 50% all inhabitants are treated, between 20% and 50% all are examined and only those found infected are treated, below 20% only those found positive in the sample are treated.

The programme receives expatriate advisory staff, vehicles, equipment and praziquantel from GTZ over a period of 5 years. Madagascar staffs and runs the regional health service.

Results

Parasitological surveys and treatment campaigns have covered more than 50% of the villages in Marovay district. Two years after a single intervention, prevalence in these villages remains below 16%.

Through their participation in the programme the motivation and performance of rural health posts has generally improved. Nevertheless, the progress of interventions has encountered delays because the quantity and quality of the provincial health service is inadequate for schistosomiasis control in the long run. There are too few posts, the level of training of the health personnel is too low and supervision is lacking. Financial resources and the supply with drugs, materials and equipment are insufficient. The problems of the health services are aggravated by a generally degraded infrastructure of roads, communications etc. This has made it virtually impossible to start in the district of Port Bergé. On the whole the programme is totally dependent on the supply of praziquantel through GTZ and at present no alternative exists neither for intervention nor for the maintenance phase.

The National Bilharzia Control Programme, Malawi

Evolution of the programme

Both, S. haematobium and S. mansoni are transmitted in Malawi. The parasites occur singly and simultaneously, there is a tendency for the areas in

which both parasites are transmitted to increase in size and in number. Schistosomiasis is an important health problem in all parts of the country. Spatially limited programmes to protect agricultural workers and tourists from schistosomiasis based on snail control have been undertaken in relation to agricultural development projects by the Ministry of agriculture in the early 1970'ies. Since 1974 the responsibility for schistosomiasis control lies with the Ministry of Health. Pilot projects financed and technically assisted by UNDP and UNEP (1974 to 1978), the United Kingdom (1979 to 1980) and West Germany (through GTZ 1980 to 1986) served to evaluate and adapt strategies first in the Shire valley and Karonga district, later in Zomba and Nkhoma districts. Since 1986 schistosomiasis control has been extended to the whole country. Interventions for the most part are limited to the treatment of cases detected in fixed centres of the basic health services except for mobile teams active in the areas of former pilot projects.

Programme design

The intervention area of the National Bilharzia Control Programme in Malawi is the whole area of the country, target population are all seven million inhabitants. The goal of the programme is to lower the prevalence of intensive infections with S. haematobium and S. mansoni to less than 5% in children and to less than 2% in adults. Intensive infections are defined in accordance with WHO (1985) as the excretion of >50 eggs per 10 ml of urine or the excretion of >100 eggs per gram of stool.

The programme consists of three advisory teams for the Northern, Central and Southern region of the country. They possess facilities for laboratory work, data processing, administration and field work in the Central region. A mobile team works under the direction of the team in the Central

region. This team attached to the Ministry of Health and coordinates the activities of all regional teams. Figure 2 shows the place of schistosomiasis control in the organigramme of Malawian health services.

No national plan of action has been formulated until present and there are no schemes for different phases of the programme. Basically all persons found infected with schistosomes in any of the basic health services are to be treated with schistosomicidal drugs. Health education about the transmission of the parasite and the prevention of infection is to be given by all health education teams. Improvement of sanitary conditions to prevent the transmission of schistosomiasis is to be part of the general efforts towards environmental sanitation. Mass treatment campaigns are continued in the former pilot project areas. After parasitological examinations of all inhabitants of a community all persons found infected are treated with praziquantel (a single dose of 40 mg/kg).

The programme receives expatriate advisory staff, vehicles, equipment and praziquantel from GTZ. Malawi provides staff, space and running cost for the programme.

Results

In the pilot project areas a significant reduction of general prevalence and that of intensive infections has been achieved in a substantial number of settlements. For the country on the whole it is still too early to report any impact resulting from the programme on schistosomiasis. No plan of action fixing goals and objectives, phases, types and criteria for interventions has been endorsed by the government. The supply of schistosomicidal medicaments to the basic health services is slow and insufficient to a degree that the proper

treatment of cases detected can not always be guaranteed.

