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NOTES TOWARDS AN ECONOMIC ANALYSIS OF THE MALI RURAL HEALTH PROJECT (P.S.R.)

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Table of Contents

Section		Page
	Executive Summary	i
I.	INTRODUCTION	1
II.	GENERATION OF SERVICES	3
	Village health services	5
	Baseline data for eventual calculation of public health improvements attributable to the PSR	6
	Anticipated reduction in child mortality from 1981 "nivaquinization" campaign	13
	Anecdotal evidence of PSR-induced health improvements in Koro	14
	Indirect evidence of PSR benefits--"process" variables	16
	The village	16
	The district health service	21
	The regional health directorate	25
	The Ministry of Public Health headquarters, Koulouba	26
	Indicators of voluntary sacrifices borne by participants in the system	29
	The villagers	29
	The VHWs	32
	Ministry of Public Health staff	34
III.	COSTS	36
	USAID cost projections	39
	Sissoko-Kelly cost estimates	45
	Issues of PSR cost analysis	48
	Recent PSR/Koro expenditure data	54
	Estimating recurrent costs	57
	Calculation of PSR/Koro coverage as a basis for estimating the unit recurrent cost	62
	Cost implications of equilibrating TBA and H-S coverage	65
	Cost implications of extending PSR to new divisions	68
	Summary cost analysis of existing supervision approach	75
	Possibilities of cost reduction	78
	Reducing the intensity of VHW supervision	80
	Increasing the average number of supervision trips per staff member per month	85
	Reducing vehicle (mobylette) costs	87
IV.	FINANCING THE PSR	90
	Introduction	90
	Financing the PSR out of Mali's national and regional budgets	94
	Financing the PSR out of special contributions from its beneficiaries	108
	Financing the PSR from the margin on drug sales	128
	Conclusions on PSR financing	147
V.	PROPOSALS FOR FURTHER RESEARCH ON P.S.R.	155

List of Tables

Table No.		Page
1.	Summary of demographic and epidemiological data collected within framework of PSR up to April 1981	7
2.	Projected annual cost of PSR village health services in demonstration arrondissement according to USAID 1976 Project Paper	41
3.	Annual cost of initiating and supervising hygienistes-secouristes in 20 villages according to Sissoko-Kelly	45
4.	PSR/Koro expenditures, September-November 1980	54
5.	Estimated cost of training course to replace 18 hygienistes-secouristes who cease to function	60
6.	Population with and without direct access to government-promoted health care in four Koro divisions	69
7.	Summary of estimated/projected incremental recurrent costs of PSR/Koro	76a
8.	Comparison between per capita cost estimates of PSR/Koro at maturity (Table 7) and demonstration arrondissement according to 1976 USAID Project Paper (Table 2)	77
9.	1981 materials budget allocation per staff position, eight district health services in Mopti region	105
10.	B. Lambl's estimates of crop production and sales of average Dogon family	109
11.	1981 tax bills of Koromatintin and Sansagou-Pin villages, Toroli division	112
12.	Sissoko-Kelly estimates of gross PSR profit margin on unit drug sales	129
13.	Price structure of Pharmacie Populaire du Mali (P.P.M.)	135

EXECUTIVE SUMMARY

The present report is an attempt to summarize the data available on economic aspects of the Mali Rural Health project (PSR) as of April 1981. It is based on collaborative research conducted during the foreign author's visits to Mali in Nov.-Dec. 1980 and Mar.-Apr. 1981, each time including a week's field trip to Mopti and Koro, the first time accompanied by a counterpart from the Ministry of Public Health, the second time by the Malian author.

The report focuses on that aspect of the PSR comprising services at village level implemented by volunteer health workers (VHWs) in two districts, Koro and Yélimané, under periodic supervision of staff of the district health service (Assistance Médicale or AM). Other facets of the program, i.e. improving health care facilities at the district capital health centers and divisional dispensaries, developing wells and promoting horticulture and minor livestock activities designed to raise nutrition standards, have been initiated too recently to show results or else have yet to get off the ground.

Allocation of scarce resources to public health expenditure is justifiable if it generates one or more of six categories of social benefits, viz. fewer working days lost through illness, increased productivity on the job, lower mortality, benefits associated with wider spacing of births, reduced physical or mental suffering, and increased learning capacity. Thus far only scattered anecdotal evidence is available to show that PSR has brought about decrease in morbidity, let alone generated any associated social benefits.

A series of epidemiological surveys carried out in Koro and Yélimané with varying degrees of rigor has produced baseline data with respect to birth and child loss rates and incidence of malnutrition, malaria, and conjunctivitis, *inter alia*. (Cf. Table 1, pp. 7-9.) In the authors' view there is sufficient consistency in the findings at varying locations and over different points in time to give the data some validity for purposes of before-and-after comparisons that could indicate, by early 1982, whether three years of VHW activity has caused a measurable reduction in morbidity and mortality.

If systematic evidence of the PSR's impact on public health and associated benefits is not yet available, the fact that a system of health service delivery is functioning, at least in Koro district, and participants in the system are regularly undergoing voluntary sacrifices to maintain it, constitutes indirect evidence that social benefits are being generated. Among "process variables" that can be cited are the following:

i. Regular activity on the part of some 113 VHWs in 43 Koro villages (data as of April 1981). January-September 1980 data collected on supervision visits to 25 villages showed the hygiénistes-secouristes (H-Ss) conducting 41 consultations per village per month and dispensing about the same number of prescriptions for four basic drugs. Sept. 1980-Feb. 1981 data showed traditional birth attendants (TBAs) retrained by the PSR assisting all 111 deliveries in nine villages.

ii. Purchase by both the Koro and Yélimané populations of H-S-prescribed drugs at an annual retail cost that ranges between 85 and 180 Malian francs per inhabitant, depending on the source and timing of the data; and payment of a FM 200 delivery fee to cover the cost of maternity supplies.

iii. Conduct of week-long separate training courses for M-Ss and TBAs under the direction of the Koro district physician, who also manages a monthly supervision program involving (in April) 12 AM staff members plus three Peace Corps Volunteers making 24 supervision visits en pair (normally covering two villages per day).

On the other hand, the system is also characterized by weaknesses in the form of vital functions--e.g. procurement plus most aspects of international and domestic shipment and handling of drugs up to AM headquarters, as well as handling of certain cash accounts--that remain in the hands of expatriates furnished under technical assistance.

Given the lack of data regarding the PSR's impact on morbidity, together with the fact that nearly all its incremental costs of operation and maintenance as well as establishment, apart from re-supply of drugs and maternity equipment, have thus far been met by external aid (a USAID grant of U.S.$3.7 million), it is not yet possible to judge whether the benefits evidenced by the perseverance of the PSR system and continuing sacrifices of its participants suffice to offset its costs.

With respect to measurement of project costs, the report focuses on incremental recurrent costs, defined in accordance with the August 1980 report of the Club du Sahel/CILSS Working Group on Recurrent Costs, on the ground that, in the context of current international discussions regarding Sahelian development, a public expenditure program is commonly judged economically viable if the host country can cover such costs over the long run, irrespective of whether it can also contribute to financing the program's establishment and/or expansion.

The report reviews the original cost estimates in USAID's 1976 Project Paper, tracing the genesis of a $2.00 target maximum for per capita annual recurrent expenditure on rural health care delivery. An initial PSR budget (Table 2, pp. 41-42) projects net public expenditure at $1.43 per capita, of which 11 per cent (16¢) is not incremental but corresponds to expenditure on existing health services, and 71 per cent ($1.00 per capita) represents drug purchase, leaving 27¢ as non-drug incremental recurrent expenditure. The Paper envisaged the population spending another dollar per capita of its own money on drugs. Allowing 60 per cent for price inflation over the five years 1976-81 would bring the estimated $1.43 of public expenditure up to $2.30 in today's prices.

In February 1980 Drs. Sissoko and Kelly analyzed actual operating results during the first year of H-S activity in Koro and arrived at an annual per capita cost estimate of FM 502 (= $1.21 at the average exchange rate for the first quarter of 1980) for Toroli division (Table 3, pp. 45-46). Only FM 38 or 8 per cent of this amount (the equivalent of 9¢ per capita) represented drug purchase, corresponding to the initial stocking of the village pharmacies, after which villages were paying the cost of resupply at Pharmacie Populaire-prescribed prices. The Sissoko-Kelly figures include salaries of existing staff, based on time attribution, and encompass costs of establishment (H-S training, etc.), hence exceed incremental recurrent costs as defined in this report.

Updated by a review of PSR/Koro expenditures during Sept.-Nov. 1980 (Table 4, pp. 54-55), the Sissoko-Kelly figures show between 70 and 75 per cent of PSR/Koro's incremental costs--i.e. nonpersonnel costs, both establishment and recurrent--being devoted to transport.

Stripped of nonessentials, operation and maintenance of PSR/Koro's existing service capacity would involve VHW supervision; periodic replacement training of VHWs, mainly H-Ss; and some associated overhead that the report estimates notionally at ten per cent of the sum of the first two items.

The report's initial cost estimates assume continuation of the current monthly supervision program, netting out personnel costs, since none of the participating AM staff have been specially hired for the project and the AM staff/population ratio in Koro is not even as high as in Mopti region's other districts. (In effect the PSR is not diverting staff from other tasks, but rather giving them the means of transport and other material complements they need to do their jobs.)

Thus, the incremental recurrent cost of supervision is estimated at FM 3 million per year; biennial replacement training of H-Ss about FM 200,000 per year; and an additional FM 300,000 for miscellaneous and overheads at the regional and national levels, and involves virtually eliminating the district physician's special PSR-related monthly trips to Mopti and quarterly trips to Bamako included in the Sissoko-Kelly budget.

The report examines evidence supporting the thesis that as a general rule PSR "coverage" should be defined to exceed the population resident in villages where VHWs are located, and concludes against it, using the 1976 Census results to arrive at a population denominator of 37,000 in the current 43 villages, which in turn yields a per capita incremental recurrent cost of FM 95, equivalent to 19¢ at an exchange rate of FM 500/$1.

Incremental recurrent costs are then estimated for three successive putative expansion phases of PSR, designed to achieve 60 per cent coverage (in the foregoing sense) of Koro district's population, including the district capital, six divisional headquarters and one other town with direct access to non-PSR health care.

The three phases comprise: (I) extending TBA coverage from the present 16 villages to all 43 in the current VHW supervision program; (II) establishing complete H-S/TBA teams in 40 villages of the two largely uncovered divisions nearest to the district capital, Koporo-kenié-Na and Dioungani; and (III) extending similar coverage to 30 villages in the outlying divisions of Diankabou and Diangourou. All three phases would require posting of additional personnel, whose costs are accordingly included in the computations; Phases II and III involve additional transport and related per diem costs; and Phase III requires an increased per diem rate to allow supervisors to remain several days in the field in lieu of returning each afternoon to Koro town.

The incremental per capita recurrent costs are summarized as follows: Phase I--FM 85 for the 27 villages still without retrained TBAs, and an average of FM 154 for H-S/TBA coverage in all 43 villages in the current program; Phase II--FM 193 for the 40 new villages; and Phase III--FM 216 for the 30 villages in the remote divisions. Incorporating all three phases, the average cost for 113 villages is estimated at FM 183, or 37¢ at the FM 500 exchange rate. (See Table 7, pp.76a-b.)

Anticipating Section IV's discussion of fiscal stringency in Mali, the report examines three alternatives for compressing still further this (by U.S. standards) already low level of expenditure: reducing the intensity of VHW supervision by AM staff, increasing each staff member's average number of supervision trips per month, and reducing the number of mobylettes used in the project and/or the monthly cost per mobylette.

A shift from monthly to bimonthly supervision would save half the transport cost and two-thirds of the incremental personnel cost of the expanded program outlined in Table 7 (p. 76b), reducing the per capita cost to about FM 90, or slightly less than the recurrent estimate for the present supervision program. PSR/Koro is about to shift from monthly to bimonthly supervision in some of its villages on an experimental basis, laying the groundwork for more reliable estimation of the efficiency loss (if any) arising from less frequent supervision.

Scepticism is expressed concening the prospects for increasing a staff member's monthly number of trips without offering the inducement of a higher per diem, thus offsetting part of the saving. Rather notional calculations hint at a net saving of about one sixth of the FM 183 per capita cost of the expanded Koro program.

The project has experimented with various formulae for cutting the cost of staff transport by mobylette. Tentatively approved as of April 1981 was a system of lump sum payments to staff members to cover repairs and hire-purchase of the vehicles. Return to a vehicle-fleet system with a contract repairmen on the payroll might reduce the number of vehicles required and repair costs sufficiently to make this a cheaper alternative, but the savings would be less than spectacular.

On the assumption that foreign aid will not be available indefinitely to finance the PSR's incremental recurrent costs, three alternative sources of domestic finance are considered: the national and Mopti regional budgets, special contributions from the project's beneficiaries, and the profit margin on PSR drug sales in the villages.

The fiscal pressure to which the national and regional governments are subject is reflected in the fact that as of 1977, Mali had the highest proportion of wages and salaries in total central government expenditure (0.54) out of 55 developing countries for which the IMF published data.

Out of other African countries only Upper Volta showed a figure above 0.40. At 0.255 Mali's ratio of "other purchases of goods and service" to wages and salaries was the second lowest in Africa, after Mauritius, whose figure is presumably explained partly by low transport costs. With budgeted material expenditure of all government departments except the Ministry of Public Health remaining frozen at its 1979 nominal level, Mali's comparative position can only have worsened. Civil service salary payments are now subject to an average delay approaching one month.

The situation is even more extreme at the level of the region, whose administration has been held to a 1981 material: personnel expenditure ratio of 0.076. For the Koro district health service the figure is only 0.047. The FM 3.5 million incremental recurrent cost estimated above for the current (43 - village) supervision program is about eight times the Koro AM's non-drug material budget excluding USAID - financed PSR costs--a budget which is on a par with those of Mopti region's other seven districts. Keeping in mind the government's implicit objective of equating the social marginal benefit of public expenditure in different uses, it is difficult to imagine the Malian authorities increasing the Koro AM allocation for material expenditure by eight times once foreign aid is no longer forthcoming to finance PSR's recurrent costs. So the authors were informed explicitly in the Ministry of Finance.

Alternatives for collecting money from PSR's beneficiaries present themselves at the (i) national/ regional, (ii) district, and (iii) village levels. Under (i), the authorities could raise Koro district's head tax (Minimum Fiscal), now the lowest in Mopti region except for concessional levies on nomads;

(ii) the district administration could impose an earmarked per capita levy; or (iii) the village authorities could assess their populations, collecting a fixed amount per taxpayer or family unit or limiting participation to families paying a subscription fee, in either case handing over the proceeds directly to the Koro AM.

For various reasons alternatives (i) and (iii) do not appear to ensure PSR's financial viability. An earmarked levy has greater appeal; a levy of FM 200 collected from all of Koro's approximately 92,000 taxpayers, or one of FM 400 collected from taxpayers only in villages with VHWs, having a population estimated at 92,000 in Table 7 (the identity of these two figures is a coincidence), would be more than sufficient to finance incremental recurrent costs of the expanded program.

It remains to be determined whether either the administration or the population would accept such a levy. It would increase individual and village tax bills by no more than 12 per cent, and account for at most a quarter of what Dogon families are estimated very roughly to spend already on health care. At the same time the population is very poor, with per capita income (not counting proceeds from occasional livestock sales) in the vicinity of $50. The government is hesitant to increase a de facto tax burden amounting to 20-30 per cent of gross cash income (excluding subsistence consumption), and has temporarily prohibited new earmarked levies. As of April 1981 there were indications that much of the population would give priority to development of wells in the allocation of any supplemental levies.

Turning to the profit margin on drug sales, assuming that the present comparison between procurement cost of generic material in the U.S. and controlled retail prices remains in effect, and rather notionally allowing 15 per cent of the retail price for domestic distribution costs on which no data are yet available, between one fifth and

one third of the expanded Koro program's incremental recurrent cost as per Table 7 could be covered in this way. However it would be folly to base the program's financial viability on the persistence at a national level of a socially iniquitous price structure associated with Pharmacie Populaire's monopoly position and the government's current price control policy. There is also some question as to whether the 14 per cent of Pharmacie's retail price structure corresponding to Malian government taxes

can continue, insofar as PSR drug sales are concerned, to be effectively earmarked for project operating expenses.

The question must be faced: what residue of the PSR could be expected to persist in the event no means were found of financing a supervision program on anything approaching the present scale. The solution to this problem hangs primarily on what mechanisms are available to ensure resupply of the village pharmacies in the absence of regular supervision visits by AM staff. Other primary health care interventions in Mali are reported to have fizzled out when the official sponsor ran out of money to effect resupply. In this connection the report raises the possibility of authorizing some of the private traders who circulate at least weekly to even very remote villages to sell PSR-approved drugs to the village pharmacies. The alternative would be to equip the cooperative retail outlets (FGRs) to handle PSR drugs and encourage the responsible H-Ss to travel to them for resupply.

The report's final section proposes that research be carried out, either in connection with the PSR's upcoming evaluation or as part of the final year's work program, in the following areas: epidemiological survey; client satisfaction survey; objective testing of VHWs'

knowledge levels; comparison of Koro VHWs on monthly and bimonthly supervision; sociological analysis of AM staff motivation and performance, and prerequisites for VHWs to exercise an impact on community hygiene; attitudes of village authorities concerning an eventual PSR levy; and alternatives to drug distribution by AM supervisors.

NOTES TOWARDS AN ECONOMIC ANALYSIS OF THE MALI RURAL HEALTH PROJECT (P.S.R.)

I. INTRODUCTION

The present report is a summary of data and impressions obtained by the authors during March-April 1981 with respect to economic aspects of the PSR in the course of a brief observation of project operations on the ground in Koro District (cercle), Mopti Region, as well as several days of discussions with the project leadership and other Malian government officials at both the national and regional levels. We wish to express our sincere appreciation to these individuals, who gave freely of their time, shared relevant information and assisted us in our analysis of the project by engaging in frank exchanges of views.

Specifically, the authors worked together in Bamako during March 24-28 and April 6-13, in Mopti during March 28-30 and April 4, and in Koro District from March 31 to April 3. During their stay in Koro they accompanied staff members of the Ministry of Health district station (Assistance Médicale or AM) on a regular tour of supervision of village health workers (VHWs) in two villages of Toroli division (arrondissement), namely Koromatintin and Sansagou-Pin.

Previous to the collaboration of Messrs. Gray and Sankaré, the foreign member of the team (Gray) had spent three weeks in Mali during November-December 1980 in order to familiarize himself with the PSR and begin the collection of economic data pointing toward the present report. On that occasion Gray profited from the collaboration of M. Abdramane Maiga, economist with the National Directorate of Planning and Training,

whom he accompanied on a similar week-long visit to Mopti and Koro (December 8-13).

The ultimate objective in economic analysis of a program of public expenditure is to draw a balance of the benefits and costs of the program in order to determine whether the expenditure is justified and what, if any, modifications in it might increase the benefits without commensurate increase in costs, or alternatively achieve the same benefits at lower cost. In the present case, as will become clear in the following chapter on generation of services, the project's benefits cannot yet be measured quantitatively. Thus the authors have been forced to set themselves three less ambitious objectives, namely to:

1) estimate the current rate of expenditure on various project components,
2) consider alternatives for reducing expenditure without seriously affecting the level of service rendered, and
3) given that most of the PSR's expenditure on materials and supplies, as well as a portion of personnel expenditure, is now financed by foreign aid (USAID), analyze the possibility of financing an increasing share of recurrent project expenditure out of local resources, whether provided by one or another level of the Malian government or by the population directly concerned.

II. GENERATION OF SERVICES

The Rural Health Project (PSR) is designed to improve the state of public health in two districts of Mali, namely Koro (Mopti Region) and Yélimané (Kayes Region), while testing the possibility of replicating certain approaches to primary health care in other districts of the country. The three approaches are:

1) establishing a system of health services at village level implemented primarily by village health workers (VHWs),
2) strengthening the health services provided to the rural population at district capital health centers and dispensaries located in divisional headquarters, and
3) initiating certain directly productive activities at the village level with a view to improving the nutritional and health status of the population, notably via development of wells and vegetable gardening.

The present report focuses on economic aspects of approach number 1, village health services, undeniably the key component of the PSR. As of the time of writing, implementation of the second approach, strengthening the district capital health centers and divisional dispensaries, has not proceeded beyond initial drafts of equipment lists and requests to USAID to allow project funds to be used for rehabilitation of structures, not provided for in the Project Agreement or any of the four amendments to it executed thus far. (Several Malian observers of or participants in PSR expressed concern over the delay in implementation of this facet of the project, and felt that it was likely to impede the realization of one aspect of approach number 1, namely inducing the VHWs

to recommend evacuation of cases they diagnose as risky by instilling confidence as to the availability of satisfactory curative facilities at divisional and district levels. The authors did not attempt to identify the bottlenecks which have so far impeded implementation of the health center/dispensary component of PSR.)

More progress has been achieved in implementing the third approach. Drawing on villagers' contributions in cash, kind and labor, as well as non-USAID donor assistance (notably CARE-Mali), PSR staff have promoted the rebuilding of a dam in Yoro, Diangourou division, Koro district; distributed tools, vegetable seeds and fruit tree seedlings in Yoro; conducted surveys of village water supplies in both Koro and Yélimané districts; initiated deepening of one or two village wells in Koro[1]; prepared a detailed program and arranged financing for the drilling of 21 new wells and deepening of eight old ones in 24 villages of Yélimané district; and drawn up plans for gardening projects in other villages as well as a rabbit-raising scheme for Koro district.

These subprojects are either still in gestation, too newly implemented or insufficiently documented to yield concrete data on increased output of food and clean water. However, the procedures involved in eventually appraising their benefits should raise no particular problems, and since this type of activity can easily be (and more often than not, is) carried out in contexts other than that of a primary health care project, the present report does not review further PSR's impact in this domain.

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[1]Work had started at Goursindé on March 31, the day before the authors passed by on tour. The district physician remarked on the sense of relief and pleasure evinced by the village chief, previously soured on PSR by protracted delays. The compressor and its crew were to move next to Bondo-Tena.

Village health services

The services which are supposed to be provided by village health workers can be summarized as follows:

1. Hygienistes-secouristes (H-S; sanitation/first-aid agents)

   a. Curative aspect:
      diagnosis of ailments
      advice to patients
      prescription and supply of drugs
      helping arrange evacuation of serious cases

   b. Preventive aspect:
      promotion of family hygiene and environmental sanitation

2. Traditional birth attendants (TBA; accoucheuses traditionelles)

   a. advice to pregnant women
   b. diagnosis of and, where necessary, help in evacuating cases at risk
   c. assistance at delivery
   d. follow-up of the newborn
   e. promotion of family hygiene

In the long run allocation of scarce public sector resources to promoting these services is only justified through realization of one or more of the six following benefits or groups of benefits:

1. reduction in working days lost through illness
2. increased productivity while working
3. reduction in mortality
4. a set of benefits resulting from wider spacing of births
5. reduction in pain and suffering, whether physical or mental
6. increased capacity of children and youths to learn in and outside of school and subsequently earn a decent living.

In the event, no formal survey data exist indicating that PSR has brought about such benefits in its first three years of operation, and the authors agree with PSR managers that it would have been a waste

of time to seek such indicators of success through new epidemiological surveys at this early stage in the project's implementation. In this connection it is relevant to note that the 1979-80 Club du Sahel/CILSS Working Group on Recurrent Costs found underestimation of the time required to experiment with new approaches to social engineering and implement them on a field scale to be a serious defect in the approach of some donors to Sahelian development.[2]

At the same time the project has generated some data that could eventually form a basis for significant before-and-after comparisons. These are summarized in the following paragraphs. The final section of the report presents our recommendations concerning studies which we believe should be carried out with a view to facilitating such comparisions.

Baseline data for eventual calculation of public health improvements attributable to the PSR

Table 1 presents evidence collected with respect to the following seven demographic and epidemiological parameters on the basis of field surveys in Koro and Yélimané districts carried out under PSR auspices between May 1978 and April 1981:

1. crude birth rate
2. child mortality
3. child loss in relation to number of pregnancies
4. child growth
5. child malnutrition
6. incidence of malaria
7. incidence of conjunctivitis

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[2]Club du Sahel/CILSS, p. 297. It should be noted that the authors of the present report found no such unrealistic expectations on the part of ned with the PSR.

Tableau 1

RESUME DES DONNEES DEMOGRAPHIQUES ET EPIDEMIOLOGIQUES RECUEILLIES DANS LE CADRE

DU PROJET SANTE RURALE JUSQU'A AVRIL 1981

Cercle/arrondissement/ source des données (Note A)	Envergure de l'échantillon	Date(s) de Référence	Tranche d'âge (ans)	Nombre d'observations et population de référence (chiffres absolues)	Taux calculés	Caractéristiques du test, standard de comparaison et/ou autres commentaires
1. TAUX DE NAISSANCE BRUTE						
Koro/Toroli						
Sissoko-Kelly (1)	8 villages	10/79-3/80	---	128 naiss., pop. 5286, 1/2 an	49/1000	Données relevées des cahiers des hygiènistes-secouristes
Touré-Sankaré-Gray	8 villages (dont 3 inclus dans S-K)	9/80-2/81	---	96 naiss., pop. 4067, 1/2 an	47/1000	Données relevées des fiches de contrôle des accoucheuses-traditionelles recyclées
2. TAUX DE MORTALITÉ INFANTILE						
Koro/Toroli						
Sissoko-Kelly (1)	8 villages	10/79-3/80	0-30 jours 0-1 an 0-4 ans	4 décès 14 décès 20 décès } sur 128 naissances vivantes, 1/2 an	31/1000 109/1000 156/1000	Données relevées des cahiers des hygiènistes-secouristes
Yélimané/Tambacara						
Daulaire-Taylor	village de Diongaga	fév. 1979 (enquête)	0-1 an 0-5 ans	96 décès 169 décès } sur 533 naissances vivantes	180/1000 317/1000	Données rapellées par les mères de famille
3. PERTE DES ENFANTS PAR RAPPORT AU NOMBRE DE GROSSESSES						
Koro/Toroli						
Lambl	3 villages	mai 1978 (enquête)	non specifiée	94 morts sur 237 grossesses	40%	Données rapellées par les mères de famille
Koro/Diankabou						
Lambl	non specifiée	mai 1978 (enquête)	non specifiée	29 morts sur 59 grossesses	50%	
Yélimané/Tambacara						
Daulaire-Taylor	village de Diongaga	fév. 1979 (enquête)	au dessous de 6 ans	77 avortements, 9 mort-nés, et 169 décès sur 619 grossesses	41%	

4. CROISSANCE DE L'ENFANT

Koro/Toroli						
Sissoko-Kelly (2)	12 villages	1/12/78-26/4/79	1-5 ans	244 garçons + 263 filles = 507 total	50ème centile de l'échantillon correspond au 2ème centile du standard américain (tant pour poids comme pour taille)	

5. MALNUTRITION DES ENFANTS

Koro/Toroli						
Lambl	6 villages	mai 1978	1-5 ans	16 malnourris sur un total de 75 enfants	21%	Bracelet standard passe le coude à la première poussée
Sissoko-Kelly (2)	12 villages	1/12/78-26/4/79	1-5 ans	200 malnourris sur un total de 1.125 enfants	18%	Bandelette indique circonférence du bras de moins que 13,5 cm. pour les Dogons ou 13,0 cm. pour les Peulhs
Koro/Diankabou						
Lambl	2 villages	mai 1978	1-5 ans	7 malnourris sur un total de 33 enfants	21%	Bracelet standard passe le coude à la première poussée
Yélimané/Tambacara						
Daulaire-Taylor	village de Diongaga	fév. 1979	0-5 ans	43 malnourris sur un total de 128 enfants	34%	Circonférence du bras ≤ 80% du standard

6. PALUDISME

Koro/Toroli						
Sissoko-Kelly (2)	12 villages	1/12/78-26/4/79	< 1 an	6 rates palpables sur 85 enf.	7%	Méthode de la rate palpable. On a dépisté une incidence de 32% entre les enfants Dogon par rapport à une incidence de 57% entre les Peulhs
			1-4 ans	190 sur 417 enf.	46%	
			5-9 ans	159 sur 346 enf.	46%	
			10-14 ans	21 sur 97 enf.	22%	
			inconnu	50 sur 108 enf.	46%	
			total	426 sur 1053 enf	40%	
Koro/Central et Toroli						
Letarte	Koro ville + 7 villages (dont 2 inclus dans S-K)	23/9/80-22/10/80	< 1 an	12 positifs sur 25 enf.	48%	Méthode de la goutte épaisse. Moyenne des prévalences par groupe d'âge est 49%. Letarte indique un intervalle de confiance de 42 à 56%, à risque 5%
			1-4 ans	92 positifs sur 172 enf.	53%	
			5 ans	8 positifs sur 25 enf.	36%	
			total	112 positifs sur 222 enf.	50%	
Yélimané/Tambacara						
Daulaire-Taylor	village de Diongaga	fév. 1979	< 1 an	22 rates palpables sur 42 enf.	52%	Méthode de la rate palpable
			1-5 ans	39 sur 83 enf.	47%	
			6-15 ans	39 sur 87 enf.	45%	
			16 ans +	17 sur 163 adult[illegible]		

7. CONJONCTIVITE

Koro/Toroli

Sissoko-Kelly (2)	12 villages	1/12/78-26/4/79	<1 an	30 dépistés sur 88 enf.	34%
			1-4 ans	152 sur 451 enf.	34%
			5-9 ans	49 sur 374 enf.	13%

Yélimané/Tambacara

Daulaire-Taylor	village de Diongaga	fév. 1979	<4 ans	40 dépistés sur 105 enf.	38%
			5-9 ans	7 sur 65 enf.	11%
			10-14 ans	0 sur 44 enf.	0
			15 ans +	2 sur 161 adultes	1

Note A: Les données dans ce tableau proviennent des six sources suivantes:

Sissoko-Kelly (1): Projet Sante Rurale, Koro -- Documentation Supplémentaire, May 1980, pp. 30-32.
Touré-Sankaré-Gray: examination des fiches de contrôle des accoucheuses traditionelles, Koro, 2 avril 1981.
Daulaire-Taylor: Activités du Projet Sante Rurale dans le Cercle de Yélimané, 1978-1979, février 1980, pp. 86-99. Daulaire et Taylor rapportent les resultats d'une enquête menée par d'autres avant leur intégration au projet.
Lambl: Enquêtes Préliminaires, Sanitaires and Socio-Economiques, Diankabou et Toroli, 18 juin 1978.
Sissoko-Kelly (2): Projet Santé Rurale, Koro -- Enquêtes Médicales Menées dans l'Arrondissement de Toroli du 1 décembre 1978 au 26 avril 1979 -- Analyses et Interprétations, sans date.
Letarte: Enquête Epidémiologique Malaria, Projet Santé Rurale, Koro, janvier 1981.

In all but one case (child growth) data defined in a comparable manner are presented from two or three different surveys.

Apart from the information in Table 1 the surveys also present the following epidemiological data:

1. Koro/Toroli--Sissoko-Kelly (1979) measures incidence of skin and respiratory diseases, ear infections, anemia, tuberculosis and goitre among children up to 14 year of age in 12 villages.
2. Yélimané/Tambacara--Daulaire-Taylor report cites data on anemia and trachoma incidence in Diongaga village.

Finally, apart from the surveys mentioned above, urine and stool tests were carried out in January 1979 on pupil volunteers in the Tambacara school (reported in Daulaire-Taylor, pp. 85-86) and by Harry Zysman, PCV, on school children in Yoro, Diangourou arrondissement, and Koro town. Such tests have obvious value, but it would be difficult to establish a link between PSR activities in a subset of villages and any eventual improvement in health conditions of children in centrally located schools that might be observed through such tests.

Questions have been raised concerning the reliability of much of the epidemiological data. With respect to Yélimané, Daulaire and Taylor, making available for the first time results of a survey of Diongaga village in Tambacara division carried out by staff who preceded them in the project, present the following caveat:[3]

> ...all the data assembled from this survey must be accepted with caution, since the method of selection was apparently not a true random sample, and because

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[3] Daulaire-Taylor, p. 92.

> of the problems with methodology ... (discussed in detail in the respective sections of the report--ed.) All conclusions must therefore be considered tentative until confirmed by other surveys. Nonetheless, the information does provide an interesting insight into the overall health status of the people of Diongaga.

Inadequate contol of sampling procedure is also cited by Letarte in his review of the September-October 1980 malaria survey in Koro. However, as indicated in Table 1, Letarte believes that a 95% confidence interval comprising seven points in either direction can be attached to his summary measure of malarial incidence (i.e., 49% ±7%).

The project's staff of physicians advised the authors of the present report that identification of symptoms in the 1978-79 Toroli survey was not sufficiently precise to enable any subsequent survey to establish significant trends in disease incidence, excepting the case of malnutrition, whose identification is based on arm measurements. As economists the authors have no grounds for disputing this caution, but they are troubled by the implication, seconded by Daulaire and Taylor in their Yélimané report, that more than three years into a four-year project there will still be almost no baseline information that can be used subsequently to evaluate the impact of village health worker activity on disease incidence.

Speaking again as laymen from the medical point of view, the authors are struck by certain coincidences among the results of different surveys summarized in Table 1, and wonder whether these do not indicate a sufficient degree of relaibility in those surveys to justify comparisons with data to be obtained in the 1981-82 survey program. For example:

1. The gross birth rates of 49 and 47 established in the two Toroli exercises point to a measure of central tendency that may be sufficiently stable to determine eventually

(certainly not as soon as 1981-82, to be sure) whether the TBA component of the PSR is inducing a wider spacing of births

2. Cf. child loss/pregnancy rates of 40% and 41% found by Lambl in Toroli (1978) and the 1979 Yélimané/Diongaga investigators, respectively.

3. Cf. malnutrition rates of 21% established by Lambl in both Toroli and Diankabou (1978) and 18% by Sissoko-Kelly in Toroli (1978-79).

4. The three malaria surveys reported in Table 1 give highly consistent results for the 1-4 or 1-5 year age groups - 46% 53%, and 47% for Sissoko-Kelly (Toroli, 1978-79), Letarte (Central and Toroli, 1980), and Daulaire-Taylor (Diongaga, 1979), respectively. On the other hand the discrepancy with respect to the less-than-one-year group in Koro Central/ Toroli (7% versus 48%) raises a question as to whether the palpable spleen method results in under-detection among infants.

5. Diagnosis of conjunctivitis is highly consistent as between Toroli (Sissoko-Kelly, 1978-79) and Diongaga (Daulaire-Taylor, reporting on the 1979 survey) with respect to all age groups identified -- 34% versus 38% for the 0-4 age group, 13% versus 11% for the 5-9 year group, and 1% versus 0 for the 10-14 year group, respectively.

Any trends in the incidence of malaria and conjunctivitis would be of particular interest in the context of the PSR, inasmuch as chloroquin and sodium sulfacetimide constitute half of the village pharmacy arsenal

and given the forthcoming introduction of prophylactic chloroquinization among small children in Koro district.

Even as laymen the authors can appreciate that elements of subjectivity enter into epidemiological diagnosis under field conditions in Koro and Yélimané districts; therefore, the possibility should be considered of involving in follow-up surveys, at least as consultants, some of the medical personnel no longer in situ who participated in the initial surveys. The authors met with Dr. Sissoko, now at Point "G" Hospital in Bamako, who held to the view that the findings of the Koro surveys he conducted jointly with Dr. Kelly and subordinate staff could serve as a base for measuring improvements or otherwise in public health conditions subsequent to the initiation of PSR activity. Presumably Dr. Sissoko could be induced to prove his point by demonstrating in the field to future survey staff the criteria of diagnosis that he, Kelly et al. applied in 1978-79.

Anticipated reduction in child mortality from 1981 "nivaquinization" campaign

Although at the time of preparation of this report it was only in the planning stage, mention should be made of a "nivaquinization" campaign scheduled for the rainy season of 1981 (June-November) which the PSR medical staff was convinced would reduce mortality from malaria in the 6 month to 4 year age range in the short run. The program involves an initial promotion through PSR-trained H-Ss, who will be provided with sufficient chloroquine tablets (the PSR-supplied American drug, not the French Nivaquine from which the exercise takes its name) to give each child in their village 1 1/2 tablets per week. Parents will be required

to pay FM 175 for each child's 5-6 month course. The approach has already been tested in Kolokani, where it is reported to have given positive results.

PSR staff plan to conduct a new malaria survey after the 1981 campaign, comparing the results with the outcome of the 1980 survey wirtten up by Letarte (op. cit.). They look to this as the best possibility for demonstrating direct benefits from the PSR's village health services in the short run.

Anecdotal evidence of PSR-induced health improvements in Koro

An H-S in Tinsagou told one of the authors in December 1980 that malaria bouts in his village had become considerably shorter and less severe since he started treating people with chloroquine phosphate. AM staff members said they had noticed such an effect in before-PSR/ with-PSR comparisons in a number of villages.

As a rule, however, there has been little feedback to the PSR management from patients who have been treated by VHWs, either H-Ss or TBAs. In the course of their regular supervision visits district staff meet the VHWs and occasionally the village chief or other representatives of the local leadership, but rarely seek out patients to learn their perception of VHW-provided care. Apart from the question of whether it is realistic to ask the staff to devote additional effort along these lines, they would certainly complicate their relationship with the individuals being supervised by using the same occasion to check on the VHWs' patients behind their backs.

On the other hand, we do not feel that the PSR can be properly evaluated in the absence of at the very least some sort of client

satisfaction survey, and we recommend that such an exercise be mounted in connection with the joint GRM/USAID evaluation planned for late 1981.

An initial step in this direction is described in the May 1980 evaluation report of Correze, who met with women in several villages of Tambacara division, Yélimané district, and reports a lack of confidence in the H-Ss' ability to treat their health problems or those of their children. Often the women did not know who the H-Ss in their village were; at most they knew the individual dispensing drugs, whom they described by saying, "There is nobody who gives care here, there is someone who sells medicine." "You can't talk about just any disease with him. Anyway, he always gives out the same pills; they are the same for everyone ..."[4] These remarks reflect the widely reported underrepresentation of women and children among the H-Ss' patients and in no way vitiate the possibility that these workers are improving the lot of a significant group of the population.

To carry anecdotal reporting to an absurdity, while strolling in Koromatintin the authors buttonholed and queried, through an interpreter, a mother with an infant outside the hearing of the TBAs. The woman acknowledged delivering in the care of one of the PSR-trained TBAs and volunteered how much the TBA had helped her. In a less positive vein the authors noted from the VHWs' registers that infant and child deaths still occur sporadically in villages served by VHWs. In Sansagou-Pin a 6 year old boy had recently died 20 hours after contracting diarrhea, a condition the district physician surmised the VHW could have arrested had it been brought to his attention.

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[4] Correze, English translation, p. 20.

Indirect evidence of PSR benefits -- "process" variables

Where one observes a social system operating whose transactions involve repeated sacrifices of time, effort, and/or material wealth on the part of its agents, there is a presumption that those making the sacrifice are currently perceiving, or expect to perceive in the future, benefits in return, whether material or psychological. Note that this is still a long way from asserting that the value of the benefits approximates the cost of outside resources that may have been invested to create the system and keep it running.

With this caveat in mind, let us identify the "system" that is now operating, together with the transactions in that system involving sacrifices by its agents, and the corresponding benefits they appear to perceive.

The system we will examine is a subsystem of the PSR that delivers health services to villages in Koro and Yélimané districts. Inasmuch as the project has been considerably more active in Koro than in Yélimané over the past year, and its operations are much better documented in Koro, the bulk of the evidence presented will relate to Koro.

It is convenient to define four levels in the PSR village health subsystem, namely the village, the district health service, the regional health directorate, and the Ministry of Public Health headquarters.

1. The village. In Koro, as of April 1981 some 83 PSR-trained H-Ss located in 42 villages were believed to be providing consultation services and recommending and selling drugs to their neighbors as well as

to visitors from other villages. Six courses between March 1979 and Feb.1981 had trained 89 H-Ss from 45 villages. Thus, after two years attrition amounted to only seven percent, although a handful of H-Ss had been absent for periods of several months on migration to the Ivory Coast.

Information on the rate of consultations is available from Letarte's tabulation of January-September 1980 supervision forms for 25 of the 35 villages served by the first four training courses. The monthly average, excluding months when the H-Ss were on migration or supervision reports were missing, was 41.3 consultations per village, or roughly 22-23 per H-S. The range of village averages for the nine month period was 9.2 - 86.5; monthly observations ranged from zero to 130.[5] Letarte's data also show the H-Ss in question dispensing a total of 7,916 prescriptions, or a monthly average of 41.9 per village over the 189 village/months covered by the reports.[6]

According to PSR/Koro staff, the H-Ss are collecting regulation prices for the four drugs they dispense to villagers (aspirin, chloroquine phosphate and penicillin tablets, and sulfacetamide eyedrops or ointment), and safeguarding the cash receipts. Staff making supervisory visits replenish the H-Ss' drug supplies as needed, taking in return cash equivalent to 85% of the regulation prices for new supplies (the remaining 15% represents a margin available for future expenditure on community welfare projects). The staff are supposed to verify whether the H-Ss' cash balances correspond to recorded sales net of new purchases. Even

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[5] Letarte (February 1981), p. 4. An average of slightly below two H-Ss per village is assumed.

[6] Ibid., p. 25. Number of village-months given in Table 1, p. 7.

when the H-S who functions as a pharmacist is present this is not always possible since receipts in some villages are from time to time turned over to a treasurer appointed by the leadership. In those instances where the control has been carried out, PSR staff have reported no discrepancies.

A complete control would involve also verifying the H-Ss' drug inventories, which is omitted from the supervisory procedure. During a December field trip the foreign author requested such a check in the two villages visited. I each case the total value of the pharmacy stock (cash plus drugs) slightly exceeded the amount computed from the appropriate accounting form (presupposing in one case the validity of the H-Ss' claim to have FM 25,000 on deposit with the treasurer, who was absent during the visit). This may be due to the H-S' inability on some occasions to give a patient exact change. In any case the episode provides anecdotal evidence of the financial solvency of PSR's drug operations at the village level in Koro district.

Turning to Yélimané, incomplete data indicate that between 40 and 50 H-Ss from 14 villages were trained in three courses between February 1979 and June 1980.[7] As of January 1980 six out of 27 H-Ss trained in the first two courses had ceased functioning; during the ensuing year at least three more of that group dropped out, giving a total attrition rate of not less than one-third (9/27).[8] There is no evidence that H-S activity had stopped altogether in any of the 14 villages as of early 1981.

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[7] Daulaire-Taylor, p. 13, and Baudouy (February 1981), p. 21.

[8] Ibid. The figures given are minima based on three villages (out of a total of six) from the 1980 cohort plus four villages (out of a total of eight) from the two 1979 courses, visited by Baudouy in January 1981.

As of January 1980, 20 out of the 21 H-Ss then in place told PSR/Yelimane staff conducting a survey that they were seeing 5.5 patients per week, or say 24-25 patients per month.[9] Consultation records are not maintained in Yélimané along the lines of those in Koro. Data is not available on the number of prescriptions, though village pharmacy records as summarized by Daulaire-Taylor show a steady rate of monthly activity during the second half of 1979.[10] Baudouy found operating pharmacies in all seven of the villages he visited a year later, notwithstanding a virtual cessation of supervision (see below).[11]

Another "process" variable of considerable interest is the incidence of evacuations of seriously ill patients, on the advice of VHWs, which would not have taken place in their absence. In his midterm evaluation report Cissé describes the VHWs giving their patients "evacuation slips" which serve as a kind of safe-conduct pass to the dispensaries or health centers of Toroli, Pel (a Catholic mission center) and Koro town. He adds that in Koro district "it is not uncommon to see the VHW himself accompany certain patients to the nearest medical center for emergency cases such as snake bites; or, additionally, the VHW himself will go and seek the ambulance of the health center if he is unable to otherwise transport the patient."[12] Cissé quotes Dr. Sissoko as saying that, thanks to the presence of the VHWs, "he now sees in his consultations certain categories of patients (notably the elderly) who would never have come for

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[9] Daulaire-Taylor, p. 20.

[10] Ibid., pp. 29-33.

[11] Baudouy (February 1981), p. 21.

[12] Cissé, p. 17.

treatment on their own initiative."[13] The number of such instances has not been tabulated. Oddly enough it appears to have been noted less frequently during the second year of VHW operations in Koro, following Dr. Sissoko's departure. Cissé found the practice to be of little significance in Yélimané.

Turning to the traditional birth attendant (TBA) component of the PSR, as of April 1981 some 31 PSR-trained (more precisely, re-trained or recyclées) TBAs were providing assistance to mothers in 16 Koro villages, using a dozen types of material -- razor blades, compresses, cotton, plastic sheets, soap, alcohol, antiseptics, etc. -- from a kit provided by the project. During the six months following TBA course number 1, held in August 1980, 17 TBAs in 9 villages reported assisting at 111 deliveries.[14]

In Yélimané, three TBAs from Diongaga village participated in two afternoon training sessions during February 1979 and another eleven from four different villages attended some sessions in June of the same year. These two groups received no follow-up from the PSR until Baudouy looked up four of the TBAs (the first three plus another from the June course) 1 1/2 to 2 years later and found them remembering what they had been taught and asserting that they applied it in practice, particularly aseptic severing of the umbilical cord.[15] In January 1981 a TBA training course took place, attended by 12 women.

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[13] Ibid., p. 18.

[14] Computed by Yaya Touré and the authors from TBA supervision reports in Koro.

[15] Baudouy (February 1981), p. 9.

It should be stressed that the foregoing tabulation says nothing about the social value of all this activity or its relationship to the cost of the program. The system described here could easily persevere for years even if the net impact of the H-Ss' consultations and drug prescriptions on the population's long-run health status were negative (which the authors do not believe that it is, although the concern of PSR's medical staff about the possible build-up of pathogen resistance as the population takes incomplete courses of chloroquine and penicillin is worrisome). Whatever the social benefits, however, an activity has been started at village level in both districts that is exhibiting significant dynamics and would continue to yield perceived services for some time even were PSR's intervention to come to a sudden halt, as it virtually did in Yélimané in 1980 from the viewpoint of many PSR-trained VHWs.