The National Schistosomiasis Control Programme, Mali

Evolution of the Programme

S. haematobium, S. mansoni and S. intercalatum are transmitted in Mali. Schistosomiasis constitutes one of the most important health problems in irrigated areas and in populations engaged in fishing on large rivers and natural or artificial lakes. The importance of urban schistosomiasis is still insufficiently known. In 1978 control activities were started as a component of a project to construct small dams in the district of Bandiagara that was assisted by GTZ. In 1982 a national programme for schistosomiasis control was created as a part of the ten years plan for the development of health services. The existing project was incorporated into the national programme. After a preparatory phase until 1983 four intervention areas were chosen that represented environments with a particularly high transmission potential, the populations most in need of protection and agricultural development. To facilitate the eventual transfer of control to rural basic health services in 1984 a component was added to develop primary health care in the intervention areas. Because of overlap with numerous other projects in this field and problems to combine very different concepts in the programme, this was discontinued again in 1988. From 1988 to 1992 control operations in the intervention areas are to be completed. The responsibility for schistosomiasis control is to be handed over to district basic health services and the programme will retain only an advisory and supervisory function. GTZ assistance is to end in 1992.

Programme design

Schistosomiasis control in Mali is to reach eventually all districts in whom the prevalence of one parasite exceeds 20%. This is the case in urban areas of Bamako, Segou and Mopti and the present intervention areas of the programme, the Office du Niger and Baguineda irrigation zones, the district of Bandiagara and the Sélingué dam zone. It is the goal of the programme to diminish general prevalence below 20% and that of intensive infections to below 5%.

The National Schistosomiasis Control Programme in Mali consists of a central unit equipped with facilities for laboratory work, data processing and administration and two mobile teams. It is attached to the National Institute for Public Health Research, one of the Directions of the Ministry of Health and Social Welfare. Control is implemented through mobile teams of the programme. Activities are coordinated with other health services through a Joint Coordinating Committee chaired by the Cabinet of the Minister in which all Directions are represented. Figure 3 shows the place of schistosomiasis control in the organigramme of Malian health services.

Schistosomiasis control in Mali is divided into three phases. Activities of the preparatory phase are planning, the evaluation and adaptation of strategies and methods, epidemiological investigations to identify districts with a schistosomiasis prevalence >20%. During the intervention phase active control is to cover all villages with a prevalence >20% until the goal of the programme has been reached. Maintenance consists of the treatment of persons found infected with schistosomicidal drugs in fixed centres of basic health services at district level. Sample surveys of the central schistosomiasis control unit will serve to detect rises in prevalence. If levels above 20% are found, active

interventions are to be restarted.

The main strategy of schistosomiasis control in Mali is mass chemotherapy using praziquantel in a single dose of 40 mg/kg combined with health education and the provision of clean water. Focal snail control is limited to places with a high transmission potential. Chemotherapy is given to all inhabitants of a community with the exception of pregnant females and children under two years of age without prior examination if baseline prevalence was found to exceed 20%. In all other cases only those persons found infected during the sample survey receive treatment.

The programme receives expatriate advisory staff, vehicles, equipment, praziquantel and local staff from GTZ. Mali provides office space and skilled personnel. The contributions from GTZ are to be gradually reduced until 1992.

Results

More than 100 villages with a population of about 75,000 have been covered by control operations in the intervention areas of the programme, resulting in a reduction of prevalence of about 50%. In one of the areas, the Baguineda irrigation zone, all settlements have reached the maintenance phase. Epidemiological investigations have included more than 300 villages and about 75% of the inhabited territory of Mali. The goals of the intervention phase have been reached to about 80% in the rural areas. The analysis of data collected by the programme has provided insights into various aspects of schistosomiasis control in a sahelian country (Brinkmann et al. 1988a,b,c,d).

Until 1987 there was no allocation of funds for schistosomiasis control in the Malian budget for the development of health services. Peripheral basic

health services in Mali still lack financial resources, equipment and medicaments. Because of low and irregular salaries the motivation of the existing personnel, though usually sufficiently trained, is low to take over additional tasks.