2. The district health service. The district health service, or Assistance Médicale (AM), is PSR's agent for establishing and maintaining the village health services described in the preceding section. In Koro as of April 1981 the AM comprised 28 active Malian staff members, of whom 23 were on the government payroll and five matrones rurales were paid by the government-controlled cooperative organization, CAC. About two-thirds of the staff is based at dispensaries located in the capitals of Koro's six divisions, aside from the Central Division, of which Koro town is the capital. The official duties of half the team include participation in the PSR, although only one member, the community development technician, devotes full time to it. The AM is headed by the district physician, currently Dr. Hamar Alassane, who estimates his own time allocation to the PSR at more than 60 per cent.

Arriving in August 1978, HIID's first medical adviser in Koro, Dr. Patrick Kelly, with a later assist from Mrs. Kelly, worked closely with the then district physician, Dr. Filifing Sissoko, in carrying out epidemiological surveys and planning and organizing the project. As the implementation of village pharmacies and subsequent supervision and re-supplying of VHWs became institutionalized, Dr. Kelly became free to devote an increasing proportion of his time, prior to his departure in May 1980, to analyzing provisional operating results and expanding the data base for subsequent evaluation. Installed in Koro in late July 1980, Dr. Kelly's successor, Dr. Claude Letarte, worked closely with Dr. Hamar in preparing a new work program, cost analysis and four-monthly budget. Later in the year he felt free to focus on evaluative work. With his transfer to Mopti in early 1981 HIID's operational involvement at the district level was effectively suspended.

Rounding out the PSR team in Koro is a group of Peace Corps Volunteers. A single PCV served in Koro during the PSR's start-up phase (1977-79), inter alia conducting a preliminary health/socio-economic survey (cited in Table 1) and participating in the first two H-S training courses. A team of three Volunteers has worked full-time on the project since November 1979, one helping to launch and operate the PSR's TBA component, a second participating in both the H-S and community development facets and a third filling the role of laboratory technician. All three take their turns on regular VHW supervision tours. All will complete their Peace Corps service within a matter of weeks (May 1981).

The Koro AM has now carried out eight training courses for VHWs (6 for H-Ss, 2 for TBAs) and one for matrones rurales. Recruitment,

involving as a rule promotional ("sensibilisation") tours such that each target village is visited three times; logistical arrangements for the courses; curriculum preparation; allocation of sessions to instructors (largely regular AM staff members) with at least a year of PSR experience; provision of initial pharmaceutical stocks or maternity trousseaus to the newly trained VHWs; monthly supervision tours encompassing resupply of drugs/TBA materials and tabulation of VHW consultation and other records; all these procedures have become sufficiently routinized so that some staff members could tell the authors they were confident of their ability to carry out regularly four courses per year, assuming away budget constraints.

In the event it has been decided to suspend new training courses in Koro to let the staff concentrate on the upcoming nivaquinization campaign and also because it is felt that servicing and supervising 113 VHWs now on the ground in 43 villages[16] fully commits the AM's available personnel resources.

In conclusion, at the level of the Koro district health service a system is in place which has brought about regular expansion of the PSR village health program, appears to be maintaining it in the face of only modest attrition, and is embarking on bold new initiatives.

On the other hand reservations about the system's viability -- as before, abstracting from budget constraints and offering no judgment as to likely impact on the population's health status -- arise in connection with (1) the heavy use that is being made of three Peace Corps

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[16] 82 H-Ss plus 31 TBAs; 42 villages with currently active H-Ss, of which 15 also have TBAs, plus one village with a TBA but no H-S.

Volunteers in operating roles right up to their departure, e.g., their role in logistics and documentation for the most recent H-S course, and (2) the Ministry of Public Health's inability to assign the district physician a management assistant who could ease the heavy burden of accounting and administrative chores which the PSR imposes on him. This makes the success of PSR/Koro critically dependent on one officer's continued willingness to maintain his present killing pace and work substantial uncompensated overtime for the sake of the project.

Turning to the AM in Yélimané, there is no need to repeat the diagnosis in several of the PSR mid-term evaluation reports[17] as to why a viable system of project administration has not come into being. It will suffice to quote the most recent documentation, Baudouy's January 1981 trip report, to the effect that the PSR team, "very young and inexperienced, appears to have gained nothing at a technical level from the presence of foreign advisers. It has made numerous errors in the course of its activities, all of which could have been avoided had a competent manager organized the work and imposed a rigor indispensable to the project's success. At present the team is disoriented feeling that its work is devoid of results at the village level."[18] Baudouy finds it noteworthy that the team has continued to function in spite of everything, and even managed to organize two courses (June 1980 and January 1981) without assistance from senior personnel.

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[17] Cf. Cissé, pp. 23, 25-27, and Correze, pp. 16, 18-19, 29 (English translations); White, pp. 7-8, 26.

[18] Op. cit., p. 18.

3. The regional health directorate. Basic precepts of development administration dictate that a PSR-type program can only be mounted at a national level, covering more than a handful of Mali's 46 districts, if the regional health directorates play an active role as intermediaries between the ministry headquarters at Koulouba (Bamako) and the district health services (AMs). Anyone who has observed the administrative burden imposed on ministry headquarters by the need to support PSR field operations in only two districts, one of the two being (at the time of the authors' observations) relatively inactive, shudders at the thought of Koulouba having to service five, let alone 46, active field offices.[19] This is illustrated most graphically in the confusion that would result as one new district after another joined the radio system (known locally as the RAC) on the single wavelength via which PSR/Koulouba is allowed to maintain communication with Mopti, Koro, Kayes and Yélimané, so helpful to the management of the project.

Playing a management role in the PSR would impose on the regional health directorates substantial new tasks, by way partly of reviewing district proposals or performance and partly of direct execution, *inter alia* in the areas of work programming, budgeting, expenditure control (notably for vehicle costs, shown in Section III below to account for the bulk of PSR material expenditure), drug distribution, personnel administration, and data collection. At present such supervision and control of these functions as does take place, with the

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[19] This observation holds even allowing for the considerable proportion of PSR/Koulouba's transactions occasioned by the technical assistance component of the project.

exception of administration of Malian personnel, all of whom currently form part of the regular district establishment, is carried out almost exclusively at Koulouba. Apart from the Mopti regional director's periodic visits to Koro, which result in useful exchanges of views and experiences regarding issues of primary health care and lend prestige to opening or closing ceremonies of VHW training courses, the directorate's role has been limited largely to pro forma review of work programs, budgets and accounts, their transmittal to Koulouba, and transmittal of cash to the AM.

Efforts are underway to enlarge the Mopti regional directorate's role. The recent posting to Mopti of Dr. Ousmane Doumbia, pharmacist with Pharmapro, the Ministry of Public Health agency charged with procuring drugs for distribution within the hospitals and public health services, and the transfer of HIID adviser Letarte are steps in this direction. At the time of writing it is too early to predict what kind of an administrative "system" vis-a-vis the PSR, as distinct from the other functions of the AM, will emerge at the regional level; what can be stated, however, is that none worthy of the name currently exists.

4. The Ministry of Public Health headquarters, Koulouba. Standing at the apex of the PSR pyramid, this entity initiated the project on behalf of the Government of Mali, negotiated external (USAID) finance to underwrite it, has provided virtually all the Malian staff involved in its execution, and has reviewed and approved, if not actually initiated, virtually all except the most mundane day-to-day actions pursued in implementing it.

The PSR could not have gotten as far as it has in fielding VHW-

based primary health care in Koro and Yélimané in the absence of actions taken at the national level to:

1. enlist the enthusiasm of district physicians -- indeed failure to achieve this in Yélimané was a major factor behind the project's difficulties there;
2. obtain USAID advances for a rotating fund with which to finance transportation, other material expenses and certain supplemental personnel costs of the project, accompanied by accounting procedures acceptable to USAID as a basis for replenishing the fund;
3. arrange transfer of cash to the district health services;
4. import mobylettes and other vehicles, supplying the mobylettes to the AM staff and establishing procedures for receiving and safeguarding hire-purchase deductions from their salaries;
5. procure drugs in the United States, air freight them to Bamako, establish storage facilities in Bamako and ship consignments as required to the AMs, all accompanied by appropriate inventory control procedures;
6. collect the proceeds of drug sales from the AMs and safeguard these in Bamako;
7. organize planning workshops and collaborate with the AMs and technical assistance staff in designing project strategy and preparing initial training courses;
8. establish and operate a system of rapid (radio) communication with the AMs; and

9. maintain managerial capacity for prompt decision-making on issues posed by both the field and technical assistance teams.

The fact that these actions have been taken and continue to be taken as required to support the previously mentioned activity at AM and village level suggests that some kind of "system" is indeed functioning at the national level. However, the question arises: to what extent is it a Ministry of Public Health sy tem that can survive the termination of foreign assistance? (As before, we continue to abstract from the budget constraint.)

The indications are that much has yet to be accomplished in this regard. Key facets of the system remain after three years in the hands of USAID and foreign advisers. USAID imports the drugs, HIID imports the vehicles and (thus far) most other equipment. Foreign advisers take delivery of the drugs, control the inventories in Bamako, arrange for shipments to the field (more often than not taking them along on their own field trips), collect drug sales receipts as well as mobylette hire-purchase payments, carry these back to Bamako and deposit them in bank accounts whose checkbooks they retain (although the Malian project director has co-signatory authority). The foreign advisers make a significant share (though below 50%) of the local purchases reimbursable under the rotating fund. USAID maintains the only extant record of the balance of project funds available under the original project agreement and subsequent amendments for disbursement via the rotating fund. The HIID-employed secretary operates the radio at Koulouba. The HIID team director supplies the Malian project director, who carries other responsibilities in the National Directorate of Public Health, with most

of the documentation he requires to exercise his managerial role. The principle has been accepted of assigning a Malian counterpart to begin assuming some of these tasks, and a promising start was made in November 1980 with an experienced official who was then transferred out after a few weeks. A replacement was being sought as of May 1981.

Indicators of voluntary sacrifices borne by participants in the system

Still without any implication that benefits suffice to offset costs, the following list of sacrifices currently borne by respective categories of participants provides partly qualitative, partly quantitative indicators of the benefits which they perceive in the system.

1. The villagers

   a. Time and effort spent in consulting with H-Ss. An unknown number of patients are repeaters, suggesting they may have received some relief on earlier consultations. Letarte's January-September 1980 data for 21 villages whose records give patients' origin show 17% of patients coming from outside the village, the average visitor coming from more than 11 km. However, Letarte cautions against overemphasizing these results as indicators of popular appreciation of the H-Ss' services, feeling that the considerable distances travelled suggest the visitors were in the village primarily on other business on the day in question.[20]

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[20] Letarte (February 1981), pp. 37, 38, 43. The 17% was calculated by the authors directly from Letarte's data on individual villages. The 11 km. distance is a minimum because Letarte arbitrarily assigned to patients citing an origin more than 30 km. distant, the average distance for all other outside visitors, i.e., 11.03 km.

b. Disutility on the patients' part (for the H-Ss' perspective see below) associated with disturbing the H-Ss at odd hours, delaying their agricultural work and even summoning them back from their fields, which numerous H-Ss have reported to AM staff and outside observers. However, the dynamics of the H-S/patient relationship have so far rarely induced patients to make payments in cash or kind for the H-Ss' services. The problem of VHW compensation is discussed in the next section.

c Purchase of drugs. Three efforts have been made to estimate annual per capita drug purchases under the PSR over a number of villages. Based on PSR/Yélimané-recorded deliveries during 1979 and village pharmacy stocks tabulated in January 1980, Daulaire-Taylor estimate an annual rate of FM 180 in nine villages, which range individually between FM 99 and 402. Reviewing H-S prescription records over the first 12 months of operation in Koro, Sissoko-Kelly estimate FM 118 per year. Letarte's review of similar records for 25 Koro villages during January-September 1980 implies annual per capita expenditure of about FM 85.[21] At an exchange rate of FM 500 = $1

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[21] Daulaire-Taylor, p. 45; Sissoko-Kelly, p. 21; Letarte (February 1981), based on monthly average per capita units of aspirin, penicillin and chloroquine dispensed according to Appendix, p. 2, times official selling prices, plus a rough 15% allowance for sulfacetamide eyedrops based on the share of this item in the Sissoko-Kelly sales total.

this implies per capita drug expenditure ranging from U.S. 17 to 36¢. Well below the $1.00 per capita (at 1976 prices, no less) projected in the USAID Project Paper, but still not negligible in a region with per capita income in the vicinity of $50. The higher rate in Yélimané than in Koro presumably reflects higher purchasing power associated with emigrants' remittances, an important factor in that area.

d. Payment of the FM 200 delivery fee (Koro only). PSR-retrained TBAs in Koro are instructed to collect FM 200 per live delivery to defray the cost of replacing materials in the project-supplied trousseau. Project staff, who are responsible for collecting the proceeds from the TBAs on regular supervision visits, report that it is indeed paid. (However, insofar as the payment is equivalent in value to gifts of kola nuts or meat traditionally presented to the TBA, which one of the authors heard TBAs in Sansagou-Pin complain it has replaced, the PSR is occasioning no incremental sacrifice from its beneficiaries on this account.)

e. Evacuation of seriously ill patients on VHW advice. Where a trained VHW occasions an evacuation that would otherwise not have occurred, the project can be said to have induced a sacrifice from the patient or his or her family. Evacuation cost is always a private responsibility; some families indebt themselves for

years buying gasoline to send a member with the AM Land Rover to the hospital in Mopti or Ouahigouya, Upper Volta.

2. The VHWs

Under this heading one has to take account of the time and effort devoted by VHWs to carrying out functions for which they receive little or no real remuneration -- participation in training courses; consultation with patients and dispensing of drugs, which we saw above can involve serious inconvenience and which some H-Ss have told PSR staff can take up to three hours per day during the rainy season when malaria is prevalent; management of pharmacy accounts; completion of consultation and prescription reports, of which different versions exist for literate and illiterate VHWs; meetings with AM staff on promotional and supervision tours; meetings with visiting economists and other project evaluators, of which the PSR has certainly introduced more than its share (!); and an occasional need to travel to Koro to replenish drugs in the event that adequate supplies have not arrived via AM supervision tours.

A number of observers have expressed the view that the H-Ss cannot be expected to continue their current level of sacrifice without remuneration over the long run, and that a VHW-based primary health scheme is not viable in the absence of mechanisms to insure adequate remuneration. On the other hand all who are familiar with the present fiscal crisis in Mali (see Section IV below) recognize that there can be no question of putting VHWs on the government payroll (and some argue that to do so would undermine the PSR's modus operandi). The solution is therefore seen in arranging for the village community itself to remunerate its VHWs, whether on the basis of consultation fees paid by patients or

their families, or an annual flat sum payment per taxpayer or per family, bordering on a rudimentary health insurance scheme.[22]

Indeed, the desirability of some form of local compensation of VHWs has been a PSR precept from the beginning;[23] and village chiefs and elders have been repeatedly exhorted -- on some occasions the term "harangued" would probably be a more precise description of what has gone on -- to this effect in the course of promotional and supervision tours as well as ad hoc visits by outsiders. It appears that the chiefs and elders always give the same response: "Yes, we appreciate the time and effort devoted by our VHWs, we realize they should get something concrete out of it, we are considering ways of organizing assistance for them in their fields...No, this hasn't happened yet, but we are talking about it and hope to arrange something for next season..."

The same refrain was repeated when the Malian author of this report raised the issue of VHW compensation with the chief and elders of Sansagou-Pin on April 1, 1981 (in the presence, it should be added, of one of the two H-Ss -- the other was on temporary migration to the Ivory Coast). Our reaction as economists was perhaps a bit different from that of some other observers who have participated in such discussions. It seemed to us that the villagers were saying, in effect, "For the time being our VHWs are satisfied to carry out a duty assigned them by the community, from which they derive psychic utility notwithstanding their gripes to AM officials and visitors. If and when the ambience here changes so that the only way to get these services performed is to pay

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[22] See Cissé, pp. 19-22, and Letarte (February 1981), pp. 13-14.

[23] For example, see USAID Project Paper, p. 38.

somebody for it, then we'll face that issue when it arises. In any case we haven't found the H-Ss' work so important as to warrant paying enough compensation to deter a man from taking off for the Ivory Coast should the opportunity present itself."[24]

3. Ministry of Public Health staff

For all government employees engaged in it the PSR represents a substantial increase in the work load that would prevail without it. As far as we are aware, no personnel establishment anywhere in the PSR network is any larger than it would have been in the PSR's absence, with the exception of a chauffeur or two assigned to PSR/Koulouba. Even with the project, the 1981 Mopti regional budget gives Koro district the fewest AM staff members per 10,000 population of any of Mopti's eight districts -- 1.73 as against 2.42 for the average of seven districts not including Mopti district itself (where the staffing density is 4.72) and 2.18 for the district with the next lowest density.[25]

The additional burden on the district physician himself involves substantial overtime work with no extra compensation other than FM 2,000 per day of movement outside Koro town, equivalent to 23% of his daily cash salary (annual salary divided by 300 days). As previously noted the incumbent, Dr. Hamar, estimates his time allocation to the PSR at above 60%.

With the other AM staff members, rather than occasioning overtime work or interfering with regular duties the PSR serves rather to provide

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[24] Both of Sansagou-Pin's H-Ss spent most of the first year following their May-June 1979 training in the Ivory Coast; the village pharmacy started functioning only in July 1980.

[25] Authors' calculation, comparing AM staffing according to the 1981 regional budget with 1976 census data (Recensement, Volume I, pp. 13-16).

them with clearly defined tasks, a set of incentives, and material complements to their salaries, particularly means of transport, that enable them to put in a day of constructive work. It casts no aspersions on the motivation of staff members in other district health services, but merely reflects on the constraint which Mali's current fiscal stringency imposes on productive public service, to report that several observers remarked to the authors on the contrast between the relatively high level of AM activity in Koro and that in other districts of the country.

In the area of material incentives, the daily allowance which the PSR provides (with USAID finance) for supervision tours and other movement outside one's post (whether Koro town or a divisional capital) represents a considerably larger percentage increment to daily compensation for staff members beneath the district physician -- e.g., 130% for staff in the category of health aide (aide soignante, 5th category). Irrespective of material incentives or management directives, however, some AM staff members clearly believe that the project is already helping or will eventually help to raise the health status of Koro's population, and are pleased to devote the additional effort involved as opposed to sitting around and doing nothing with the corresponding time. This does not mean, on the other hand, that the individuals in question look forward to spending more than three or four years in the relative isolation of Koro.

III. COSTS

The Club du Sahel and the Inter-State Committee on Drought Control in the Sahel (CILSS) highlight the distinction between recurrent and non-recurrent expenditure on development programs in the Sahel. Following are the summary definitions of these two concepts given in the Club/CILSS 1980 report on recurrent costs:[26]

1. Recurrent expenditure: the set of annual flows of gross expenditure of the government and its agencies, in local currency or foreign exchange, undertaken in order to generate socio-economic benefits in connection with the operation and maintenance of a unit of installed capacity, regardless of the source of finance of the expenditure in question, domestic or foreign.
2. Non-recurrent expenditure: all expenditures incurred in connection with establishing this capacity, regardless of the nature of the expenditure (purchase of capital goods or current inputs, personnel payments, etc.), the type of payment (in foreign exchange or local currency) and the source of financing. "Non-recurrent," "establishment," and "development" costs or expenditures are considered synonymous.

The policy significance of the recurrent/non-recurrent distinction lies in that there is a presumption on the part of macro policy analysts representing both donor and recipient country viewpoints, that it is

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[26] Club du Sahel/CILSS, op. cit., p. 19. Both of the present authors participated in the working group that prepared the report, one (Gray) as co-rapporteur and the other (Sankaré) as an independent consultant.

uneconomic for developing countries to establish productive capacity whose operation and maintenance cannot be financed in the forseeable future out of domestic resources, whether via direct cost recovery or local budget allocations; while on the other hand it represents a sound practice of development administration for donors to finance a major share, even 100 percent, of any category of costs involved in establishing productive capacity in poor countries facing particularly severe constraints on saving. More concretely, it is generally considered undesirable to initiate projects or programs whose continued operation over the long run is dependent on foreign aid flows while on the other hand there is no economic rationale for donors to shy away from financing so-called local costs of establishing productive capacity, including specifically public or private sector personnel costs, as well as quasi-recurrent expenditure in the form of operation and maintenance costs of projects whose successful outturn requires many years of experimentation before the productive capacity can be said to have become "established".

The report acknowledges the ambiguity that arises from applying strictures against recurrent cost financing in the social sectors, notably education and health, most or all of whose operation and maintenance costs can be considered investment in human capacity. In this light donors are urged to consider entering into long-term commitments to finance O & M expenditures in those sectors. Also noted is the ambiguity associated with determining what level of recurrent expenditure on a project or program, in excess of costs recoverable directly from users or beneficiaries, a country can "afford" to cover with general revenue, given that each government is sovereign with respect to allocating its

national budget. To this problem there is no solution short of helping the government in question to appraise the marginal social utility of use of its fiscal resources in different sectors and activities, and take steps (raising expenditure here, reducing it there) to equate marginal utility across the board.

To the extent that the USAID Project Paper of August 1976 can be said to reflect a consensus of Malian government and USAID opinion about the PSR, it shows the project's initiators adhering to the philosophy that a significant share of recurrent costs, particularly those occasioned by use of pharmaceuticals, should be borne by the direct beneficiaries or their families, while the remainder should be modest enough so that the government could afford in the forseeable future to cover it out of local budget resources in line with an expressed willingness to increase gradually the share of public revenues devoted to rural welfare.[27]

At the same time, the project's financial plan is indicative of USAID's willingness to pick up a substantial proportion of operation and maintenance expenditure -- notably all facets of transportation cost, materials and supplies (including whatever share of drug costs could not be recovered from beneficiaries), and certain supplemental personnel costs (but not the current payroll of government staff involved) -- during the establishment phase, not to mention virtually the entire cost of foreign technical assistance. In effect, USAID was agreeing to treat these quasi-recurrent costs as non-recurrent costs of project establishment, conforming to the Club du Sahel/CILSS report's subsequent definition.

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[27] Cf. USAID, op. cit., pp. 21 and 49.

Likewise conforming to the philosophy underlying that report, the present section distinguishes recurrent and non-recurrent costs of the PSR, focusing on measurement of the minimum level of expenditure that would have to be incurred in future in order to do nothing more than operate and maintain the capacity to produce village health services that has been established during the PSR's first three years.

USAID cost projections

The Project Paper of August 1976 states as one of the PSR's primary purposes to produce village health services at an annual operational cost of U.S. $2.00 or less per capita "in order to make GOM (Government of Mali) expansion and replication of such services financially feasible".[28] The figure of $2.00 is based on an estimated $1.70 current per capita expenditure on health out of the 1975 national budget; however, it turns out this calculation was inflated by almost 25% by use of an exchange rate of FM 400 = $1.00 to convert the budget (FM 38 billion is equated with $95 million, which is then divided by an estimated 1975 population of 5.6 million, giving about $17, multiplied by ten percent as the health sector's budget share in recent years), when the official exchange rate at the time, cited two paragraphs later in the Project Paper and otherwise applied throughout it, was FM 490.[29] This would have implied 1975 per capita health expenditure of $1.38, say $1.40.

A further adjustment is implied by the 1976 census results, not available at the time, which yielded a total population of 6.4 million,[30]

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[28] USAID, op. cit., p. 13.

[29] Ibid., pp. 49-50.