The National Schistosomiasis Control Programme in the Peoples Republic of the Congo

Evolution of the Programme

Schistosomiasis is of major health importance only in the southern regions of the Peoples Republic of the Congo and in urban areas of Pointe Noire and Brazzaville. Only S. haematobium is transmitted. The parasite has been introduced to the Congo in the 1920's when large numbers of infected workers were brought from West Africa for the construction of the Brazzaville - Pointe Noire railroad. In 1979 a programme to control schistosomiasis in the Niari region was started with the assistance of GTZ. The first two years were devoted to applied research and preparatory activities. From 1981 to 1986 control operations following a standardized approach covered the Niari and Pointe Noire regions and epidemiological surveys investigated all major foci of schistosomiasis in the country. Since 1987 the programme has reached the maintenance phase. Interventions are limited to the treatment of cases detected in fixed centres. The assistance of GTZ has gradually decreased since 1986 and will end 1988.

Programme design

The target population for schistosomiasis control in the Peoples Republic of the Congo are all inhabitants of communities with a prevalence >20%. The

goal of the programme is to diminish general prevalence below 20%.

During the preparatory and intervention phase the programme consisted of a central unit in Loubomo equipped with facilities for laboratory work, case treatment, data processing and administration. Outside Loubomo the programme possessed two centres for diagnosis and treatment in N'Kayi and Pointe Noire and a mobile team. The programme was directly attached to the Cabinet of the Minister of Health and Social Welfare via the Direction for socio-sanitary cooperation. Since the beginning of the maintenance phase the mobile team has been disbanded. The central unit and the two fixed centres have been integrated into the Endemic Diseases Control Service. The National Schistosomiasis Control Programme continues to exist as one of the national programmes of the Direction for Preventive Medicine.

During the preparatory phase from 1979 to 1981 parasitological examination techniques were investigated (Mott et al. 1982) and adapted to the needs of the programme. A standard method of control was developed and introduced. Control operations during the intervention phase from 1982 to 1986 followed a standard procedure that started with sample surveys in schools, was followed by a complete registration of the resident population and repeated examination and treatment campaigns. The maintenance phase has started in 1987. It consists of the treatment of cases detected during routine examinations in the fixed centres of the basic health services and the Endemic Diseases Control Service.

The principal strategy of schistosomiasis control was mass chemotherapy accompanied by health education. Focal snail control was employed only in the major foci of Loubomo and N'Kayi. During the intervention phase a blanket treatment with a single dose of praziquantel 40 mg/kg was given to all

inhabitants of a community if the baseline survey of school children had revealed a prevalence >50%. In all other cases and during repeated visits all inhabitants were registered and examined and only those found infected were treated. During maintenance annual surveys are to cover all major foci. If prevalence is found to have risen above 20%, mass chemotherapy is to be carried out.

The programme has received expatriate advisory personnel, equipment, vehicles and praziquantel from GTZ during the preparatory and intervention phases. During the maintenance phase GTZ sends short term experts to advise on data processing and epidemiology. The Peoples Republic of the Congo has provided staff, space, running cost and a limited amount of equipment and praziquantel to the programme.

Results

Control operations have covered all main rural foci and the urban focus of Pointe Noire in the country. All foci of schistosomiasis have been investigated. More than 400,000 specimen were examined and about 70,000 treatments have been given. General prevalence of infections with S. haematobium has dropped to <10% in almost all communities covered by the programme. The goals for the intervention phase have been reached in 1986 and the programme has passed into the maintenance phase.

Since then the interest in the disease and its control has rapidly diminished. The motivation of the personnel of the Endemic Diseases Control Service to take over additional tasks appears to be low, especially

progresses from an analysis of problems via a ranking of goals to a matrix that shows how activities will achieve outputs that in turn will allow to attain the goal of the project. For each level this matrix also contains indicators, sources for the verification of these indicators and important assumptions regarding the achievement of the goals of the next higher level through the results of the present (Zils & Winkler 1982). This method had not been fully developed when the engagement of GTZ to assist schistosomiasis control programmes in Africa started. It is likely that the combination of schistosomiasis control and primary health care development in Mali would have been avoided had this planning methodology be employed in an earlier stage of the programme.