[30] Recensement, Vol. 1, p. 1.

or 6.23 million in 1975 assuming a population growth rate of 2.7%;[31] the corrected 1975 per capita health expenditure is thus $1.24 (= FM 38 billion x .10/6.23 million/490).

Before turning to detailed cost estimates it is interesting to update the $1.24 figure using 1981 budget and population data. The 1981 current budget totals FM 79 billion; the Ministry of Public Health & Social Affairs appropriation plus regional allocations for health and social affairs amount to FM 6.7 billion, or 8.5% of the budget; growing at 2.7% p.a. the 1976 population would have increased to 7.3 million in 1981, giving a per capita health budget of FM 920. Converting it to U.S. dollars at this time is a bit tricky given the current gyrations of the French franc (to which the Malian franc is tied). However, we suggest using FM 500 = $1.00, which yields an updated per capita allocation of $1.84.

The Project Paper goes on to compute the annual cost of operating a demonstration program of village health services in one division with 40 villages and a population of 20,000. This computation is reproduced in full in Table 2 for the sake of comparison with subsequent estimates presented below.

The total of FM 13.9 million is then divided by a population of 20,000 to arrive at projected per capita expenditure of FM 700, converted to U.S. $1.43 at the FM 490 exchange rate.

The budget in Table 2 is eminently a recurrent expenditure budget, since it makes no allowance for the cost of holding VHW training

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[31] Cf. Population Reference Bureau, 1980, world demographic chart.

Table 2

Projected Annual Cost of PSR Village Health Services in Demonstration Arrondissement According to USAID 1976 Project Paper

(all figures in Malian francs)

Personnel	
-Agent de Santé Rural; one per Arrondissement at MF 300,000 p.a.	300,000
-Agent de Santé Publique de Cercle; one-sixth of time per Arrondissement at MF 480,000 p.a.	80,000
-Adjoint de Santé Publique Regional: 1/36 of time per Arrondissement at MF 600,000 p.a.	16,600
-Animatrice de Santé de Village; 80 per Arrondissement at no MOH salary	-0-
Subtotal, Personnel	396,600
Transportation	
-Mobylette for Agent de Santé Rurale; one per Arrondissement at MF 120,000; depreciation over 3 years	73,500
-Operations & repairs at MF 20/mile for 5,000 miles	100,000
-Mobylette for Agent de Santé Publique de Cercle, one-sixth per Arrondissement; depreciation, operation, repairs	52,000
-Four-wheel drive vehicle (including spare parts) for Adjoint de Santé Publique Regionale; 1/36 portion of four year depreciation of 5,390,000 MF	38,000
-Operation, repairs 900,000 MF/36 at MF 150/mile for 6,000 miles (30¢/mile)	26,000
Subtotal, Transportation	288,000
Equipment & Supplies	
-Scales, one per village (50 villages) at MF 20,000; depreciation over 5 years	200,000
-Weight charts and other record-keeping materials at MF 40 per capita x 20,000	800,000
-Promotional materials and supplies at MF 40 per capita x 20,000	800,000
Subtotal, Equipment & Supplies	1,800,000

Medicines	
-Medicines supplied through local demonstration zone, free distribution at MF 400 per capita x 20,000	9,800,000
Existing Services	
-Estimate of current value of health services supplied through existing health facilities at MF 80 per capita	1,600,000*
TOTAL	13,884,600

* Note misprint in source giving this as 3,600,000.

Source: USAID Project Paper, August 16, 1976, pp. 50-52.

courses, a non-recurrent expenditure on human capital formation. (It may be a generous interpretation of the Project Paper writers' understanding of what is involved in organizing primary health care to say that they designed the budget with that explicit intent, rather than simply overlooking a major prerequisite to project implementation.)

On the other hand this initial budget also excludes significant items of recurrent expenditure that PSR experience on the ground would now suggest are indispensible for its continuation -- e.g., involvement of district headquarters staff, including the district physician himself, in addition to one so-called district public health agent; and administrative costs at regional and national levels apart from 1/36 of the time and vehicle use of a so-called regional public health agent as per the table.

The preponderant weight of pharmaceuticals in the Table 2 cost structure is immediately evident; they account for 71% of the total cost and 80% of the incremental cost attributable to the PSR (i.e., total cost less expenditure on existing services). Subsequently, the Project Paper assumes, in making dollar budget projections, that "$2.00 worth of medicines will be supplied for each inhabitant in the demonstration zone for each year of the active project period."[32] Elsewhere, the paper talks about the government collecting $1.00 per person per year from selling the drugs to the local population. Although the budget projections do not make it explicit, this would seem to account for the discrepancy between the $1.00 per capita net drug cost assumed in Table 2 and the foregoing $2.00 figure.

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[32] USAID, op. cit., p. 56.

A subsequent USAID document on the PSR, entitled "Mali Rural Health Project" (undated) and distributed by USAID/Bamako in both French and English as a general information handout, alters the picture somewhat by saying, "During the life of the project, AID-supplied medicines and equipment will be provided . . . at (a rate of) $2.00 per capita per year within the demonstration Arrondissement."[33] This paper gives as one of the purposes of PSR to establish a system with "an annual operating budget not to exceed U.S. $3.00 per person." Cost recovery through drug sales is alluded to but not quantified.

In any case, the implied objective appears to be set up a system which can operate at a per capita cost of less than $1.00 per year net of drugs and AID-financed equipment. Table 2 implies that this cost could be as low as U.S. 22¢, of which three-fourths corresponds to expenditure on existing services, leaving only U.S. 6¢ per capita as the incremental annual operating cost![34]

Before turning to more recent cost estimates based on actual performance for purposes of subsequent comparison, it is necessary to adjust the Project Paper figures for intervening inflation. The GDP deflator used by the Malian planning ministry gives a ratio of 1.18 for 1978 prices over 1976, implying annual inflation of 9%; projecting this rate to 1981, which is very likely an underestimate, gives a 1981: 1976 ratio of 1.53, slightly less than the 61% rise in the United States wholesale price

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[33] Op. Cit., p. 4 Emphasis supplied.

[34] Corresponds to subtotals for personnel and transportation, less two depreciation items in the latter, totalling FM 573,100, divided by exchange rate of 490 and population of 20,000.

index between the first quarters of 1976 and 1981.[35] Choosing a figure of 60%, we can say that drug costs of $1 or $2 in the 1976 Project Paper translate into $1.60-$3.20 at current prices, an operating cost ceiling of $3.00 translates into $4.80, and a demonstration arrondissement net cost of $1.43 in 1976 prices becomes about $2.30 today.

Sissoko-Kelly cost estimates

The Sissoko-Kelly 18-month progress report on PSR/Koro, dated February 29, 1980, contains the first detailed analysis of PSR field costs based on actual operating results (1978-79). The report estimates the total cost of a year's activities comprising two H-S training courses along with the promotional work involved in recruiting 20 villages and 40 H-Ss; donation of drugs to establish pharmacies in 20 villages; a full year's program of supervising the 40 H-Ss; and all other costs of the AM (district health service) attributable to the PSR. Table 3 summarizes the estimates:[36]

Table 3

Annual Cost of Initiating and Supervising Hygieniste-Secouristes in 20 Villages according to Sissoko-Kelly

1. Initiation of 20 H-Ss: (promotional tours, one training course, establishment of 10 village pharmacies):
   Salaries of AM personnel--based on percentages of one month's salary according to time allocation, max. 80% 219,000

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35 According to the IMF's International Financial Statistics.

36 Sissoko-Kelly, February 1980, pp. 11-15

Lodging, food, and supplies for 20 trainees (FM 8,125 per trainee)	162,500	
Transport, Land Rover & mobylettes	430,800	
Staff per diems for courses & field visits	90,000	
Other expenses (office, supplies, etc.)	20,000	
Subtotal for 20 H-Ss, 10 villages	922,300	
Total for 40 H-Ss, 20 villages (2 x FM 922,300)		1,844,600
2. Initial Donation of Drugs		
20 villages x FM 30,000		600,000
3. Supervision, control & extension in the village (costs per village)		
Salaries of AM personnel--district physician visits each village 2 x per year, supervision team of two devotes half-day each month	22,000	
Transport, Land Rover & mobylettes	36,720	
Per diems	14,000	
Office supplies for H-Ss and AM personnel	6,000	
Subtotal per village	78,720	
Total for 20 villages (20 x FM 78,720)		1,574,400
4. PSR overhead costs not directly attributable to training and supervision		
Transport: Land Rover		
Monthly trips to Mopti (400 km.)	763,200	
Quarterly trips to Bamako (2000 km.)	1,272,000	
Use by other district offices (who buy their own gas)	480,000	
Transport: mobylettes--weekly issue of 3 liters of gas-oil for personal use by 6 AM staff	374,400	
Subtotal, transport	2,889,600	
Salaries of AM personnel:		
District physician, PSR administration (35%)	401,200	
Commun. devel. technician, statistical work (25%)	150,000	
Subtotal, salaries	551,200	
Medical surveys in 12 villages	386,000	
Total overhead		3,827,200
Grand total		7,846,200

The grand total is then divided by an estimate of the population of Toroli division, less that of the divisional capital, which is served by a dispensary that has not yet been affected by the

PSR.[37] The result is a total cost of FM 502 per capita.

The report goes on to note that a full-cost estimate of primary health care as provided under PSR/Koro would have to include (i) overhead costs incurred by the Mopti and Bamako offices, (ii) costs of training and supervising the matrones rurales (one per divisional capital) and TBAs, for which preparations were underway when the report was written, and (iii) an annual retraining session for the 40 H-Ss covered in the analysis.

While the Sissoko-Kelly cost analysis contains a wealth of valuable data, spelling out its assumptions in a painstaking manner that has been most helpful to the present authors in updating the figures for two reasons, its conclusions are not fully responsive to the analytical requirements outlined in the introduction to this section. Firstly the FM 502 per capita figure (FM 423 based on the 1976 census data) is a fictitious composite since it would be impossible to sensitize villages, recruit H-Ss, hold two training courses, and conduct 12 monthly supervisions of the course graduates all during a single year. And secondly, the analysis mixes recurrent and non-recurrent costs.

The heavy weight of overhead, accounting for 49% of the Sissoko-Kelly cost total, is apparent on examining Table 3. Two-thirds of this corresponds to costs of operating the PSR/Koro Land Rover

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[37] The report uses a population figure of 17,499 less 1,894 for the capital. The 1976 census results, not available when the report was prepared, give 20,781 and 2,224, respectively (Recensement, Vol. I, p. 16, and Vol. III, p. 141). Dividing the Sissoko-Kelly total cost figure by the revised difference of 18,557 gives a per capita cost figure of FM 423.

for purposes other than promotion, training and supervision, notably monthly trips to Mopti and quarterly trips to Bamako. One would surmise that this travel must suffice to support a greater volume of activity than training and supervision of H-Ss for 20 villages--from March 1980 to February 1981, the Koro AM held three courses for H-Ss and two for TBAs, and conducted monthly supervision of VHWs then in place, with no more trips to Mopti and Bamako than the number envisaged by Sissoko-Kelly.

Issues of PSR cost analysis.

Before updating the Sissoko-Kelly estimates for Koro, it is desirable to reflect on some general issues of PSR cost analysis, beginning with those that arise from the recurrent/non-recurrent distinction elaborated in the introduction to this section.

Firstly, the fiscal stringency outlined in Section IV puts a premium on the search for ways and means of ensuring that the PSR imposes a minimum burden on Malian government budgets at such time as USAID finance is no longer available, at least for recurrent costs as defined by Club du Sahel/CILSS. It therefore becomes important to seek the minimum level of cost that will enable the productive capacity established by PSR -- namely the human and institutional infrastructure producing health services for villagers -- to continue operating at close to its current level of output. (We do not seek to maintain 100 percent of current output because achievement of the last ten percent or so may prove to be absorbing resources far out of proportion to the corresponding incremental benefits.)

In this vein, then, we must look closely at the Sissoko-Kelly estimates and any subsequent cost data to isolate all items that,

beneficial as they may be, represent enhancement of PSR's productive capacity rather than simply its preservation. Clearly all activities connected with enlisting new villages in the program, notably promotion, recruitment, training, and establishment of village pharmacies, relate to expansion rather than maintenance of existing capacity. The policy implication of drawing this distinction is that USAID and other donors should be happy to support activities leading to expansion of health service capacity, but it is not reasonable (nor does it represent an optimal allocation of scarce aid resources) to ask them to do so when local resources, whether via direct cost recovery or budget subsidy, are not available to operate and maintain capacity previously established with aid resources.

Secondly, the question arises as to how to treat drug costs in this context. The budgets in the USAID Project Paper and the Sissoko-Kelly report are strikingly different in their treatment of this item (compare Tables 2 and 3)--USAID includes the total cost of projected annual drug consumption, whereas Sissoko-Kelly include only the value of initial supplies (donations) to the village pharmacies. As a result, drugs account for 71% of the total cost projected by USAID, as against only 8% of the Sissoko-Kelly figure. Part of this is of course accounted for by the fact that the rate of drug consumption in PSR/Koro -- FM 118 per capita according to Sissoko-Kelly, FM 85 in the 25 villages studied by Letarte, as we saw in Section II -- has been far below the FM 490 per capita net cost projected by USAID, let alone the $2 rate (FM 980) gross of sales proceeds, cited elsewhere in the Project Paper. The rest of the explanation lies in the fact that sales proceeds on the basis of Pharmacie Populaire prices are

substantially in excess of the c.i.f. cost of importing the drugs from the United States, an issue that will be considered in Section IV. Taking this comparison into account, Sissoko-Kelly treat drug distribution after the initial donation as a self-financing component of the PSR--indeed, one that is generating net revenue for the project--and exclude it from their cost estimates.[38]

Defining recurrent expenditure as "gross," the Club du Sahel/CILSS report indicates a preference for measuring recurrent costs before subtracting cost recovery as from the sale of drugs. In the case of PSR, there are indeed valid reasons for seeking gross expenditure figures including drug sales; on the other hand, drug sales can be indicated alongside other costs in lieu of being included in the total. We prefer not to include them in the present case so as to leave ourselves freedom in Section IV to argue that the enormous margins between c.i.f. import cost and Pharmacie Populaire prices of the drugs used in PSR represent an iniquitous burden on consumers arising from inefficient organization of drug distribution in Mali, rather than a proper vehicle of PSR cost recovery offsetting part of government outlays on the project. Hence we will follow the Sissoko-Kelly procedure of excluding drug sales from project costs, with the proviso that initial donations will be treated as non-recurrent expenditure.

The third issue of cost analysis associated with the recurrent/non-recurrent distinction is that of how to treat costs presently incurred

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[38] Economic theory tells us, of course, that these two explanations are not independent of one another. An unknown but possibly sizable proportion of the shortfall in drug consumption as compared with Project Paper forecasts is due to high selling prices whose impact was not foreseen by USAID.

at the national and, to a minor extent, regional levels, and what assumptions to make about the levels of these costs in the future. Obviously the bulk of costs incurred at the national--one might even say international--level relates to the technical assistance rendered under the Government of Mali's contract with HIID and HIID's subcontract with the EDC. As of December 31, 1980, HIID had expended U.S. $1.6 million, while cumulative Ministry of Public Health expenditure out of the rotating fund eligible for USAID reimbursement--i.e., all other incremental PSR costs except for drug and vehicle imports and participant training abroad--was about one-tenth of that amount. During calendar 1980, HIID spent $687,000, while PSR/Koro appears to have spent somewhat less than FM 8 million, equivalent to $19,000 at the average exchange rate prevailing during 1980.[39] PSR/Koro and Yélimané together appear to account for less than half of disbursements out of the rotating fund, although the project accounts do not admit of a convenient tabulation of those Bamako purchases which have been effected on behalf of the field.

The authors intend no criticism of PSR's expenditure pattern thus far; they have no basis for judging how much less the operations in Koro and Yélimané would have accomplished than they actually have, or how much less data would be available with which to evaluate the project and plan its future course, in the event that less foreign technical

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[39] HIID expenditure data from HIID financial office. Estimate for Koro is based on Koro AM accounts for Sept.-Nov. 1980 as tabulated by C. Letarte. Expenditure for the three months was FM 2.5 million, including costs of an H-S course; the rate was probably lower earlier in the year, with fewer H-Ss and no TBAs to supervise. Average exchange rate of Ffr. 4.23 = $1 according to International Financial Statistics.

assistance had been provided, or fewer resources had gone into strengthening the PSR's central management. They merely point out that up to the present time, expenditures undertaken away from the field swamp the costs incurred at the level of Koro and Yélimané, and if continued at their past rate would almost certainly swamp any benefits generated in those two districts alone. Thus the outlays in question must be justified as predominantly non-recurrent expenditures required to launch the PSR and lay a basis for its replication in other districts of Mali. Hence the references in USAID literature to the PSR as a "demonstration rural health system . . . . (to serve) as the basis for a national rural health system."[40]

This leaves open the question of what bureaucratic infrastructure engaging in what pattern of expenditure would be "required" to maintain an already "established" PSR at the level of production targeted for the current project. The answer to the question is heavily dependent on one's assumptions about what will happen to drug distribution and vehicle management, considered further below. To the extent project headquarters, defined broadly to encompass all agencies engaged in PSR implementation at the national level, retains its present responsibility for these matters, Malian cadres will have to be assigned to take over the functions now performed by foreign advisors and the donor agency, USAID, itself. One can also envisage alternative solutions which economize on bureaucratic input.

At the present stage we content ourselves to define a national-regional overhead cost in percentage terms, X, by which our subsequent estimates of PSR field costs must be inflated in order to guarantee a viable system.

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[40] USAID (undated), p. 1.

A final issue of general import to be faced in the cost analysis is the distinction between pre-existing and incremental expenditures, with particular reference to the personnel costs of AM staff. As already noted in Section II, instead of occasioning additional hiring or reassignment of personnel at district level, the PSR has rather provided existing staff with the means to work productively. The question therefore arises whether salaries and fringe benefits of AM staff should be included in PSR cost estimates to the extent of their allocation of time to project activity. Their service to the PSR represents a real resource which has to be taken into account in assessing the total resource commitment to the project. On the other hand, in an opportunity cost sense it is a virtually free input, in that no social benefits other than some leisure are foregone by assigning the staff to PSR. Indeed, the assignment is more likely to generate negative social cost (i.e., an additional positive benefit) by giving the staff a sense of participation in useful service to the community, forestalling demoralization and deterioration of work habits.

Given that the manpower required to do the work is already on the payroll, and the government has shown its willingness to reduce material expenditure to the vanishing point in order to honor civil service tenure, a study which attempts as ours does to assess the feasibility of covering PSR's incremental costs in face of Mali's near-term fiscal and institutional constraints is justified in presenting a measurement of the recurrent cost of the present level of activity which ignores personnel charges. At the same time, one must be conscious that there is a scale of activity which just exhausts the staff's idle capacity, and beyond which further expansion is not possible without new personnel assignments, possibly coupled with management reorganization.

As regards Koro, Dr. Hamar expressed the view to the authors

that his staff was now fully committed and could not take on supervision of VHWs in additional villages, considering its other duties, including some special activities planned within the PSR framework--e.g., the June-November 1981 nivaquinization campaign. In this light, the Koro AM has abandoned plans to train new VHWs and open additional pharmacies in the current year. The personnel constraint will be taken into account below in the impact on recurrent costs of extending the PSR to the four divisions of Koro district that remain more or less virgin territory.

Recent PSR/Koro expenditure data

To get the flavor of the current pattern of cash outlays in Koro, it is useful to review the summary in Table 4 of PSR/Koro's expenditures during the three months September-November 1980, the latest period for which expenditure data are available in program categories.

Table 4

PSR/Koro Expenditures, September-November 1980

('000 Malian francs)

Hygieniste-secouriste program		
December 1980 training course:		347
Promotional tours	97	
Training Course*	250	
Supervision tours (four H-S cohorts)		144
Traditional birth attendant program		
Supervision tours (one TBA cohort)		34
Epidemiological survey (malaria)		39
Other surveys		18
Nonproject (overhead)		
Transport (subtotal)	1,034	
Koro-Bamako	152	
Koro-Mopti	114	
Weekly staff issue of gas-oil	152	
Mobylette repairs	388	
Land Rover repairs	228	
Salary, night watchman (HIID house)	60	
Subtotal, expenditure on budgeted items		1,675

Various & Contingency		
Repayment of debts (August)	329	
Freezer (kerosene, repairs)	120	
Transport (subtotal)	264	
Oil, lubrication	104	
Trips to Mopti to buy gas	56	
Road calls (breakdowns)	31	
Misc. per diems	22	
Mobylette fuel (misc.)	14	
Loss of gasoline (leakage)	10	
Transporting matrone to Toroli	10	
Mission to Karakinde (measles)	10	
Accompanying USAID visitor to villages	7	
Village pharmacy strongboxes**	45	
Office supplies	19	
Subtotal, various and contingency		783
TOTAL		2,458

* For unexplained reasons, this figure excludes both transport and staff per diem costs associated with the course.

** In principle, reimburseable by the villages.

Source: Tabulated from PSR/Koro account books by C. Letarte, December 1980.

The Table 4 figures are not strictly comparable with either the USAID Project Paper (Table 2) or Sissoko-Kelly (Table 3) budgets since they exclude staff salaries and take no account of vehicle depreciation, which is computed on an annual basis and taken into account in the Project Paper, and counted at FM 80 per km. by Sissoko-Kelly. On the other hand, Table 4 embodies a higher gasoline price than the FM 315/liter prevailing when Sissoko-Kelly wrote--FM 350 if the gas is purchased in Mopti, FM 450 for gas purchased in Koro (the government raised the latter two prices by FM 100 two days after the present authors left Koro).

Table 4 demonstrates once again the "transport intensity" of PSR incremental local expenditure. Subtracting the contingency item for debt repayment from the total, which is appropriate since much of the

debt was probably incurred in connection with transport items, and adding the fuel cost of H-S training and supervision (FM 178,000, given in separate worksheets) to the two transport subtotals in the table (1,034,000 + 264,000), we obtain a ratio of transport cost equal to 1,476/2,129 = 69%.

This figure is consistent with the result of a similar exercise with the Sissoko-Kelly data, taking total costs as per Table 3, less salaries, as the denominator. The resulting ratio is 4,655/6,273, or 74%; the modest difference is largely explained by Table 4's omission of vehicle depreciation. Comparison can likewise be made with the rotating fund accounts submitted by the ministry to USAID. The statement of October 16, 1980, allocates 69% of cumulative expenditure to that date (FM 53.4 million), or FM 36.7 million, to the category "domestic travel and maintenance;" netting out per diems included in that category reduces the percentage by less than a point. The rotating fund, of course, does not take account of vehicle depreciation, though FM 4 million was spent for purchase of a car.

Another characteristic brought out by Table 4 is the high degree of flexibility in allocation of expenditure--put more bluntly, relaxation of budgetary discipline--which USAID local financing through the rotating fund procedure has made possible. This is reflected in the elevated ratio of unbudgeted items--"various & contingency"-- to budgeted expenditure. Even netting out the debt repayment item we have FM 454,000 of contingency expenditure as against FM 1,675,000 of expenditure on budgeted items, or a ratio of .27. For a district physician who receives a mere FM 112,000 per quarter from the government budget to cover all his material expenses except drugs, as is the case

in Koro, the PSR's extra-budgetary largesse boggles the mind. (We will see in Section IV that other districts of Mopti region are in the same boat.)