Interventions in the Madagascar project are part of the rural basic health services in the project area, in the Mali and Congo projects a vertical approach is employed based on teams that are entirely under the control of the programme which in turn is part of the country's preventive health services. Both ways have been successful and it can not be decided whether one or the other is preferable. In all four projects there is a clear decision, that after an intervention phase of limited duration, during which a significant on schistosomiasis is to be achieved, the responsibility is to be transferred to basic health services to maintain the low order of schistosomiasis as a health problem. At this stage very similar problems are encountered by all four projects. The existing health services are insufficient in quantity and quality as in Madagascar and in Mali. There is little motivation to take over additional tasks as in Mali and Congo. Supply with schistosomicidal drugs is slow and unsatisfactory as in Madagascar, Malawi and Mali. As Mott (1987) has pointed out the quality and performance of basic health services is crucial to the long term success of schistosomiasis control in any country.

Schistosomiasis control requires specialized skills, dedication and a

minimum of resources over a period of five to eight years if anything is to be achieved at all. For many countries in Africa the initial investment that is needed together with the commitment of a substantial portion of the health budget over a sizeable period of time is more than is available on top of existing engagements. As Atanga (1986) and Kumwenda (1986) have explained schistosomiasis control can only be started in most countries if external assistance can be obtained for the procurement of drugs and equipment and if external expertise can be made available to do applied research necessary to adapt methods and strategies. Still the question remains how large the scope of a programme should be. The GTZ experience indicates that regional programmes with a target population of less than 200,000 persons have a number of advantages: there is a close contact to the basic health services and the addition of schistosomiasis control to the other tasks is smooth and may even result in additional motivation, the programme remains administratively controllable and budget requirements can be met. Programmes aiming at the total population of a country counting in millions as in Malawi are always in danger to be overcharged by the organization and coordination of numerous and diverse activities in distant places.

All programmes assisted by GTZ are based in the ministries of health of the respective countries. In planning future programmes it might be of interest to investigate the possibility to organize schistosomiasis control as a component of integrated rural development. This would facilitate intersectoral cooperation and open up additional resources.

Conclusions

Mass chemotherapy is an effective means to diminish the prevalence of intensive and general infections with schistosomes even in the absence of measures to control snails.

Preparatory activities, i.e. the adaptation of methods and strategies and the setting up of an organizational structure for a schistosomiasis control programme require about two years. The application of goal oriented planning methods is recommended.

A close contact with rural basic health services is beneficial in view of the final transfer of the responsibility for schistosomiasis control in programmes that are structured in a vertical manner.

Countries in Africa with a low per capita gross national product require often external assistance to prepare and implement schistosomiasis control. The scope of schistosomiasis control programmes should neither be too small nor too large. Target populations should number more than 100,000 and less than 1.5 million people. Intervention areas should not be too far from the programme.

It should be investigated how agencies engaged in integrated rural development can be implicated in schistosomiasis control provided it is a health problem in the respective project area.

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Figure 2 National Bilharzia Control Programme, Malawi, place in the organigramme of health services.

Figure 3 National Schistosomiasis Control Programme, Mali, place in the organigramme of health services.

Figure 4 National Schistosomiasis Control Programme, Peoples Republic of the Congo, place of the programme in the organigramme of health services during the preparatory and intervention phase (left half) and during the maintenance phase (right half).

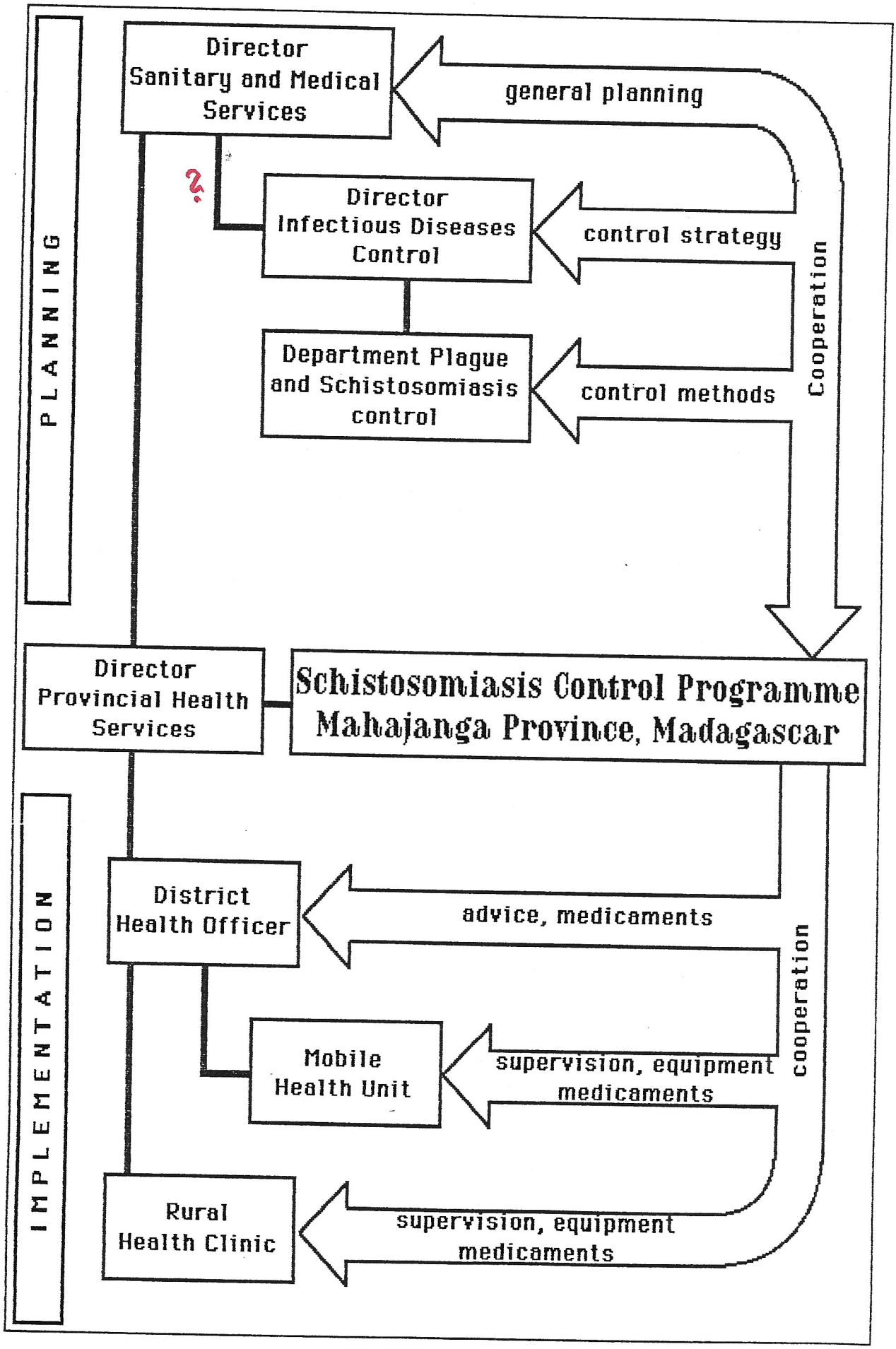
PLANNING
Director Sanitary and Medical Services
general planning
Director Infectious Diseases Control
control strategy
Department Plague and Schistosomiasis control
control methods
Cooperation
Director Provincial Health Services
Schistosomiasis Control Programme Mahajanga Province, Madagascar
IMPLEMENTATION
District Health Officer
advice, medicaments
Mobile Health Unit
supervision, equipment medicaments
cooperation
Rural Health Clinic
supervision, equipment medicaments