Estimating recurrent costs

We will now derive new estimates of PSR/Koro recurrent costs, beginning with current expenditure levels, next considering the cost implications of expanding VHW-based primary health care to presently uncovered divisions of the district, and finally looking at possible avenues of cost reduction in the program.

It is the authors' view, after consultation with the district physician and other PSR staff, that the recurrent cost to government of operating the VHW-based health services system in Koro and maintaining it at its current level of production would comprise three basic elements: 1) supervision of the VHWs by AM staff, 2) occasional training courses to replace VHWs who have migrated or otherwise ceased to function, and 3) overheads associated with these two activities.

At the present time supervision is carried out via monthly visits to 46 villages.[41] Concerning H-S attrition, it is uncertain how often a course would have to be held to train replacements. As of March 1980, nine out of 33 H-Ss trained in the first three cohorts were on migration--a discouraging record.[42] Yet a year and three cohorts

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[41] Cf. PSR/Koro (March 31, 1981). Data supplied to the authors after leaving Koro indicate that pharmacies are currently operative in only 42 villages, a 43rd village having an active PSR-retrained TBA with no H-S counterparts. We are unable to account for the discrepancy of three villages. Possibly the H-S managing the pharmacy has departed, leaving behind a colleague who has not yet reactivated it.

[42] Sissoko-Kelly (May 1980), pp. 24 and 26.

later, at least three of these migrants were back on the job, and no further net attrition had occurred, making for a provisional loss of only six out of 89 trained.[43] We will assume that future attrition requires a new H-S course only once every two years. Indeed, the holding of such a course may be just as important for the sake of maintaining H-S supervision by AM staff at its current level of efficiency--whatever that may be, the authors are in no position to judge--as for preserving the rate of coverage. Rotation of the majority of staff members every three or four years cannot be avoided, and no more effective orientation for new staff can be imagined than the experience of preparing for, observing, and possibly even teaching in a VHW course.

Turning to the TBAs, migration is out of the question for the first training cohort of 17, with an average age of 59. Nor is it likely to be significant with the second cohort of 14, notwithstanding a much lower average age (35). Deaths and retirements must eventually be counted on; however, the numbers will not justify a special course in the foreseeable future.

PSR/Koro's current monthly supervision program involves 12 different staff members, plus three PCVs, making 24 sorties en pair; i.e., 48 person-sorties or an average of 3.2 per person.[44] Eight of the Malian staff members use mobylettes supplied by the project on hire-purchase terms. Costing of mobylette use should now be based on different procedures from those underlying the figures in Table 4. In January 1981 the PSR management, concerned over mounting repair bills

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[43] Letarte, (April 1981, in progress).

[44] Computed from April supervision program, PSR/Koro (March 31, 1981).

for which the project had open-ended liability, stopped paying for repairs and decided tentatively to shift to a system of lump-sum monthly payments of FM 15,000, while also terminating the weekly issue of 3 liters of gas-oil. Staff members will continue to acquire their machines via 24 monthly interest-free payments on a tax-free wholesale value that was FM 165,000 in April 1981 (the tax exemption is worth 100% of this amount).

The three PCVs use mobylettes provided by the Peace Corps. The other four Malian staff members use either their own vehicles (mobylettes or motorcycles) or a machine controlled by the project. Issue of gas-oil for April supervision amounted to 134.5 liters @ FM 600, worth FM 80,700. Per diems at FM 1,000 x 48 person-sorties = FM 48,000. Assuming eight lump sum payments @ FM 15,000, monthly cash outlays for supervision amount to:

Fuel	80,700
Per diems	48,000
Mobylette lump-sum payments	120,000
	FM 248,700

or FM 2.98, say 3.0 million per year.

This figure omits the nonfuel costs of seven mobylettes other than the eight whose owners are entitled to lump-sum payments. In the long run, this is not a viable arrangement, especially as the three PCVs are about to leave (the authors were informed that replacement of only one of the Volunteers, a woman who contributed to launching the TBA component of PSR, was under consideration.) The question arises as to whether supervision can be conducted at no increase in cost with eleven staff members, or even only eight. This would mean increasing the average number of person-sorties per month to 4.4 (about

once a week) or even 6 (weekly sorties plus a second day on the road during two weeks of the month). The authors gained the impression that the former might be possible, but an average of six tours per month would be regarded as burdensome.

An approximate allocation of the FM 3 million supervision cost between the H-S and TBA components of PSR can be made on the basis of relative numbers currently active in the two categories; viz. 73% (83 H-Ss) and 27% (31 TBAs), or approximately FM 2.2 million and 0.8 million. The commitment of resources in conducting the supervision does not appear to differ significantly between the two categories, apart from the fact that transporting pills on the back of mobylettes involves greater breakage than delivering the types of materials included in the TBAs' trousseau.

Turning to the question of a biennial training course, Table 5 gives our estimate of the current cost of such an exercise, preceded by two recruitment visits per village as against three assumed by Sissoko-Kelly,[45] since villages whose H-Ss are being replaced will already be cognizant of the program and what is required of them.

Table 5

Estimated Cost of Training Course to Replace 18 Hygiènistes-Secouristes Who Cease to Function

	FM
1. Recruitment	
a) Staff per diems	
2 persons x 10 villages/2 villages per day x 2 trips x FM 1,000	20,000

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[45] Sissoko-Kelly (February 29, 1980), p. 11.

			FM
b)	Transportation*		
	2 mobylettes x 5 days x 2 trips x 70 km. = 1,400 km./25 km. per liter = 56 liters x FM 600		33,600
	H-S Recruitment Total		53,600
2.	Training		
a)	Staff per diems		
	8 trainers for 5 days @ 1000 FM		40,000
	1 district physician for 2 days @ 2000 FM		4,000
b)	Transportation		
	2 drivers for 2 days @ 1000 FM		4,000
	2 Land Rovers for 365 km. @ 220 FM per km.		160,600
	depreciation (FM 10 million over 100,000 km. useful life	100	
	maintenance (10% of depreciation)	10	
	fuel (FM 550/liter over 5 km. per liter)	110	
	total FM/km.	220	
c)	Food		
	2 cooks for 5 days @ 500 FM		5,000
	28 people for 5 days @ 830 FM daily rations		116,200
d)	Other supplies		
	pens, notebooks, record cards for 18 trainees @ 500		9,000
	H-S training Total		338,800
GRAND TOTAL, H-S Recruitment and training			392,400

* Mobylette nonfuel expense is fully covered in calculation of supervision cost.

Source: Computations conducted by James Brenner, Kennedy School of Government, Harvard University.

Yearly expenditure on recruitment/training for H-S replacement is assumed to equal half the total in the table, or FM 196,200 (say FM 200,000).

Next we have to consider how much overhead to tack onto the program costs. In this connection it is instructive to look through the nonproject and contingency expenditures in Table 4, leaving aside

mobylette-related items that are covered under supervision costs via the new procedures outlined above. How many trips to Mopti and Bamako, in addition to a monthly trip to Mopti already covered under the regular AM budget, will be "required" as and when PSR/Koro settles into a holding phase, involving no expansion but merely maintenance of the existing program (at present count, 43 villages, 83 H-Ss, and 31 TBAs)? How many of the varied contingency items in Table 4 must be covered to ensure maintenance of PSR capacity?

Obviously a program works better when there is some budget flexibility to meet contingencies of the type outlined in Table 4. A Land Rover breakdown whose repair cost exceeds the uncommitted budget residual can immobilize an operation for many months. On the other hand, a PSR/Koro that was seeking only to maintain itself, rather than expand, should be able to get along without a Land Rover apart from transporting trainees to and from a biennial course. Perhaps a notional ten percent over the program cost of supervision and biennial training, say FM 300,000 per annum, would meet the most pressing contingencies.

Calculation of PSR/Koro coverage as a basis for estimating the unit recurrent cost

It was noted in an earlier subsection that, in the process of seeking comprehensive coverage of individual divisions of the district, PSR/Koro has selected locations for VHWs such that over 90% of the total population would be situated within a 5-km. radius of a VHW. Assuming that anyone whose village is 5 km. or less from a VHW-served village is "covered," the population presently "covered" by the village health

services component of PSR numbered 71,266 according to the 1976 census.[46] Dividing the preceding annual recurrent cost estimate of FM 3.5 million (= 3.0 + 0.2 + 0.3) by this population total gives us an annual recurrent cost per head of FM 49.3, say FM 50, or U.S. 10¢ at an exchange rate of FM 500 = $1.00.

Based on his study of H-Ss' consultation records, and his corresponding suspicion, cited above, that most patients from outside an H-S village have come there initially on other business, Letarte expresses the view that effective access to the H-Ss is limited to a considerably shorter radius.[47] Applying 1976 census data to a map prepared by the project staff, J. Brenner of Harvard's Kennedy School of Government calculates that encircling the 14 H-S villages of Koro's Central division with a 2.5 km. radius envelops six additional villages, raising the affected population from 16,426 to 19,814, an increase of 21%. Doubling the radius to 5 km. draws in another 22 villages (for a total of 42), yielding "coverage" for 28,932 persons all told, or 76% more than the population of the original 14 villages.

"Coverage" is at best a fuzzy concept in the PSR context. We noted earlier that 17% of all H-S consultations in 21 villages whose returns were studied by Letarte (excluding four villages not specifying patients' origin) involved outsiders. At the same time, numerous observers, including most participants in the May 1980 midterm evaluation, stress the issue of underrepresentation of women and children in H-S consultations.[48] Thus, it may well be that women and children residing

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[46] Computed by J. Brenner, Kennedy School of Government, May 1981. See following reference in the text.

[47] Letarte (February 1981) p. 41, 43. The district physician supported this view orally with the authors.

in a village enjoy less "coverage" than some adult male outsiders who are frequent visitors and well-known to the village establishment. What can be stated unambiguously is that, whatever may be the H-S' degree of interest and success in furthering, in his own village, PSR objectives above and beyond that of curing simple ailments--notably making the community aware of environmental causes of illness so that it responds to H-S initiatives for corrective action--his impact in this vein on other villages, based on treating patients who originate there, will be miniscule.

Considering briefly the TBA component, for obvious reasons the outreach of this category of VHW beyond her home village is much less than that of the H-S, in most cases negligible. In some villages every quarter or extended family has its own TBA or TBAs.[49] The PSR's current configuration provides one exception to this general picture--the PSR TBA in Kaniana has a wide reputation for her skill in treating difficult pregnancies, and women come (so we were told by AM staff) from 40 km. to deliver under her care. The 22 births attended by this woman in the first six months after her course were twice to three times more than accounted for by the village's population of 250.[50]

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[48] Cf. Cisse, p. 7, and Correze, p. 21.

[49] In the course of one author's field visit to Tinsagou in December 1980, the PSR-trained TBAs complained that women in the village were resorting to non-PSR TBAs on account of the FM 200 delivery fee imposed by the project.

[50] Tabulated by the authors from data provided by Y. Toure. At the generally accepted live birth rate of 49 per 1,000 population, a village of 250 could expect six live births in an average semester.

All things considered, a strong case for defining "coverage" to include more than the population of VHWs' own villages remains to be made. We therefore recompute the per capita incremental recurrent cost of PSR as it presently operates on the basis of a population (1976 ceneus) of 37,073, obtaining FM 95 or U.S. 19¢ per head.

Cost implications of equilibrating TBA and H-S coverage

It has been repeatedly noted above that TBAs retrained by PSR/Koro are found in less than 40 per cent as many villages as are H-Ss (16 over 42 = 0.38). In the first instance this relects the fact that the TBA component got underway considerably later, only two TBA courses having been held thus far, the first a year and a half after the first of six H-S courses was held. However the discrepancy also reflects the low proportion of female staff in the AM, women -- including the five matrones rurales on the cooperative organisation's payroll -- accounting for only about a quarter of active staff members. In April 1981 only three women, one a PCV on the verge of completing her service, were conducting supervision. Another of the three was the matrone rurale based in Madougou, who had been reassigned to Toroli when the matrone in that division became pregnant and could no longer ride a mobylette.

Under the current supervision regime a male-female staff pair can cover two villages per day, each with a pair of TBAs and H-Ss, or eight VHWs in all, at the same travel cost as a pair of males covering two villages with H-Ss only, i.e. only four VHWs.

(Use of the second male staff member in this case appears at first glance to be a luxury, but the district physician argues it is justified to ensure mutual aid in the not uncommon even of a vehicle breakdown.) Thus, apart from the question of personnel requirements, filling out the PSR/Koro program to ensure that all participating villages are served by both H-Ss and retrained TBAs would not add appreciably to recurrent costs, especially as less replacement training is required for TBAs and the FM 8-9,000 purchase cost of their PSR - provided supply kit appears likely to be offset by FM 200 delivery fee collections.

However, it appears that a supplemental personnel cost cannot be avoided. Of the 48 person-sorties in PSR/Koro's monthly supervision program, eleven are currently carried out by female staff. A balanced TBA/H-S program covering the same villages would require that half the sorties be carried out by women, implying a more than doubling of the recurrent PSR work load of female staff. Considering the PCV's present role, and assuming each division's matrone rurale could be counted on for supervision work, a need would arise for three more female staff members operating out of Koro. Experience with staff pregnancies, which relieve the employee of travel duties as long as she chooses to nurse her child, indicates that one has to "over - establish" in the relevant category to the tune of perhaps one third.

We conclude that the TBA program in question would require a total of five new female staff members, three operating out of Koro supplemented by 33 per cent of (a) the Koro-based staff plus

(b) three division-based matrones rurales. To share the resulting management burden on the obstetrical nurse, one person would have to be hired at an annual salary level of FM 600,000+; we assume rather hesitantly that all the other four could be paid matrone rurale - type salaries of around FM 250,000 per annum. The implied additional salary cost is thus about FM 1.6 million, augmented as per AM/Koro's 1981 budget by 38 per cent in benefits and supplemental costs,[51] making for an annual total of around FM 2.2 million.

We have thus arrived at the following estimate of the total incremental recurrent cost (i.e. not counting existing salaries cum fringes) which the Malian Government would have to incur in order to take charge of a PSR/Koro comprising a full complement of TBA and H-S teams in 43 villages concentrated in three divisions, based on the present pattern of supervision:

	FM million
Material cost of supervision	3.0
50 per cent of cost of biennial H-S replacement course	0.2
Overh and incidentals	0.3
Incremental personnel cost of filling out the TBA program	2.2
Total	5.7

Divided by the population total of 37,000± from

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[51] Government of Mali, Direction Nationale du Budget, Sous - Ordonnancement Mopti, pp. 140-42.

the preceding section this gives us an incremental recurrent cost of about FM 154, or U.S. 31¢ per head of population residing in villages with VHWs.

Cost implications of extending PSR to new divisions

Before considering the implications of expanding PSR to new divisions of Koro it is relevant to examine the present degree of "coverage" of the district as defined above. Table 6, taken largely from a report in preparation by Dr. Letarte, shows that in three Koro divisions the PSR has established direct access to primary health care for 35 to 57 per cent of the population previously lacking it, although in the same divisions 38 to 56 per cent of the total population remains without access. The PSR has had no intervention with respect to primary health care in three of Koro's divisions, and has trained H-Ss in only one village of a fourth, Koporo-kenié-Na (listed in Table 6).

Through its intervention thus far in four divisions the PSR has provided direct access to primary health care for about 20 per cent of Koro's total population (1976 level: 185,000), raising to about 30 per cent the share of the population that resides in localities with either health centres, dispensaries or VHWs.[52] The question arises as to what would be involved in extending this coverage to 50 per cent.

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[52] Table 6 figures of 15,176 (line 2) and 36,876 (line 5) plus a notional 6,000 for three other divisional capitals served by dispensaries gives 58,000±/185,000 = 0.31.

Table 6

Population with and without Direct Access to Government - Promoted Health Care in Four Koro Divisions

	Central	Koporo-kenié-Na	Madougou	Toroli	Total
1. Total division population	45,218	26,480	25,966	20,781	118,445
2. Population in towns with health centers/dispensaries	6,091	3,368	3,493	2,224	15,176
3. Population outside (2) (=(1) - (2))	39,127	23,112	22,473	18,557	103,269
4. (No. of H-S- served villages as of March 1981)	(14)	(1)	(11)	(16)	(42)
5. Population of H-S- served villages	16,141	2,151	7,971	10,613	36,878
6. (5) as a percentage of population outside (2) (=(5)/(3))	41%	9%	35%	57%	36%
7. Population outside (2) and (3) (=(3) - (5))	22,986	20,961	14,502	7,944	66,393
8. (7) as a percentage of division population (=(7)/(1)	51%	79%	56%	38%	56%

Source: C. Letarte, "Le Projet Santé Rurale--Trois Ans Après--Reflexions et Recommandations", draft, April 1981. All population data are from 1976 Census.

Average distances between Koro town and the population centres of Koporo-kenié-Na division are roughly equal to those between Koro and Toroli; the same comparison holds for Dioungani and Madougou, sections of which lie considerably further than the two nearmost divisions excluding Central.

Thus, most of Koporo-kenié-Na and Dioungani could be incorporated into the PSR at no greater aggregate travel cost than has been incurred up to now. The same does not hold, to be sure, for the northern and easternmost divisions, Diankabou and Diangourou, respectively,

Establishing VHWs in the 25 largest villages of Koporo-kenié-Na, excluding (i) Pel, which is served by a Catholic mission health center, (ii) the divisional capital with its dispensary, and (iii) Koporo-kenié-Pé, where a VHW team already operates, would provide access to a (1976) population of 16,500±. Another 13,000+ live in the 15 largest villages of Dioungani, again excluding the divisional capital. Participation of these 40 villages, equivalent to a near doubling of the present VHW network, would thus involve another 30,000 villagers, raising the population with access to primary health care to 88,000± (see footnote 52), or 48 per cent of Koro district's population.

In weighing possible involvement of other divisions, however, one has to deal with the capacity constraint raised by the district physician. According to his judgement, the AM's personnel resources are currently stretched about as far as they can be under the conditions prevailing in Koro. It is in such circumstances that program expansion involves incremental personnel costs, which there can be no question about including in recurrent costs.

In the first instance, any new staff hired for the purpose of extending the PSR into new divisions would be engaged primarily in promotion, VHW recruitment, and training. One implication of the Club du Sahel/CILSS recurrent cost report is that donors should be willing to finance any and all expenditure items related to program development or establishment, including salaries and benefits of government personnel. Eventually, however, as has already happened with the present PSR/Koro team, the staff will find its time taken up with maintaining the capacity thus established, and the question will arise: can the Malian government absorb their personnel costs as part of the incremental recurrent expenditure associated with the PSR?

Let us assume that the project has passed through an expansion phase such that 40 new teams of H-Ss and TBAs, 25 in Koporo-kenié-Na and 15 in Dioungani, have been established and need supervision. The trio of health technicians that mans most divisional dispensaries, but at present has very little to work with, would in theory be available for supervision tours in its own division, just as is now the case with their Toroli and Madougou counterparts.

How many Koro-based staff, additional to the present establishment of about ten, would be required to conduct the expanded supervision? The best way to answer this question is to examine the total work load associated with supervising, say, 83 VHW teams in five divisions -- all of Koro district except Diankabou and Diangourou -- and estimate

the staff needed to supplement PSR/Koro's present establishment, augmented as previously suggested to fill out the TBA program.

The 40 new villages may be assumed to add 44 monthly person-sorties to the 48 currently undertaken (cf. PSR/Koro's April program), giving a total of 92, half male and half female. The existing establishment (May 1981 position plus assumed new female staff) may be summarized as follows:

<u>H-S component</u>

Koro-based: nine male staff (including 2 PCYs) currently conducting supervision

Division-based: two male staff (nurse plus health care auilliary) in each of four divisions, viz. Dioungani, Koporo-kenié-Na, Madougou and Toroli, total of eight

Total: 17

<u>TBA component</u> (excluding 33% over-establishment)

Koro-based: two obstetrical nurses plus two matrones rurales

Division-based: one matrone rurale in each of four divisions

Total: 8

For the H-S component we thus have 17 existing staff members to carry out 92/2 = 46 person-sorties, giving an average of 2.7 per person per month, scarcely a heavy burden. What has happened, of course, is that the previously assumed filling out of the existing program's TBA component has reduced the current number of male sorties from 37 to 24, leaving idle male capacity that can easily handle an additional 40 H-S teams.

On the other hand, for the TBA component we have eight active staff members, net of those on official or de facto maternity leave, who would have to make an average of nearly six (46/8 = 5.75) sorties per month, considered by PSR/Koro to be an unreasonable burden. To reduce the average to four we would have to hire three or four additional female staff, plus a reserve. To share in management responsibility for 40 additional villages one of these would have to be at the obstetrical nurse level; we assume three more matrone rurale types.

Turning to overhead costs, the authors believe that a major expansion of PSR/Koro could not be carried out in the absence of a managerial assistant to the district physician (a theoretical alternative would be another physician as deputy head of the district, but it would presumably be even more difficult to single out Koro in this way than to supply the Koro chief with a nonphysician manager). We put the salary notionallly equivalent to the state nurse level.

The incremental personnel cost of adding 40 villages in Koporo-kenié-Na and Dioungani can be summarized as follows:

TBA component	Cash salary (FM p.a)
Obstetrical nurse	693,000
3 matrones rurales @ FM 250,000	750,000
Magagerial assistant to district physician	666,000
	2,109,000 say 2.1m

To the foregoing sum must be added 38% for fringes and supplemental personnel costs, giving a total incremental cost of FM 2.9 million, or FM 97 per head (=U.S. 19¢) over the previously estimated target population of 30,000.

To round out the discussion of recurrent costs of an expanded program we consider briefly the implications of supervising VHW teams in the two remaining, furthest removed divisions of Diankabou and Diangourou. The two divisional capitals lie about 85 and 120 km., respectively, from Koro. These distances rule out the current supervision pattern of daily sorties by mobylette from Koro. In order to have any time to spend in villages, staff would have to make tours of several days, staying overnight en route. Few staff members are reportedly willing to do this at the current per diem rate of FM 1,000. Assume it would take FM 3,000 per day. Covering, say, 30 villages in the two divisions at a rate of two villages per day would then cost 15 X two staff members X FM 3,000 = FM 90,000 per month, plus perhaps six person-days of travel and accomodation at the divisional capital before touring villages, for a total of about FM 110,000 per month or FM 1.3 million per year in per diems alone. This is roughly one million more than the per diem cost of supervising the same number of VHW teams in divisions close to Koro, representing a significant incremental recurrent cost eve supposing that the multi-day trips, by eliminating the daily return to Koro, add nothing to total transport cost.

Such an expansion would also generate additional personnel needs, say three new matrone rurale types plus a couple of Koro-based males, at a total annual cost of around FM 2 million including fringes.

Summary cost analysis of existing supervision approach

Table 7 brings together the analysis of incremental recurrent costs of (A) PSR/Koro as it was operating in April 1981, together with three successive putative expansion phases which comprise (B) filling out the existing program (mainly with retrained TBAs) so that full teams function in all 43 currently participating villages, (C) establishing full teams in 40 villages of adjacent Koporo-kenié-Na and Dioungani divisions and (D) doing the same in 30 villages of more remote Diankabou and Diangourou divisions. Section E of the table represents the total incremental recurrent cost of PSR/Koro after all three expansion phases, at which time 60 per cent of the district population is presumed to reside either in towns with health centers/dispensaries or in VHW villages.[53] With respect to costs of supervision in the second and third expansion phases we depart from a base figure of FM 95 per capita, calculated on p. 65 for the existing supervision program.

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[53] Calculated by dividing district population of 185,000 into sum of 92,000 in VHW villages according to Table 7, plus 15,000 in towns with health centers etc. as per Table 6, plus a notional 6,000 in such towns in the remaing three divisions; 113/185 = 0.61.

In the third expansion phase (D) nonpersonnel costs of supervision are adjusted upward by the increased per diem cost; otherwise all incremental recurrent costs in the table relate to necessary increases in the personnel establishment.

Table 7 shows the average incremental recurrent cost per capita rising from FM 95 (=U.S. 19¢) for the present program to FM 154 (= U.S. 31¢) once the TBA component fills out and FM 183 (=U.S. 37¢) once 60 per cent population coverage across all seven divisions is achieved. The marginal cost per capita , which is the incremental cost for a given expansion divided by the population of villages newly covered in that phase only, starts as low as FM 85 (=U.S. 17¢) in the case of phase 1, comprising only the personnel cost of additional female supervisory staff and excluding transport costs, since the amount of travel remains constant as female supervisors substitute for males. The marginal cost rises to FM 193 (=U.S. 39¢) per capita for Phase II, and FM 216 (=U.S. 43¢) per capita for Phase III, encompassing the remoter divisions.

It is interesting to compare these unit cost estimates and projections with those of the USAID Project Paper, given on pp. 41-42 above. Table 8 facilitates absolute and percentage comparisons between the four categories of incremental recurrent costs for PSR/Koro at "maturity" -- H-S/TBA teams functioning in all seven divisions, located in 113 villages with a total population of 92,000 -- and similar categories in Table 2. It excludes the final two categories of Table 2, drugs and existing health services, which are not taken into account in the incremental cost estimates of Table 7.

Table 7

Summary of Estimated/Projected Incremental Recurrent Costs of PSR/Koro

Cost items	(1) (2) Number of villages in which VHWs located... and their population	(3) Annual incremental recurrent costs: Total (FM million)	(4) Annual incremental recurrent costs: per Capita (3)/(2) (FM)
A. PSR/Koro, coverage as of April 1981 (H-Ss functioning in 42 villages, retrained TBAs in 15 of same villages plus one other)			
Transportation (p.59)		3.0	81
H-S replacement training (p.61)	43..37,000	0.2	5
Incidentals (10% of above)		0.3	8
Subtotal, April 1981 coverage		3.5 m.	95 (=19¢)
B. PSR/Koro expansion Phase I--April 1981 coverage with TBA component filled out (both H-Ss and retrained TBAs functioning in all 43 villages)			
Personnel cost, additional female staff (P.68)	27..26,000	2.2	85
Subtotal, April 1981 coverage plus expansion Phase I	43..37,000	5.7 m.	154 (=31¢)
C. PSR/Koro expansion Phase II--VHW teams functioning throughout Koporo-kenié-Na and Dioungani divisions			
Transportation, H-S replacement training and incidentals, calculated on basis of existing program's per capita cost(FM 95)	40..30,000	2.8	95
Personnel cost, additional female staff plus managerial assistant		2.9	97
Subtotal, expansion Phase II		5.8 m.	193 (=39¢)
D. PSR/Koro expansion Phase III+VHW teams functioning in Diankabou and Diangourou divisions			
Transportation, etc., @FM 95/capita		2.4	
Additional per diem cost of supervision (P.75)	30..25,000	1.0	
Personnel cost, addit. male & female staff (p.76)		2.0	
Subtotal, expansion Phase III		5.4	216 (=43¢)

Table 7 (cont'd)

Summary of Estimated/Projected Incremental Recurrent Costs of PSR/Koro

Cost items	Number of villages in which VHWs located... and their population	Annual incremental recurrent costs	
		Total (FM million)	per Capita (3)/(2) (FM)
E. PSR/Koro at maturity--VHWs functioning in all divisions	113..92,000		
Transportation			
April 1981 coverage		3.0	
Expansion Phase II and part of III, assumed at FM 81 x 55,000		4.5	
Additional per diem cost of expansion Phase III		1.0	
Subtotal, transportation		8.5	92
H-S replacement training--April 1981 coverage 0.2 m.+ FM 5 x 55,000 population for expansion Phases II & III		0.5	5
Incidentals--April 1981 coverage 0.3m + FM 8 x 55,000 for expansion Phases II & III		0.7	8
Personnel (additional staff only)--expansion Phase I (2.2 m.), II (2.9 m.) & III (2.0 m.)		7.1	77
TOTAL		16.8	183 (=37¢)

Table 8

Comparison between Per Capita Cost Estimates of PSR/Koro at Maturity (Table 7) and Demonstration Arrondissement According to 1976 USAID Project Paper (Table 2)

Cost category	Malian francs per capita		Percentages	
	Project Paper*	Table 7	Project Paper	Table 7
Transportation	14	92	11%	50%
Personnel	20	77	16%	42%
Equipment and Supplies**	90	8	73%	4%
VHW replacement training	--	5	--	3%
Total	124	183	100%	100%

* Subtotals from Table 2, p. 41, divided by assumed 20,000 population of demonstration arrondissement.

** As estimated in the present paper this item is a rather notional ten per cent of the basic transport cost of FM 81 per capita, and covers miscellaneous expenses including but not limited to office supplies.

Table 8 brings into sharp relief the contrast between the heavy emphasis which the Project Paper gave to equipment and supplies, comprising (1) annual depreciation of one scale per village, (2) "weight charts and other record-keeping materials", and (3) "promotion materials and supplies", both of the latter being costed at FM 40 per capita per annum, versus the token allocation for such items in our own estimates. The latter reflect the fact that as of April 1981 no scales had yet been delivered to any village though preparations were being made to demonstrate the use of this item to TBAs;[54]

[54] The foreign author hand-carried a baby-scale to Mali in March 1981 for such use.

moreover no educational materials were in use in the villages, and the only record-keeping materials comprised notebooks, small charts and ball-point pens with which VHWs recorded their consultations, in many cases (the VHWs being illiterate) by means of symbols. Should the PSR start making significant use of weight charts and educational materials at village level the authors would be happy to see their cost estimates adjusted accordingly.

In the meantime, however, as a recurrent activity--i.e. distinct from its initial sensitization and training functions--PSR/Koro is turning out to revolve around monthly tours of participating villages by AM (district health service) personnel. Hence the heavy weight of transport costs, already highlighted on pp. 55-56, as well as incremental personnel costs, which will become important if and when the expansion phases envisaged in Table 7 are launched.

A final word regarding the comparison in Table 8: setting price inflation since 1976 roughly equal to 60 per cent, as per page 45 above, the FM 124 total cost figure computed from the Project Paper becomes FM 198 in 1981 prices, not significantly different from the Table 7 estimate of FM 183 averaged across 113 villages in Koro's seven divisions.

Possibilities of cost reduction

From an American perspective an annual per capita recurrent cost level of U.S. 37¢ (= FM 183) for primary health care seems so low that one is more inclined to

look into ways of increasing the quality of service, even if it costs slightly more, than to try to cut the PSR's costs still further. In this vein one is tempted to consider ways and means of enhancing the PSR's intervention in preventive health care through VHW initiatives to promote family hygiene and environmental sanitation, one of the services listed on page 5 above.[55]

However as shown in Section IV, the incremental expenditure outlined in Table 8 is equivalent to 90 per cent of the Koro AM's total 1981 budget, and there is no way that the Malian government can allocate the corresponding additional local resources in the foreseeable future. Hence a need to explore every possiblility for reducing costs.

Three conceivable avenues of cost reduction can be identified; these are:

1) Reducing the intensity of VHW supervision by staff of the district health service (AM);
2) Increasing the average number of supervision trips per month per staff member; and
3) Reducing the number of mobylettes utilized in the project and/or the monthly cost per mobylette.

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[55] The many 1980 mid-term evaluation reports and much other PSR literature are unanimous in pointing out that the VHWs have thus far played a minimal role in this regard. The authors were told by AM/Koro staff of four or five H-Ss, mainly individuals serving simultaneously as functional literacy agents, who had taken initiatives such as digging latrines and were seeking to instill a general public health consciousness in their neighbors.

Each of these possibilities will be considered in turn.

Reducing the intensity of VHW supervision. With supervision of VHWs accounting for the overwhelming share of PSR/Koro's recurrent costs, it is clear that any reduction in the level of this activity will have a direct impact on costs. For example, a program of bimonthly rather than monthly supervision would involve only half the amount of per diem payments and use of fuel. In the case of a monthly supervision program drawing on not less than four staff members using PSR mobylette, a shift to bimonthly visits would make it possible to involve only half as many staff members in the program and provide only that number with project vehicles. (This would not be possible in the case of the present TBA component, where three female staff members handle the supervision chores in 16 villages.)

Bimonthly as opposed to monthly supervision would likewise reduce the incremental personnel cost of the three putative expansion phases summarized in Table 7. The fully expanded program covering 113 villages would involve, say, 60 person-sorties per month, instead of 120, counting each stop on a multi-village tour in Diankabou and Diangourou divisions as a sortie. Assigning half the sorties to males leaves them with still less of a workload than PSR/Koro's April 1981 program of 37 male sorties. On the other hand the women would now have about three times their April program of 11 sorties. The existing matrones rurales in the four new divisions to be covered (there may in fact be only three in post at the moment) would share in the burden; considering the need for over-establishment to ensure availability of female staff for mobylette travel.

and the desirability of mangement assistance for the present obstetrical nurse, the expansion could be accomplished by adding one obstetrical nurse and two matrone rurales at a total annual cost of FM 1.6 million.

Irrespective of the intensity of supervision the expansion envisaged above would require managerial assistance for the district physician; as costed on page 74 above this raises the total incremental personnel cost of the expansion program with bimonthly supervision to FM 2.5 million, as against the FM 7.1 million for monthly supervisiion foreseen in Table 7.

Notwithstanding the cost savings that would accompany a reduction in the intensity of supervision, this course of action can only be recommended if one is satisfied that the corresponding reduction in benefits will not outweigh the savings. At the present time a number of PSR staff members are concerned that reducing the frequency of supervision would bring with it disadvantages that could undermine the effective functioning of the VHWs. One worry is that halving the frequency of contact with the district health service would substantially lessen the VHWs' enthusiasm for their work, which arises out of a feeling of participation in a joint endeavor involving all levels of government as well as many neighboring villages.

Secondly, there is concern that more H-Ss will exhaust their supplies of certain drugs in between supervision calls, thus find themselves in the discouraging position of not being able to respond to their patients' needs, or else having to go to the trouble of journeying to Korotown in order to restock. (TBAs will also run out of items in their maternity kits, although lack of a particular item will scarcely prevent them from performing their traditional office.)

A third problem is that reduction of staff-VHW contact will lessen the opportunities for staff members to test the VHWs' retention of material from their training courses, remind them of pointers they have forgotten and advise or exhort them in regard to meeting problems of community health. Staff members felt this was particularly important with the older TBAs, who have more difficulty retaining what they have been taught. During the authors' tour of Koromatintin and Sansagou-Pin the AM obstetrical nurse queried both sets of retrained TBAs as to the cause of malaria; one TBA attributed it to contaminated food, the other three said they had forgotten. All claimed to remember the explanation given in their August course when the nurse reminded them of it. Administering a special examination to 20 H-Ss in Yélimané, Daulaire and Taylor found a strong positive correlation between the H-Ss' knowledge on health issues and the frequency of their supervision.[56]

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[56] Daulaire -Taylor, p

Finally, reducing the frequency of supervision will lessen the reliability of the VHWs' records and their recall of events they have neglected to record--a particular problem, obviously, in the case of illiterate VHWs. PSR staff have found it necessary to space their visits as closely as posible to 30-31 day intervals in order to be able to allocate events correctly to a given monthly period. The virtual collapse of supervision in Yèlimanè has led to complete neglect of H-S consultation records, although Daulaire and Taylor found that the recording of drug receipts and sales had proceeded regularly in seven village pharmacies, in most cases within a ten per cent margin of error.

Accuracy of production data is probably of least importance once a project has been established and must survive on local financing; on the other hand it is of great importance in an experimental phase such as that in which the PSR now finds itself and can justifiably be regarded as an investment deserving of foreign aid financing.

Thus in considering possible cost reduction through lessened intensity of supervision it is the first three disadvantages that must be evaluated. Questions such as the following must be asked: how much initiative do the supervising AM staff members presently take, and how much can be expected of them in future, as the project settles down to routine operation, by way of establishing meaningful communication with VHWs

such that their visits convey knowledge and enthusiasm, rather than serving functions merely of material resupply, cash collection and/or data recording? How serious are the VHWs' lapses of knowledge during lengthy intervals between supervision visits, and how far is their effectiveness on the ground correlated with supervision frequency? Can acceptable means other than staff visits be found to ensure resupply of drugs and maternity equipment?

Given its links to the problem of ensuring local finance for PSR's future recurrent operation the issue of drug resupply is considered at length in Section IV below. Meanwhile, PSR/Koro itself is taking the initiative to test the disadvantages of less frequent supervision. The authors were informed of the AM's intention within the next few weeks, once the nivaquinizatio campaign has been launched, to initiate bimonthly supervisio of H-Ss who have been functioning at least 15 months, and within the next year to attempt a systematic comparison of the effectiveness of H-Ss under the two supervision regimes (monthly and bimonthly).

An indication that VHWs continue some minimum level of activity and that village pharmancies remain in operation virtually without supervision is provided by the Yélimané experience as reported first by Daulaire and Taylor in February 1980, and then by Baudouy a year later. The authors believe it would be worthwhile, in connection with the upcoming PSR evaluation, to undertake a systematic comparison of the knowledge of and production of services by the Koro and Yélimané H-Ss.

necessarily including some verification of client satisfaction.

Increasing the average number of supervision trips per staff member per month. It was mentioned on page 58 that PSR/Koro's April 1981 supervision program allocated 48 person-sorties among a dozen Malian staff members and three Peace Corps Volunteers. The PCVs were listed for two, three and four sorties, respectively[57]; the Malian staff were distributed as follows by number of sorties:

No. of sorties in April 1981:	2	3	4	5	(sorties)
No. of PSR/Koro Malian staff:	5	1	4	2	(persons)

A physical/legal ceiling (ruling out Fridays as half-workdays and Sundays) on staff supervision travel would be 22 person-sorties in the average month; at this rate three staff members, including one female to handle eight sorties to TBA village-pairs, would be more than enough to do the job, assuming for the time being that a pattern of monthly supervision of each village is retained. In principle three mobylettes would likewise suffice, instead of the 15 or so different machines that were used in April, including three Peace Corps vehicles and four more outside the PSR hire-purchase scheme. Our estimate on page 59 of the transport cost of PSR/Koro's current superivsion program assumed eight mobylettes qualifying for monthly lump-sum payments of FM 15,000. With only three machines, monthly payments drop frop FM 120,000 to FM 45,000, reducing the FM 3.0 million annual cost by 30 per cent to FM 2.1 million per year. (The fuel and per diem components of total monthly cost remain the same, of course.)

This extreme case is not worth pursuing, however, since not only would reserve mobylettes be required and repair costs rise well above the lump sum payments as three machines were asked to perform the service of the present 15, but it would be unreasonable to keep any staff members permanently on the road. For one thing

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57 Somewhat less than their normal workload since they were in Bamako on Peace Corps business during the first half of April.

there would be no time for them to render trip reports, restock and settle accounts, not to mention performing AM duties outside the PSR.

A bit less unrealistic would be a pattern of Tuesday-Thursday-Saturday travel, the officer spending Mondays, Wednesdays and Friday mornings on headquarters business. This would involve 12-13 supervision trips per month, more than double what any staff member now puts in (though a number currently make additional sorties on other PSR or non-PSR assignments). On this basis four staff members could handle the present workload, still requiring only one female to make eight sorties to TBA villages.

Jumping to the full-expansion scenario, the 113 villages requiring 120 person-sorties, half male and half female, could be handled by five males and five females. Taking into account the divisional officers already in post, including matrones rurales, little staff expansion would be required -- on the male side only the district physician's managerial assistantwould still be needed, on the female side an obstetrical nurse plus one or two matrones rurales would be sufficient. The incremental personnel cost would thus amount to 2.6 million in lieu of the FM 7.1 million envisaged in Table 7. Transport cost could be reduced by say, 15-20 per cent, from the FM 7.7 million in Table 7 to around FM 6.5 million. The total incremental recurrent cost thus amounts to FM 11.1 million, a saving of FM 5.7 million compared with the FM 16.8 total cost figure in Table 7.

However, before waxing enthusiastic about this promising vehicle for reducing PSR osts we must take into account the caution expressed by the district physician and others concerning the feasibility of assigning staff members to heavy (three-or even semi-weekly) travel schedules "en brousse" (in the bush) at the present per diem level of FM 1,000. This is a fact of life in Mali--a function of the average civil servant's willingness to exert himself given the rewards and sanctions associated with public service, and given the paralysis that he observes around him due in part to compression of budget appropriations for nonpersonnel expenditure.

Thus part of the FM 5.7 million saving computed above would be sacrificed in higher per diem charges (leaving aside the question of whether the Malian administration could sanction payments for middle-level staff in excess of FM 1,000). Increasing it by, say, FM 2,000 per day across the board would cost 120 person-sorties X 12 months (still assuming monthly supervision) X FM 2,000 = FM 2.9 million, or roughly half the gross saving.

Reducing vehicle (mobylette) costs. The PSR has at various times experimented with or given serious consideration to three alternative regimes for handling the project's extensive mobylette fleet. The first regime was that of a vehicle pool out of which machines were assigned on a day-to-day basis as available. Management early on became concerned over the rapid deterioration of the fleet, attributed in large part to the staff's lack of proprietary interest in, and hence neglect of, the vehicles they were using.

This led in early 1979 to introduction of a new regime, whereby staff members assigned regularly to PSR duties were allocated particular machines for personal as well as official use and allowed to acquire title to them via 24 monthly payments of FM 5,000, equivalent at that time to one twenty-fourth of the c.i.f. import price of FM 120,000. In Koro, staff received a weekly gas-oil allotment of three litres for personal use of their mobylettes; all maintenance and repair costs were assumed by the project, regardless of the extent of private use or cause of damage. The plan was that staff members would be free to sell their used machines after two years and, if they were scheduled to remain for an appreciable length of time with the project, acquire new machines under a similar arrangement.

Staff members thus received the benefit of interest- and duty-free acquisition of a mobylette. Under a level payment system interest at 15% would have cost them FM 820 per month; the import duty being 100% of the c.i.f. price, the benefit on

that account was equivalent to FM 120,000. Since the machines were financed by foreign aid tied to the PSR, neither the foregone interest nor the duty should be regarded as opportunity costs of the project. On the other hand the weekly gas-oil allocation was very much an opportunity cost of the project. Valued by Sissoko-Kelly at Fm 400/liter and thus FM 62,400 per staff member per year on the basis of the Mopti price (see Table 3, p. 46 above), but already more properly valued at the Koro price of FM 500/liter, this was raised to FM 450 (FM 550 Koro price) during 1980, and would have cost FM 550 (Mopti) or 650 (Koro) after the April 1981 fuel price increases. At the April Koro price three liters of gas-oil is worth FM 1,950, and a year's allotment per machine would have cost the project FM 101,400 had not the mobylette regime been changed in January 1981.

This change arose out of management's concern over sky-rocketing maintenance and repair costs, felt to be a function not only of the project's open-ended commitment to pay these costs but also of the inherent difficulty facing the district physician to control for actual need and value for money. According to calculations of Dr. Letarte, PSR/Koro paid a monthly average of FM 6,066 per machine over its first 22 months, or about FM 73,000 per annum. At 1981 spare parts' prices -- the c.i.f. price of the machine itself has now risen by 38% to FM 165,000 -- the current annual rate could easily be FM 100,000 which together with the weekly allotment would be burdening PSR/Koro with FM 200,000 per annum in direct costs per machine, or FM 1.6 million over eight machines.

In the face of such costs the project management decided tentatively to suppress the weekly personal allotment, make each staff member responsible for repairs to his own machine and limit the project's liability to a monthly FM 15,000 lump sum payment, out of which staff members who had not yet paid off their machines (by April three individuals in Koro had done so) would continue making monthly payments -- FM 5,000 for those assigned machines at a price of FM 120,000, FM 6,875 for those servicing

machine bought at FM 165,000. The PSR's annual direct cost per machine would thus be limited to FM 180,000 (12 X 15,000). As of April the new regime had not yet been finally approved, and the monthly lump-sum payments had not started.

Given the financial constraints discussed in the following section the question arises as to whether the cost of servicing the project's mobylette fleet could not be reduced. In the authors' view consideration should be given to reinstituting the system of a project-controlled vehicle fleet, employing a full-time contract repairman. Under PSR/Koro's present program no more than four machines are in use for supervision purposes on a given day. Allowing for a couple of machine in reserve, project maintenance of six machines ought to cost less than 8 X FM 180,000 = FM 1,440,000 per year.

IV. FINANCING THE P.S.R.

Introduction

The present section will examine evidence relating to PSR's objective of establishing whether, in the words of the USAID Project Paper, Government of Mali "expansion and replication of such services (is) financially feasible".[58]

Our focus on recurrent costs in Section III reflected our belief that, if it appeared likely that sufficient Malian resources would be forthcoming to operate and maintain capacity to deliver primary health care such as that established thus far under the PSR, then USAID and/or other donors would be prepared to pay the costs of establishing additional such capacity, in Koro and Yélimané as well as other districts of Mali. Conversely, if it appeared that the capacity in question, once established could not be operated and maintained except through continued infusion of external aid, then the donors were likely to take the attitude that the social value created by PSR-type services in Mali was insufficient to offset the opportunity cost of providing it, even without taking non-recurrent--i.e. "establishment" or development"-- costs into account. Hence, the donors would conclude allocation of scarce aid resources to PSR-type activity was not justifiable.

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[58] USAID, op. cit., p. 13.

Moreover such a calculus would not be restricted to the donors; it would be logical for Malian policy-makers to draw a similar conclusion. Applying the lessons of the CILSS/Club du Sahel recurrent cost study, the authors were even obliged to consider the possibility that the Malian authorities had already, before PSR was launched, revealed an implicit if not explicit judgement that the social benefits of rural primary health care were insufficient to offset the opportunity cost of devoting Malian resources to either establishing PSR-type capacity or operating and maintaining it. Their reason for nonetheless agreeing to the project, according to this hypothesis, was that USAID's "specific project approach" reduced the PSR's social opportunity cost, as seen from Mali's viewpoint, to a small fraction of the nominal Malian franc value of USAID's contribution.