Figure 1

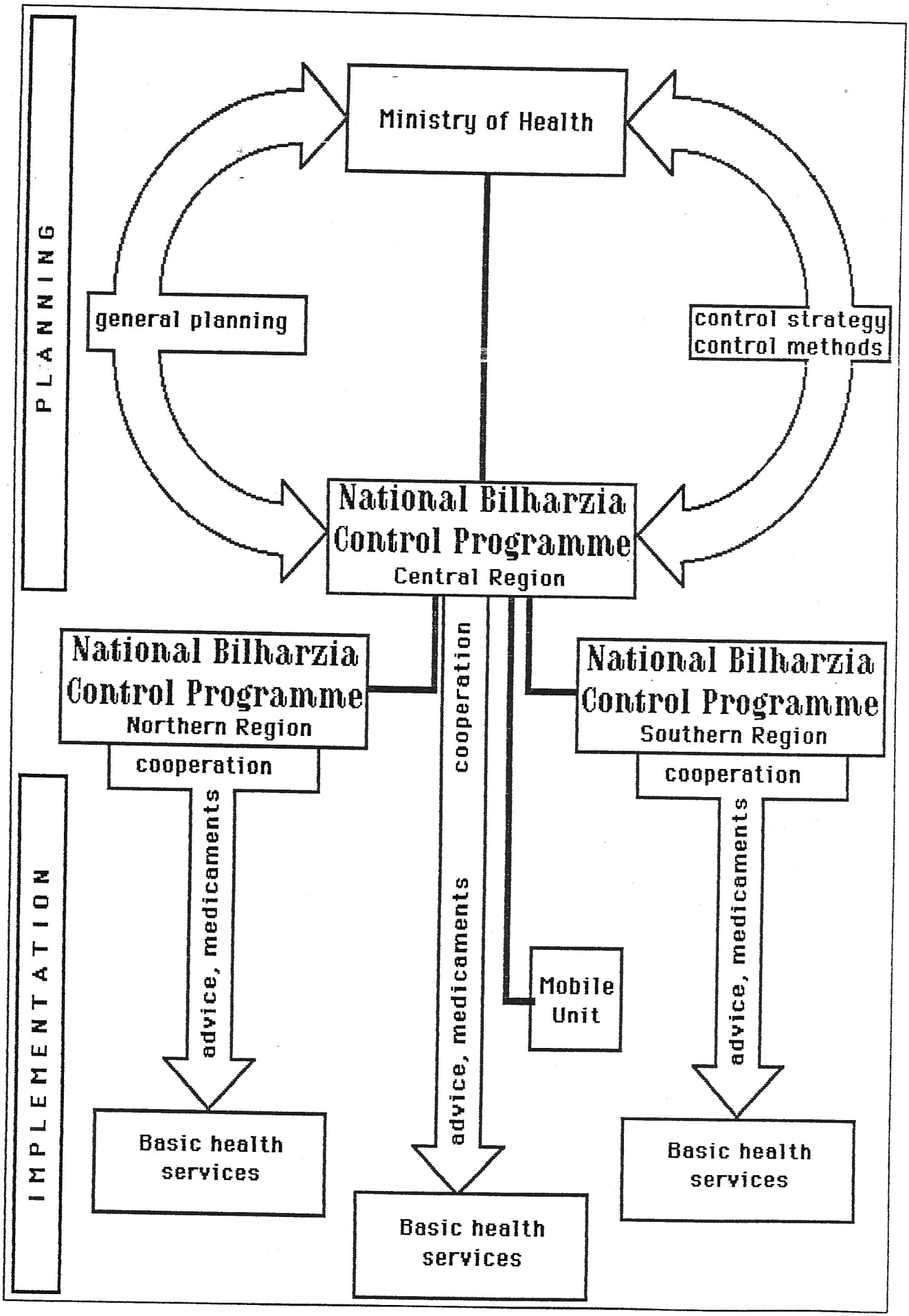
PLANNING
Ministry of Health
general planning
control strategy
control methods
National Bilharzia Control Programme
Central Region
National Bilharzia Control Programme
Northern Region
National Bilharzia Control Programme
Southern Region
cooperation
cooperation
cooperation
advice, medicaments
advice, medicaments
advice, medicaments
Mobile Unit
IMPLEMENTATION
Basic health services
Basic health services
Basic health services