When a donor offers a country X amount of completely untied aid funds, the country will allocate the money as it would an equivalent increase in domestic revenue, undertaking additional expenditure in various sectors such that the perceived social benefit from spending Y francs on Project A is at least equal to that from diverting Y to Project B instead. The social opportunity cost of spending Y on Project A is, then, the benefit that is foregone in Project B because the money is spent on A rather than B. Conversely, when a donor expresses willingness to finance, say, an experimental approach to rural primary health care, and does not give the receiving country to understand that, if it turns down this offer, the money will be available for allocation according to the host government's own priorities--indeed, gives the opposite impression,

that the money will otherwise be available only for uses to which the recipient attaches low priority, including as the extreme case reallocation to another recipient by the donor's headquarters--then the benefits sacrificed by foregoing such alternative uses of the resources are very low. The strict project approach which USAID, along with most other donors, has indeed followed in Mali has led to precisely this situation, such that from Mali's viewpoint the opportunity cost of spending $3.7 million of aid resources on rural primary health services is far below that of spending the nearly two billion Malian franc equivalent of domestic resources on these services.[59]

It was made clear to the authors by senior Malian officials, seconded by knowledgeable foreign observers of the Malian scene, that the Malian government would not, in the foreseable future, have allocated sufficient domestic budget resources to establish the capacity for delivery of rural primary health services that now exists in the form of the PSR, even assuming that the Ministry of Public Health could have duplicated the present capacity at significantly lower cost than has actually been incurred as a result of USAID and HIID participation. To explain this fact it is not enough to say that Mali could not "afford" to establish PSR with domestic resources, even at lower cost.

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[59] Multiplying $3.7 million times exchange rate of FM 500 used in the present paper gives FM 1.85 billion.

The Government of Mali unquestionably has the sovereign power to cut back allocations to other projects and sectors, in the process dismissing a few hundred civil servants, and thereby acquire the resources necessary to sensitize villages, recruit and train village health workers and set in motion a supervision and drug distribution program. The fact that the government has not used its own resources to this end reflects a judgment that the resulting social benefits would not compensate for the opportunity cost in terms of benefits foregone in other uses of domestic revenues.

This may seem a suphemistic way of saying that the country's political stability would be endangered should it start dismissing civil servants, cancelling its employment commitments toward the products of higher training institutions and/or eliminating scholarships for subsistence costs of students in secondary schools and above. But there is not a government in the world that does not assign a higher social value to political stability, in other words, to its own preservation, than to many alternative development-oriented uses of the resources at stake, and political objectives must be taken into account in describing the implicit if not explicit benefit-cost calculus that governments conduct in formulating their budgets.

Apart from the government's unwillingness to allocate ordinary revenues to establishing PSR-type programs, the authors were also advised by senior Malian officials that it was out of the question in the foreseeable future to finance from the national or regional budgets the

incremental recurrent costs of such programs at anything approaching the level identified in Section III for even the least scale of activity in Koro district--that is, the current program of supervising H-Ss in 43 villages and TBAs in 16 villages of Koro district. The officials consulted were, however, open to considering any formula that might be found to raise other local resources to cover recurrent costs.

In the following subsections we will examine the reasons why government budget support for PSR's incremental recurrent costs appears to have been ruled out; we will consider two other possible sources of local financing for these costs, namely, (1) special contributions from the rural populations served by the project and (2) the current profit margin on sale of drugs through it; and finally we will examine the implications for PSR's *modus operandi* of our findings concerning potential sources of local finance for recurrent costs.

Financing the PSR out of Mali's national and regional budgets.

Our object in this subsection is to assess the opportunity cost which the Malian authorities would perceive in directing domestic revenues, freely allocable at the government's discretion to other public uses (this distinguishes the resources in question from most foreign aid flows), towards financing the PSR's incremental recurrent costs.

As pointed out above this opportunity cost comprises the benefits foregone in other uses because quantum X of domestic revenue is allocated to the PSR rather than to those other uses (one such use being, of course,

to allow economic units to consume or save the resources in question at their discretion rather than transfer them as taxes to the government.) The concept of equating "marginal social utility" in different uses of public funds represents another analytical device for viewing the same phenomenon. Governments seek to equate the social utility of the last unit of resources--say in the present case a million Malian francs--allocated to each use. For insofar as the government's planned expenditure pattern has not yet achieved such an equilibrium, a net social benefit can be generated by shifting a million francs of budget funds out of use A where it will yield <u>less</u> social utility (i.e. lower benefits) into use B where it will yield <u>more</u> utility or benefits. From the viewpoint of financing the PSR the question then becomes: can we foresee a time when the Malian authorities would perceive a greater social utility from letting the PSR have the FM 3.5 million needed to maintain monthly supervision of 113 VHWs in 43 villages of Koro district, than from allocating this amount to other uses?

To answer this question it is necessary to examine certain of Mali's public finance parameters. Senior Malian officials refer to their national budget as a "budget of salaries". Is this any more the case in Mali than in other poor countries? For evidence in this regard we turn to the IMF's <u>Government Finance Statistics Yearbook</u>,1979 edition,

which presents budget parameters for 109 countries on a comparable basis.[60] For 26 less-developed countries in Africa, and 29 in Asia and the Western Hemisphere, the IMF table gives wages and salaries as a percentage of total central government expenditure including net lending, for some year between 1973 and 1978 (in most case 1977). Among the 55 countries Mali's figure of 54.15 per cent is the highest; Upper Volta's 51.44 per cent is in second place. No other African country attains 40 per cent.

Civil servants need complementary inputs--goods and services purchased from outside the government--in order to function productively. The same IMF table enables us to compare "other purchases of goods and services"--other, that is, than wages and salaries--as a ratio to the latter. At 0.255 Mali's ratio is the second lowest in Africa, after Mauritius (0.226). Comparing Mauritius' small size and convenient access to fuel supplies with Mali's expanse and remoteness, it is immediately clear that a given intensity of contact between government officials and the population can be supported at much lower transport cost in Mauritius than in Mali.

It is perhaps most relevant to compare the ratio of other purchase of goods and services to wages and salaries for Sahelian countries having a common French colonial heritage with respect to government finance.

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[60] IMF, op. cit., pp. 17, 19.

Following are the ratios for the four Francophone Sahlian countries covered in the IMF table:

Mali	0.255
Niger	0.964
Senegal	0.682
Upper Volta	0.296

The impact of Niger's burgeoning uranium revenues is clear, as is also the higher stage of development reached by Senegal with its $340 per capita GNP in 1978 compared with Mali's $120 and Upper Volta's $160.[61]

The low ratio of other purchases of goods and services to personnel expenditure points to the existence of a substantial amount of idle human capacity throughout the public service--personnel who are under-utilized due to lack of complementary inputs, such that increments of production--delivery of additional services to the public--can be obtained relatively cheaply via purchase of inputs with no additional personnel expenditure. Indeed we have already seen how this situation pertains in the district health services as illustrated by Koro. Examples of immobilization of civil servants due to lack of purchased inputs abound in the Malian administration. Most agency motor pools have ceased to function.

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61 World Bank, World Development Report, 1980, p. 110.

Only in projects where transport expenses are financed by foreign aid does one find agricultural extension agents and health officers circulating among the population or teams from Opération Puits drilling wells. The efficacy of health care at divisional dispensaries, district health centers and regional hospitals is severely hampered by lack of basic drugs (the authors witnessed this situation personally at the Toroli dispensary and Koro health center). The phenomenon reaches an extreme in the Ministry of Planning where reproduction and release of statistical reports suffer long delays due to lack of funds for paper.

As can only be expected, the fiscal crunch which Mali has experienced since 1977 has aggravated this situation. Meeting the civil service and military payroll has the first claim on any government's resources; Mali has found it necessary to divert to this end funds budgeted for other uses. As of December 31, 1980, arrears in payment of suppliers' invoices exceeded FM 5 billion. For some time beginning in 1978 the Postal Checking System ceased functioning as the Treasury drew on the system's "float" to meet the payroll. In the past two years (1980 and 1981) the material expenditure budget of every civilian agency except the Ministry of Health has been fixed at its 1979 level. In the face of 10-15 per cent annual inflation--higher for gasoline, which has risen by 43 per cent in less than two years--this has meant a real decline in purchased goods and services.

During 1980 civil service pressure to recoup lost purchasing power from inflation led the government to raise salaries by ten per cent and advance every employee two steps in his or her grade, causing substantial over-expenditure in the personnel budget. This was financed largely in two ways, firstly, by cancelling the fourth quarter (1980) material expenditure allocation of every civilian agency except the Ministry of Health, and secondly, by mortgaging revenues allocated to the 1981 budget. Notwithstanding all this effort on behalf of the payroll, as of April 1981 salary payments were delayed by an average of 20 days (as of mid-April the Malian author had not yet received his February salary).

The conclusion to be drawn from these indicators of fiscal stringency is that, from the viewpoint of the national government, the social marginal utility of expending an additional FM 3.5 million at its discretion, equivalent to the social opportunity cost of expending this sum on material purchases for PSR, corresponds first and foremost to the feelings of bureaucratic relief generated by a shorter delay in paying government officials their monthly salaries, and secondly to the significant increment in activity that can be achieved in almost any sector of the administration by making available a modicum of additional purchased inputs. It is these very perceptible marginal benefits at the national level against which PSR must compete in requesting an enlarged share of the Malian government budget.

No wonder the authors were told by responsible officers in the Ministry of Finance that it would be an exercise in futility for PSR to ask that the national budget take over, in the foreseeable future, recurrent costs presently borne by USAID.

The social opportunity cost of increased local budget expenditure on the PSR becomes still clearer when one looks at the Mopti regional budget and the implications of fiscal stringency for administrative activity at the regional and district levels. In his introduction to the draft 1981 budget the governor warns that failure to increase the appropriation for entertainment of official delegations, of which he claims Mopti receives more than any other region, "will expose the region to grave financial difficulties, occasionally forcing it into unorthodox and not-to-be-recommended fiscal acrobatics."62 With this rationale the draft budget calls for a 1981 appropriation of FM 13.0 million (US$28,000) for "fetes et cérémonies publiques" compared with a 1980 allocation of FM 1.2 million; in the event, like all other non-personnel appropriations, this one too remained at its 1979 level.

The governor goes on to complain of the poor state of staff living quarters, stating that most department heads and other senior officials are "forced to live indecently", and refers to the near-collapse

62 Government of Mali, Sous/Ordonnancement Mopti, op. cit. Governor's Note de Présentation.

of some of the offices in Mopti (which the authors again observed first hand). The draft budget asks FM 34.7 million for maintenance and repair of buildings and quarters; once again the 1979 ceiling of FM 3.8 million (less than US$8,000) was imposed.

Turning to economic services, the governor notes the almost daily inflation afflicting costs of maintaining roads and wells, whose current appropriations he describes as "insignificant" in relation to real costs. The draft budget asks for FM 19.7 million in material expenditure for road maintenance and FM 11.6 million for wells, compared with FM 11.8 million in personnel expenditure for the two services together, thus seeking a ratio of 2.65 for material: personnel expenditure. In the event the 1980 allocations of FM 4.1 and 1.7 million ($8,200 and 3,400) respectively were retained, holding these two materials-intensive services to a material: personnel expenditure ratio of 0.49.[63] Thus, for paractical purposes road and well maintenance is limited to aid projects funded outside the budget.

In the primary education sector, the draft budget sought FM 31.5 million for purchase of school supplies, but the region was again held to the 1980 allocation of FM 8 million, an average of under FM 16,000 (=US$31)for its 511 teachers.

63 Figures for 1980 allocations refer to actual transfer of funds from Bamako which, according to the governor's note, has always been less than approved budget allocations, another source of complaint. Data taken from individual Mandats de Délégation, 3rd quarter of 1980, at the Sous/Ordonnancement, Mopti, and multiplied by 4.

A larger sum is available for material expenditure in this sector via the head tax levy channeled through the Association des Parents d'Elèves, but data concerning its breakdown between educational materials proper as opposed to furniture (desks and benches), maintenance and repair and new construction is not available. In Toroli division three classrooms have been bult by local populations but have stood empty for three or more years due to lack of teachers; the divisional chief said there were no concrete plans to staff these schools in the foreseeable future.

Altogether Mopti region proposed FM 123 million in budget-financed material expenditure for 1981, for a material:personnel expenditure ratio of 123/928 = 0.133; in the event it, like Mali's other six regions, was held to its 1980 material expenditure allocation, in this case FM 65.5 million. With FM 912.1 million in personnel expenditure approved by the central government (equivalent to 98% of what the region asked for under this head), the region is held to a budgeted material:personnel expenditure ratio of 65/912 = 0.071. It should be reiterated that actual material expenditure includes a substantially larger amount financed outside the budget by foreign aid; however what is relevant to this subsection is the availability of funds through the national and regional budgets.

Finally we turn to the health sector. Here the region has budgeted FM 201.2 million in personnel costs for 339 staff members, as against FM 15.2 million for materials including drugs, giving a material:personnel expenditure ratio of 0.076.

For Koro district itself the 1981 Assistance Medicale budget looks as follows:

	FM thousand
Salaries	12,861
Supplemental personnel costs	4,943
Material expenditure excluding drugs*	448
Drugs (estimated**)	380
Total, AM budget	18,630

Including drugs, Koro's ratio of material to personnel expenditure amounts to 828/17,804 = 047.

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* Equal to 4 times the amount actually remitted quarterly to the district physician, or FM 112,000, which is in turn only 77 per cent of the budgeted amount of FM 583,000.

** The allocation for drug purchase is not broken down by district in the regional budget. This figure assumes that the Koro AM receives the same share of the 1981 regional budget for drug purchase (FM 3.8 million) that it receives in the district allocation of the budget for other material expenditure (i.e. ten per cent).

According to the district physician, the 1st quarter 1981 expenditure pattern of the non-drug material allocation, which follows, is typical:

AM operation	FM
Transport	
100 liters gasoline X FM 450 (Koro retail price before FM 100 price increase of April 1981)	45,000
Oil	13,400
Land Rover repair	3,100
Office supplies	
Note books	18,000
50 blue bic pens	2,500
Sanitation Service	
57 liters kerosene (for refrigerator)	19,950
Matches	50
Maternal & Child Health Service	
Ten bags charcoal	10,000
Well bucket (rubber)	1,000
Total	113,000

It is normal procedure for a district physician to visit regional headquarters once a quarter; the round trip Koro-Mopti by Land Rover consumes 80 liters of gas, leaving 20 liters per quarter, worth approximately 100 kilometers, for travel by Land Rover within the district. (At the new price of FM 550, 80 liters costs FM 44,000, or 39 per cent of the total non-drug materials budget.)

Missing from the budget is any allocation for transport other than by the AM's Land Rover (a pre-PSR acquisition financed by migrants from Koro living in the Ivory Coast), or for travel per diems.

The opinion of government officials consulted by the authors in- and outside the Ministry of Public Health was unanimous to the effect that, should USAID finance no longer be available for PSR recurrent costs, government-wide regulations, dictated by the fiscal stringency enumerated above, would forestall use of AM budget funds either for monthly mobylette payments or for staff per diems.

The question arises whether the Koro AM's materials budget is lower than it would otherwise be in recognition of the extra-budgetary funding through PSR. Table 9 shows Koro to be tied for third place among the Mopti region's eight districts with respect to materials budget per staff position. The higher figures for Tènenkou and Youvarou go only part way toward offsetting

Table 9

1981 Materials Budget Allocation per Staff Position, Eight District Health Services in Mopti Region

District health service	(1) Materials allocation (excluding drugs), 1981 Mopti regional budget* (FM '000)	(2) Number of staff positions, 1981 Mopti regional budget	(3) Allocation per staff position, (1)/(2) (FM '000)
Bandiagara	542	37	15
Bankass	511	32	16
Djenné	543	37	15
Douentza	511	38	13
Koro	511	32	16
Mopti	1,098	93	12
Tènenkou	511	29	18
Youvarou	619	21	29

Figures apply only to Assistance Médicale and exclude minor allocations (to some districts only) for Sanitation and Maternal & Child Health Services.

the extraordinary transport costs arising from the regular inundation of those districts. Half the districts enjoy the same absolute allocation as Koro, two others receive only six per cent more (FM 543,000).

What, then is the justification on equity grounds for increasing the materials budget of the Koro AM alone by 700 per cent--FM 3.5 million on top of FM 511,000, or 880 per cent on top of the FM 448,000 that is actually being transferred at present--so that PSR can continue monthly supervision of 113 VHWs in 43 villages once USAID funds are exhausted (or become restricted to financing nonrecurrent costs of program expansion)? What is the likelihood that the government will be willing in the foreseeable future to allocate to Koro an additional FM 16.8 million to fund recurrent costs of a PSR that extends primary health care to 60 per cent of the population (cf. Table 8, p. 76b)? How could the government justify this to Mali's other 45 district health services, all pointing to the additional activity they could undertake if given a supplemental materials budget of FM 373,000 (= FM 16.8 million/45 districts, equivalent to 70 per cent of the average current materials budget of the seven outlying districts of Mopti region)?

It is this type of consideration that senior finance officials have in mind when they say that the government budget cannot pick up the PSR recurrent costs now financed by USAID. It is the responsibility of these men to advise the Council of Ministers on how to equate the social marginal utility of budget expenditure

in different sectoral and functional uses, and thus to know roughly how pressing are the needs left unsatisfied at the margin of each agency's expenditure. They know what 45 district health services could do with an extra FM 373,000 in materials expenditure, just as they know what 450 different national, regional and district agencies could do with a mere FM 37,300 worth of additional purchased inputs. But they have to hold the line, keeping Mopti region to a materials:personnel ratio of 0.76, the Koro AM to 0.047, and the government as a whole to a figure that by now may well be under 0.20 compared with the 0.255 derived from the IMF's calculatons for 1977 (taking into account stagnation of nominal materials expenditure since 1979 as against an observed 15 per cent annual increase in personnel expenditure). For to do otherwise would be to lengthen the delay in meeting the government payroll, with the political risks that entails.

It is useful to reexamine in this light the per capita cost figures derived in Section III above. In Table 7 (p. 76b) we demonstrated how 60 per cent "coverage" of Koro district in the sense of access to primary health care within one's town or village might be achieved at an incremental recurrent cost of FM 183 or US 37¢ per head. This compared with an estimated incremental materials cost of FM 95 (= US 19¢) for maintaining the current program. Viewed outside the context of the district budget these costs seem ridiculously low. But let us relate them to the Koro AM's total

1981 budget (excluding PSR costs funded by USAID) on page 103. At FM 18.6 million this works out to almost exactly FM 100 or US 20¢ per head of Koro's population. Thus, the least ambitious alternative outlined in Section III--maintenance of the existing VHW network--is seen to nearly double per capita budget expenditure with respect to the population of the 43 villages involved. Extension of coverage to 60 per cent of the population, involving 92,000 persons through the PSR (apart from another 20,000 or so covered outside it), involves nearly tripling the per capita budget expenditure on that population (adding FM 183 to the present FM 100 level).

An even more dramatic contrast emerges when one considers that the Koro AM's non-drug materials budget works out to about FM 2.4 per capita over the district population (FM 448,000/185,000 persons). Expenditure of FM 95 per capita would increase this by forty times for the affected population.

We conclude that such leaps in budget allocations for the rural population are not realistic in the light of Mali's fiscal situation.

Financing the PSR out of special contributions from its beneficiaries.

Having ruled out significant local budget support for the PSR's incremental recurrent costs we now turn to investigate possibilities for generating supplemental revenues from the rural populations who benefit from it.

The next subsection deals with the possibility of financing PSR out of the margin on drug sales; in the present subsection we focus on possibilities for attracting direct contributions from the benefitting population apart from that margin.

The point of departure in analyzing any population's ability to pay for health services is an attempt to measure its cash income. The authors were able to locate only one systematic report on cash incomes in Koro, that prepared by Peace Corps Volunteer B. Lambl in June 1978, summarized in Table 10. Lambl's figures relate to crop proceeds only, and represent averages of estimates given her by extension

Table 10

B. Lambl's Estimates of Crop Production and Sales of Average Dogon Family (12-15 members of whom 6-7 cultivate)

Crop	Production (kilograms)	Subsistence consumption (kg.)	Sales Volume (kg.)	Sales Price FM/100kg.	Sales Proceeds FM
Millet	2,500±	1000-2000	650* 750**	7,000* 3,600**	45,500* 27,000**
Fonyo	600,700	400	300	10,000	30,000
Peanuts	500,600	150	450	10,000	45,000
Beans	200-300	100	100-200	?	?
Pigeon Peas	200-300	100	100-200	?	?
Sorrel	175	50	125	?	?
				Total	147,500

* Sales on free market
** Obligatory marketing through OPAM.

agents of Opération Mil (Millet) and chiefs in three Toroli villages. No estimates are available for average income from sales of livestock, which tend to be sporadic according to occasional or unforeseen requirements.

Lambl's figure for millet production corresponds roughly to what the authors were told in a meeting with the village chief and elders in Koromatintin, who said a normal family would fill one of its three grain-bins, holding 20 bags (2,000 kg.), in a normal season. On the other hand data forthcoming in both Koromatintin and Sansagou-Pin indicated a 1980/81 OPAM assessment in each village amounting to only about ½ bag per taxpayer, the number of taxpayers equalling roughly the number of cultivators. Thus for the current year a family with 6-7 cultivators would have been assessed only 300-350 kg. as against the 750 kg. cited by Lambl. Selling the difference on the free market would realize an additional FM 13-15,000, or ten per cent on top of Lambl's estimate of cash income from crops.

It should be noted that the millet prices, both free market and OPAM, reported by Lambl in 1978 were virtually identical with those cited by villagers and officials on the authors' field trip nearly three years later; retail prices in the towns have of course increased, but with marketing (especially transport) costs rising much faster the producer's receipts have shown little change, signifying a worsening of the peasant's terms of trade.

Lambl's survey yielded the following breakdown of annual cash expenditure per Dogon family:[64]

	FM '000
Taxes and education levies	30
Parties, weddings, baptisms	20
Food during pre-harvest season	60
Condiments	20
Clothing	10
Illness	10
Total	140

Given cash income from crops exceeding FM 147,500, occasional sales of livestock and the fact that taxes and other levies ("cotisations", or earmarked taxes) appear to be FM 5-10,000 less than indicated by Lambl (see below), other expenditure items must normally be somewhat larger than her estimates.

The authors were able to note detailed tax bills for the two villages visited in April 1981; these are given in Table 11. Assuming 6-7 taxpayers per extended family, the annual tax burden per family would amount to FM 20-26,000, or on the order of 15 per cent of gross cash income.

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[64] Lambl, English translation, page 9. "Condiments" presumably refers to sugar, salt, kola nuts and other supplements to a basic carbohydrate diet in addition

Table 11

1981 Tax Bills of Koromatintin and Sansagou-Pin Villages, Toroli Division

Tax/Levy	Rate (FM/Unit)	Koromatintin No. Units	Koromatintin Value (FM '000)	Koromatintin percent of total	Sansagou-Pin No. Units	Sansagou-Pin Value (FM '000	Sansagou-Pin Perce of tot
Taxes							
Head tax (per taxpayer)	1,275	169	215	37%	209	266	34%
Development tax (per taxpayer)	225	"	38	7%	"	47	6%
Tax on firearms	1,250	7	9	2%	9	11	1%
Livestock tax-subtotal			62	11%		145	19%
Cattle	400	80			220		
Goats	70	360			641		
Donkeys	150	21			20		
Horses	1,300	1			7		
Subtotal, taxes			324	57%		469	60%
Levies (per taxpayer)							
CAC (Cooperative action agency)	500	169	84	15%	209	104	13%
Youth and School*	1,000	"	169	29%	"	209	27%
Koro Social Action Committee**	-	"	-	-	"	-	-
Subtotal, levies	1,500	"	253	44%	"	403	40%
Totals			577	100%		783	100%
Average payable per taxpayer	(FM)		3,417			3,747	

* Increased from FM 500 in 1980 when proceeds were split FM 300 to the Association des Parents d'Elèves (Pupils' Parents' Association) and FM 200 to the Union Nationale de la Jeunesse Malienne (National Union of Malian Youth). Allocation for 1981 had not been announced as of April 1.