Figure 2

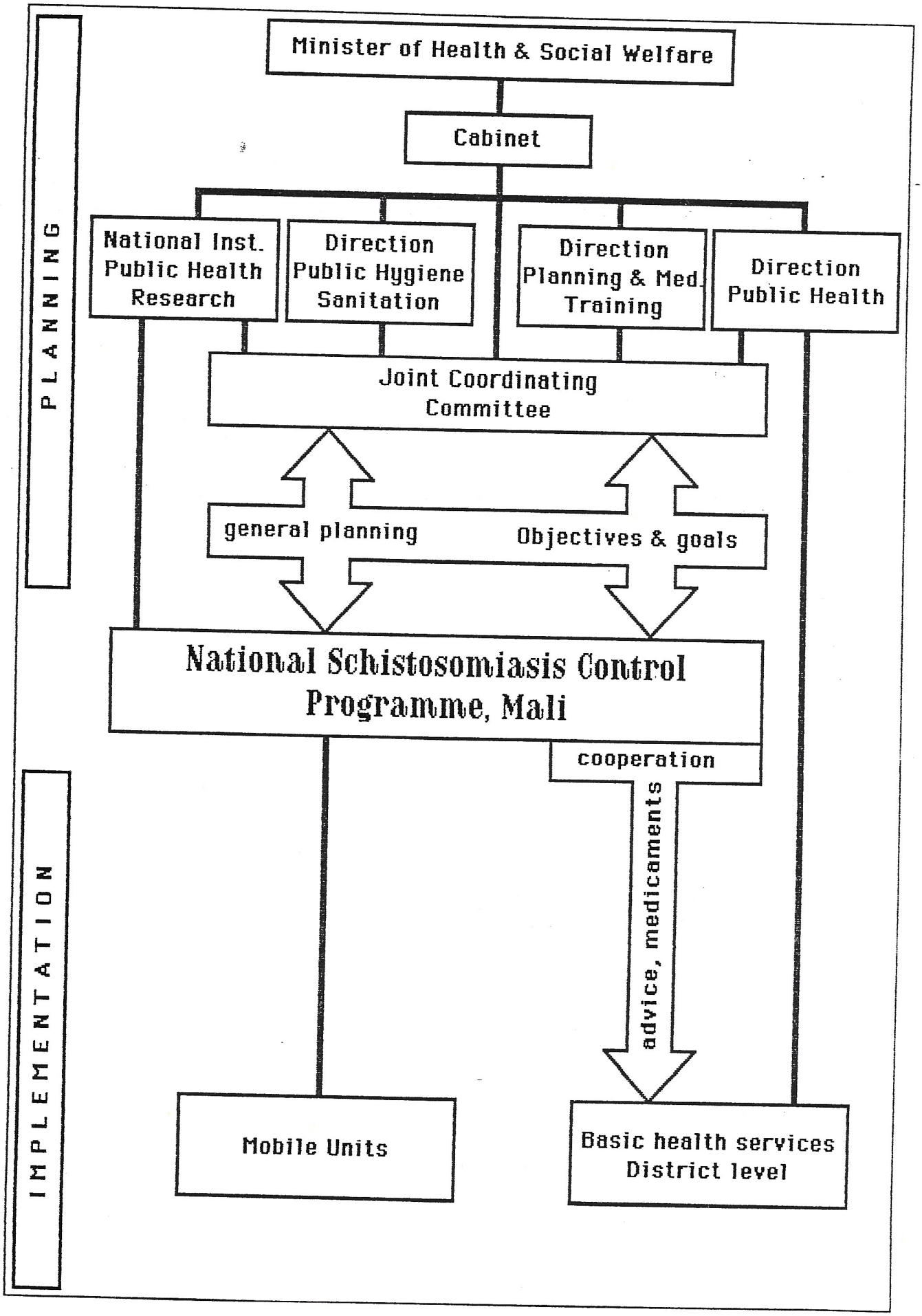
PLANNING
Minister of Health & Social Welfare
Cabinet
National Inst. Public Health Research
Direction Public Hygiene Sanitation
Direction Planning & Med. Training
Direction Public Health
Joint Coordinating Committee
general planning
Objectives & goals
National Schistosomiasis Control Programme, Mali
cooperation
advice, medicaments
IMPLEMENTATION
Mobile Units
Basic health services District level

Figure 3

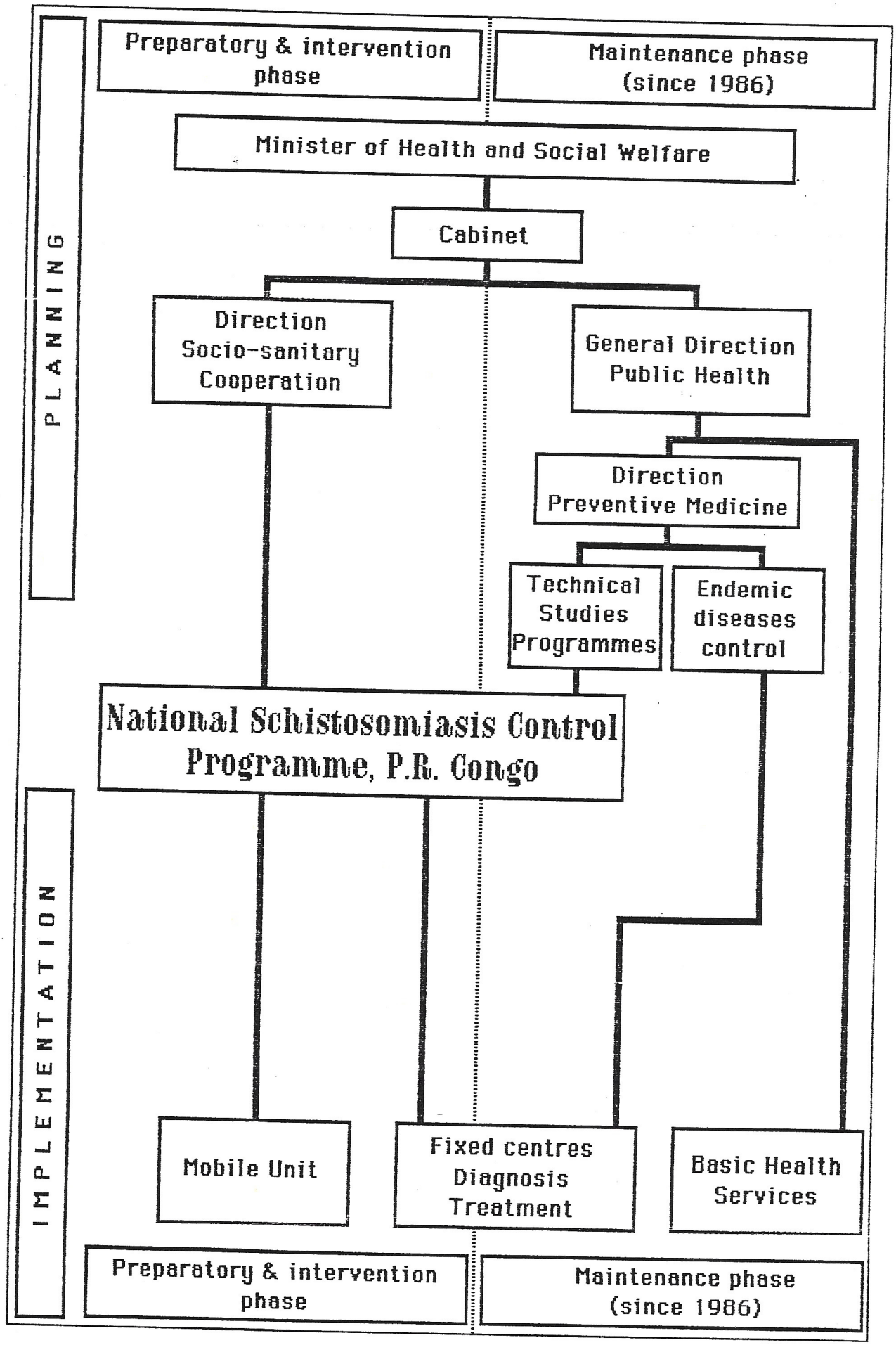
PLANNING
Preparatory & intervention phase
Maintenance phase (since 1986)
Minister of Health and Social Welfare
Cabinet
Direction Socio-sanitary Cooperation
General Direction Public Health
Direction Preventive Medicine
Technical Studies Programmes
Endemic diseases control
National Schistosomiasis Control Programme, P.R. Congo
IMPLEMENTATION
Mobile Unit
Fixed centres Diagnosis Treatment
Basic Health Services
Preparatory & intervention phase
Maintenance phase (since 1986)

Figure 4