** Established to promote construction of operating block at Koro health center. Compulsory levy of FM 500 in 1980 was not repeated in 1981, though village tax bills still show corresponding entry.

In Section III above we arrived at a range of FM 95-183 as the per capita incremental recurrent cost of the PSR to the district health service (Assistance Médicale), excluding drugs. Were the population to assume this cost it would imply an annual burden of FM 1,100-2,750 per extended family of 12-15 persons. Clearly this would be within the means of a family perceiving the cash income estimated by Lambl as per Table 10. Indeed it would amount at a maximum to merely a quarter of what she was told Dogon villagers already spend on illness ("maladies") in a normal year. Adding in the mean of the Sissoko-Kelly-Letarte estimates of per capita drug purchases cited on page 30 above, or roughly FM 100, gives a maximum per family cost of FM 4,250, still less than half of that putative expenditure.

Thus, in the same sense that the Malian Government could "afford" to pick up the incremental recurrent costs of the existing PSR operation in Koro, an expanded version giving coverage to 60 per cent of the district or indeed a similiar nation-wide effort (see pp. 93-94 above), so also Koro villagers could "afford" to take over PSR's incremental costs by way, let us say, of a health levy added to the two existing levies in Table II. A levy of between FM 190 and 370, say 200-400 per taxpayer collected <u>only</u> in villages with functioning VHW teams, would suffice. (Since taxpayers comprise half the population one merely doubles the per capita cost figure).

This is less than last year's FM 500 levy for the Koro health center operating block that is not being repeated in 1981 (though the taxpayers' burden has not gone down since the Youth and School levy has meanwhile doubled to FM 1,000).

This may well turn out to be the only feasible way of financing a continuing supervision program once foreign aid is no longer available to underwrite recurrent costs (or the government decides on a program expansion that exceeds the availability of aid for the sector.) Introduction of such a levy would, however, alter the ground rules under which PSR has established itself in Koro, and diminish the receptiveness of the population. At the present time a village that is being recruited into the program is given to understand that it need only designate the VHWs and, by purchasing drugs as needed, pay susequently for replenishment of the initial drug supply. The population is exhorted to support its VHWs especially by assisting them in cultivation, but as noted earlier (pp. 32-34) the villagers find in general that this is not necessary to keep the VHWs going.

On the other hand if new villages come to understand that participation in PSR means acceptance of a supplemental annual levy of FM 400 per taxpayer (we pick the upper end of the cost range because it applies to the full expansion scenario), then it is probable, considering that even now some villages turn down the invitation to participate, that fewer will join voluntarily.

Alternatively, if the government decides that the realization of public goods through PSR--that is, benefits which everyone enjoys whether or not he participates directly and pays for personal service--so warrants, it could impose the levy on any or all villages, in which case the factors a village weighs in deciding whether to participate remain as before.

One can imagine several altervative schemes for collecting money from villagers to finance the PSR's incremental recurrent costs, encompassing supervision, delivery of replacement drugs and maternity supplies, replacement training of H-Ss, and some associated overheads. Government could (1) increase the Minimum Fiscal (head tax), which is determined on a district-by-district basis (since 1977 Koro's has been FM 1,275, less than that of any other district in Mopti region except for the special rates for nomads in Douentza and Youwarou districts); (2) it could impose a special levy, appearing on the bottom half of each village's tax bill (see Table 11), that would be collected through the normal channels (through the village chief to the chef d'arrondissement or division chief); or (3) the village authorities could assess the population and, bypassing the division chief, transmit the money directly to the AM. Under this latter heading two alternative bases of assessment can be imagined, (i) the village chief collects a fixed amount from every taxpayer or family in the village, or (ii) families join the health scheme on a voluntary basis,

paying an annual subscription fee to a treasurer designated by the chief, and no member of a nonsubscribing family is entitled to consult the VHWs.[65]

In the authors' view only alternative (2), the special levy, would be feasible in Mali. An increase in the Minimum Fiscal would simply be channeled into the regional and national treasuries--the tax is split 60-40 between the region and the central government--where it would disappear in the government's chronic cash squeeze. The authors were warned in the Ministry of Fiance itself that any aid funds intended to underwrite the PSR's material expenditures would never reach it if they were paid into the government's regular cash accounts.

Alternative (3) cannot be dismissed as readily, but in the authors' view imposing a tax collection role on top of the AM staff's other functions would dissipate their energies and also undermine the PSR's financial soundness. (Collecting health fees would put the supervisory staff in a very different role from their present one of handing over replacement drug supplies in exchange for the proceeds of previous sales). The regular tax collection system is supported by the police power of the state, and the authors were given numerous indications of its effectiveness. They sat in the division chief's office as he counted cash delivered to him by a village chief, and then gave

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[65] The latter scenario, a kind of insurance scheme analogous to so-called community health plans in the United States, is being tested in Senegal. See M. Over, "Five Primary Health Care Projects in the Sahel", Club du Sahel/CILSS Working Group on Recurrent Costs of Development Projects in the Sahel, 1980.

the man a deadline for returning with the remainder of what his village owed. They heard accounts of villagers borrowing from one another and even migrating temporarily to the Ivory Coast to earn tax money. The regional budget allows for only a 4 per cent shortfall in collection of direct taxes on villagers.[66]

Conversely, AM staff intending to collect health fees in the course of supervision tours will often find the chief away when they visit; if they find him he will likely procrastinate with excuses about the crushing tax burden or the poor harvest. The chief himself will have trouble collecting if the H-Ss have gone on temporary migration, or the AM supervisors failed to show up for a couple of months or forgot to bring supplies of a certain pill when they called. Villagers who have not availed themselves of the VHWs' services or did not get satisfaction when they did will be reluctant to pay.

The alternative of a voluntary subscription scheme depends on the level of discipline that one could expect the VHWs to exercise. It would be to the VHWs' short-run financial advantage to serve non-subscribing clients who offered a modest consultation fee that would contribute little or nothing to the AM's supervision costs. Indeed it is difficult to imagine a VHW turning down a request for advice from a sick neighbor, whether or not

66 Calculated from two items in 1981 draft budget entitled "remises sur impôts directs" and "remises sur taxe de développement".

a subscriber--assuming the subscribers as a whole undertake to remit a fixed amount to the AM. (Applying our maximum-expansion cost estimate of FM 183 per capita to the two villages figuring in Table 10, Koromatintin (population 333) and Sansagou-Pin (380), yields annual amounts of about FM 61,000 and 70,000, respectively, roughly ten per cent of the annual tax bill.) On balance, it is the authors' fear that the proceeds which the AM could count on from voluntary subscription schemes would be too volatile from one year to the next, as villages entered and pulled out in accordance with the vagaries of the harvest, to sustain a regular supervision program with all the fixed costs involved, in terms both of transport and staff.

We are left, finally, with alternative (2), an earmarked levey similar to the three listed in Table 11 (of which the last, intended for the Koro Social Action Committee formed to promote the health center operating block, was introduced in 1980 but suspended for the current year.) Such levies have the force of law, whether de jure or de facto, no less than direct taxes (the top half of Table 11). Should the government decide to impose a PSR levy in participating districts there is no question about the administration's ability to collect it at divisional level and channel it to the district physician through the district commandant's office. It remains, therefore, to examine factors pro and con which the district administration, with the approval of the regional Governor and, above him the Presidency of the Republic, would likely consider in deciding whether or not to introduce a PSR levy.

Firstly, on the pro side, there is the previously mentioned "public good" dimension of the PSR, which is the ultimate justification of most taxation. Perhaps the most significant public good associated with the PSR is the access it provides to rudimentary forms of health care in case of need. An individual may rarely or never consult his village H-S and contribute nothing to his maintenance (notably, supervision and re-supply by the AM), nevertheless the H-S and his supply of drugs are available if needed, providing a form of insurance that leaves each member of the community better off than he or she would be without it.[67]

Another form of public good presumably yielded by the PSR is the reduction in risk of infection to other members of the community as the H-Ss' patients are cured or evacuated. Again, a villager may object to being taxed to support the PSR and insist he will never consult a VHW, but this reduction in risk is a benefit he perceives anyway. The VHWs also reduce the community-wide risk of infection to the extend they enhance public consciousness of health issues and improve community sanitation, an area in which, to be sure, little progress has been noted thus far relative to initial hopes expressed in the USAID Project Paper.

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[67]See M. Over, op. cit., and Club du Sahel/CILSS, Recurrent Costs of Development Programs in the Countries of the Sahel, p. 167.

A final concept of public good relevant here is the principle, firmly embedded in the political philosophy of Mali's governing party, the UDPM, that the community shares in the well-being as well as the suffering of its individual members. Hence the provision of health care to any individual provides a benefit to the whole community, quite apart from reduced risk of infection or increased productivity.

The existence of such "public good" benefits justifies imposing an obligation on all economically active members of the village community to contribute to the cost of the program in that community. The local and national administrations might well conclude along these lines that a FM 400 annual levy on Koro taxpayers was justified to maintain a program that got its start with almost no local financial participation.

At the same time the administration would not want to impose such a levy without testing public opinion via consultation with a sample of village chiefs and local party (UDPM) leaders. These individuals would certainly take into account variants of the "public good" considerations outlined above. On the other hand they would also think seriously about (1) exactly what it was the levy was destined to pay for, and (2) how the benefits to be yielded by it would compare with the present marginal utility of Koro villagers' cash expenditure.

The village leaders' appreciation of the end-uses of a PSR levy will depend to a considerable extent on their perception of the benefits derived from the VHW supervision program, and the possibility of obtaining these benefits more cheaply. The AM supervisors' function of resupplying drugs and, to a lesser extent, maternity equipment will certainly receive high marks; the Koro opinion-makers will understand that the only other way of obtaining drug supplies under existing law (see following section) is for the H-Ss to journey to the nearest district capital.[68]

On the other hand it is not clear what value will be attached to other functions of the supervision visits. Some village chiefs will be aware that some--by no means all--AM staff take the occasion of supervision visits to communicate with VHWs in ways that improve the health workers' skills and modus operandi. Others are likely to have a less favorable impression, finding the visits perfunctory and rejecting the idea that their populations should pay an additional levy to defray the associated mobylette operating costs. In the authors' view it would form part of a comprehensive PSR evaluation exercise to request formally that representatives of the district and divisional administrations sound out village chiefs on the possibility of a PSR levy as a last resort to keep the project going.

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[68] In certain other districts of Mali the cooperative (CAC) retail outlets in divisional capitals stock pharmaceuticals, though complaints are heard that the CAC tends to neglect this aspect of its trade in favor of items with larger turnover, e.g. salt, sugar, batteries.

The principle of comparing benefits from a PSR levy with other ways in which a village taxpayer can spend FM 400, in other words evaluating implicitly the marginal utility of consumer expenditure, is just as relevant in assessing the local leaders' acceptance of a PSR levy as was a similar calculus in judging the national and regional governments' willingness to assume the PSR's recurrent costs in their respective budgets. In this regard several indicators were provided to the authors:

1. The fact that the head tax has remained fixed for four years notwithstanding inflation of the costs of government administration on the order of 50-60 per cent during that period, along with the associated fiscal stringency described in the previous section, suggests a perception on the government's part that the population is too poor to support expanded public services. Without taking into account indirect taxes or subsidies (there are few if any of the latter) on consumer goods purchased by Koro villagers, to a direct tax burden of FM 20-26,000 or roughly 15 per cent of gross cash income (see p. 111 above) must be added a food subsidy worth FM 14-28,000 (depending on the time of year and corresponding level of the free market price) that each peasant family as defined in Table 10 provides via the 3-3½ bags of millet it is obliged to sell through OPAM.

The effective tax burden thus rises to between 20 and 30 per cent of gross cash income (excluding subsistence consumption).[69] By developing-world standards Koro villagers cannot be considered lightly taxed.

2. The authors were informed by the Koro regional commandant that the Presidency had recently banned new administration-imposed levies, which, at least in Koro district, rules out levies other than those for the CAC (Government cooperative agency) and Youth and School associations (UNJM and APE). While the measure did not prevent a doubling of the Youth and School levy this year, it appears to have forestalled a repetition of the 1980 levy for the health center operating block, raising a question as to where the Koro Social Action Committee will get the financing to complete that project.[70]

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[69] For purposes of this calculation the cash income denominator must be increased by the difference between the free market and OPAM values.

[70] As against the initial estimate of FM 75 million for construction only, Koro UDPM leaders told the authors FM 55 milion had been collected through 1980, based on the 1980 levy (which would have yielded about FM 46 million if collected from all Koro's 92,000+ taxpayers) and some voluntary subscriptions in 1978-79. Our informants said inflation had pushed the cost well above FM 75 million. As of April 1981 construction was at a standstill.

Apart from grass-roots complaints about the tax burden the government was reacting to accusations of misappropriation of funds by local APE staff, and may also have been trying to protect the integrity of the central and regional government budgets against a proliferation of earmarked taxes.

3. The fact that Dogon families celebrate parties, weddings, and baptisms, which according to Lambl absorb on average close to 15 per cent of their gross cash income, in no wise detracts from the proverty of this population. Added to her estimate of crop sales, Lambl's valuation of FM 160,000 for the subsistence consumption of the average family described in Table 10 gives it a gross income from cultivation, excluding the value of livestock sold and consumed, of about FM 310,000 or U.S.$620 at a FM 500 exchange rate. Over 12-15 family members this works out to $41-52 on a per capita basis in 1978 prices, which as noted earlier seem to be roughly the same as 1981 producer prices for the commodities in question.

Another indicator of poverty is the scarcity of means of transport--Table 11 shows Koromatintin with 21 donkeys and one horse for a population of 333, Sansagou-Pin with 20 donkeys and seven horses for 380 persons. Bicycles were little in evidence during the authors' visit.

The chief in Tinsagou (956 pop. according to the 1976 census) claimed that most bicycles introduced into his village were brought by migrants returning from the Ivory Coast, and sold to outsiders in the ensuing months. He estimated the number of portable radios in his village at six or seven. At no time during the authors' day-time tours (one in December 1980 and one in April 1981) did they hear radios playing in any village.

4. The development priority uppermost on the minds of both the population and the administration in April 1981 was water. Describing it as "the problem of problems", Koro's commandant, Lt. Kalil, led the authors on a march around several of Koro town's defunct wells. He claimed that, in the current dry season that would end in June, some 200 small settlements had been forced to decamp in search of water. The district health center's own well had dried up in February. The commandant's focus was echoed in separate meetings with the local UDPM leadership, including one of Koro's three deputies to the National Assembly, and the Toroli division chief.

The Koro chief of Opération Puits indicated that he had no local budget to maintain or deepen wells that were giving out, and thus could work only where foreign aid was available (as with the CARE finance that had just been released for deepening wells in two PSR villages) or the population had come up with the full estimated cost.

He said it was painful to see villages coming forward with (for them) large sums in cash, only to be told that they had to raise still more in order to meet 100 per cent of the cost. A standard estimate for the cost of deepening an existing well by one meter was FM 300,000 (i.e. equivalent to roughly half the annual tax bill of Koromatintin, or one month's current expenditure on VHW supervision in Koro.) In comments of some representatives of the administration as well village leaders there was more than a hint that, if they were free to suspend PSR's supervision program for the time being and divert the funds in question to deepending village wells, they would not hesitate to do so.

The authors engaged the leaderships of Koromatintin and Sansagou-Pin in dialogue regarding their priorities and willingness to pay levies for PSR and well maintenance or deepening. In Koromatintin they were told flatly that the villagers would assess themselves for well improvement and were willing to pay the cost of drugs, but that water was the No. 1 priority and they could not simultaneously bear an additional assessment for the PSR's administrative costs. The chief then asked his visitors if FM 1,000 per head would suffice to repair the well this year, to which the district physician replied that a study would be needed.

In Sansagou-Pin the villagers complained about declining water levels in all three wells. To the question: what could the village contribute, the first response was that the harvest had been poor and they were still (as of April 1st) paying their taxes, hence an assessment in 1981 was not possible. At that point the 15 or so men sitting around us discussed animatedly among themselves, finally announcing they could come up with FM 1,000 per taxpayer. One villager suggested they could raise even more by assessing each livestock owner a lump sum per animal.

In Goursindè the population came up with more than FM 1,000 per taxpayer after CARE finance for deepening their main well, promised in 1979, was delayed nearly two years. The chief told the authors he had collected FM 500,000 from a taxpaying population of 308,[71] and with an additional FM 100,000 the village could have paid for the work itself, but before this was collected CARE came through. Now the village was considering how to use the money (the alternative of simply returning it to the contributors was not mentioned). As of April 1981 the village had two PSR-recycled ATs but no

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71 A surprisingly high figure since the 1976 census gave Goursindè's total population as 304.

functioning H-S-- one trained in 1979 (the chief's son) was on migration in the Ivory Coast, and the village had declined an invitation to send a second H-S to the last course.

As the PSR medical staff note, while deepening and repairing a well undoubtedly spares villagers a lot of effort and improves their quality of life, its impact in terms of disease and death prevention is questionable because pathogens enter the water as easily during its subsequent handling and storage in the home as through a defective well. Conversely a PSR intervention such as the forthcoming nivaquinization campaign is very likely to save lives.

It is to be hoped that village leaders will become aware of this contrast as the results of nivaquinization come into focus. Meanwhile, however, indications were strong that many of them valued the benefits from adding one meter to the depth of their wells more highly than those of equivalent expenditure on the PSR supervision program.

Financing the PSR from the margin on drug sales.

The possibility that the profit margin on sale of PSR drugs through the village pharmacies could make a significant contribution to financing the project's cost is analyzed in the February 1980 report of Sissoko-Kelly.

In accordance with Malian government policy that drugs must be priced uniformly throughout the country, retail prices of PSR drugs have been determined so as to be identical with those of pharmaceutically equivalent products distributed by the Pharmacie Populaire as approved by the price control authority (the Economic Affairs Directorate of the Ministry of Finance). Comparing these prices with information supplied by HIID/Cambridge on the purchase cost, c.i.f. Bamako (by air freight), for U.S. generic versions of the four items distributed through PSR/Koro, Sissoko-Kelly compute the gross profit margin as a percentage of the retail price. Their calculations are reproduced in Table 12.

Table 12

Sissoko-Kelly Estimates of Gross PSR Profit Margin on Unit Drug Sales

Drug	Quantity & specifications	(1) Retail price, PSR (FM)	(2) Price c.i.f. Bamako (US wholesale price plus air freight) (FM)	(3) (%oof retail price)	(4) Gross Profit margin (= retail price or 100% less (2) or (3) and 15% margin for village use) (FM)	(5) (% of retail price)
Pencillin	1000 pills, each 250 mg.	100,000	8,904	8.9%	76.096	76.1%
Aspirin	1000 pills, each 324 mg.	12,500	1,671	13.4%	8,954	71.6%
Sodium sulphate	15 ml. flask, 15% solution	700	311	44.4%	284	40.6%
Chloroquin phosphate	1000 pills, each 250 mg.	20,000	12,117	60.6%	4,883	24.4%

Source: Sissoko-Kelly, February 1980, pp. 18-19.

Columns (4) and (5) of the table give gross profit margins in the sense that domestic (Malian) costs of transport and handling, for which Sissoko and Kelly lacked data, are not taken into account. Nevertheless they surmise that these additional costs would not exceed 50 per cent of the gross profit margin.[72]

Based on supervision records, Sissoko-Kelly report drug sales by PSR/Koro village pharmacies as follows for the project's first year (March 1979-February 1980):[73]

Pencillin	FM 248,000
Aspirin	" 162,875
Chloroquin	" 33,700
Sodium sulphate	" 67,200
Total	FM 511,775

Based on percentages in Table 12, the c.i.f. cost of this mix of drugs is estimated at FM 99,583, or 19 per cent of retail value; the 15 per cent profit margin for the villages yields FM 76,766; and the gross profit margin for the PSR would be FM 335,426, or 66 per cent of retail value. Allocating half of this to domestic handling and transport costs still leaves a 33 per cent margin of retail value for the PSR.

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72 Op. cit. p. 19.

73 Op. cit., p. 21

Applied to Sissoko-Kelly's estimate (see p. 30 above) of FM 118 for annual per capita drug sales, a 33 per cent margin yields FM 39, or 41 per cent of PSR's incremental per capita recurrent cost as computed in Section III on the basis of the existing supervision program. Assuming an expanded program with an incremental per capita recurrent cost of FM 183 as per p. 76b above, the putative FM 39 margin contributes 21 per cent of the required financing.

As noted in Section II above, Letarte's review of prescription records for 25 village pharmacies during January-September 1980 yields a somewhat lower estimate of annual per capita drug purchases, namely about FM 85. His figures also show a different mix of drugs sold, chloroquin with its lower profit margin accounting for a larger share of revenue (though still below either penicillin or aspirin) than the 7 per cent reflected in the Sissoko-Kelly data above. Applying the profit margins in Table 12 to Letarte's drug mix yields an overall gross margin of about 60 per cent; allocating half of this to local handling and transport, and multiplying the other half by the per capita sales figure, we have an implied 30% X FM 85 = FM 26 as the contribution of drug turnover per capita to PSR financing. This represents 27 per cent of the current FM 95 incremental recurrent cost figure and 14 per cent of the FM 183 estimate for an expanded program--a helpful but scarcely decisive contribution.

Before designing a PSR financial package that includes the profit margin on drug sales it is appropriate to consider the origin of this margin and ask how stable a future source of income it would comprise. Net of domestic handling and distribution costs which we will estimate below on a different basis from Sissoko-Kelly's 50 per cent "guestimate", the margin arises from the fact that retail drug prices in Mali, including those of the PSR, are fixed with a view to ensuring the Pharmacie Populaire a modest return over costs that encompass (i) f.o.b. purchase prices, mainly for proprietary products from French laboratories, that are substantially higher than prices paid for generic equivalents procured competitively in the United States, and (ii) tax payments to the Malian government, mainly (to the extent of 92 per cent in 1979) customs duties on imported drugs, that in 1979 added 25 per cent to the f.o.b. purchase cost.

The authors pursued the matter by interviewing officials of Pharmacie Populaire and the price control authority in the Directorate of Economic Affairs, and analyzing data in Pharmacie Populaire's 1979 annual report. Most of Pharmacie Populaire's prices are controlled at a level equivalent to 1.5 times the "prix de vignette" in effect for a particular item in France--that is, the retail price to the public which the French Social Security system will reimburse to a client. An estimated 75-80 per cent of the products that comprise Pharmacie Populaire's universe of choice carry prix de vignette in France; for those that do not,

Malian price control allows Pharmacie Populaire a 170 per cent markup over the price ex-laboratory (i.e. the factor of multiplication is 2.7). Another principle of price control is to limit Pharmacie Populaire's domestic costs including profit to 40 per cent of the f.o.b cost of its products.

Pharmacie Populaire's price structure is illustrated in Table 13, based on the company's 1979 annual report. Columns 2 and 3 represent alternative views of the build-up to retail prices such as those charged for the four PSR drugs or their equivalents as shown in Table 12. Column 2 shows percentage markups over an f.o.b./Europe cost base of 100, while column 3 shows the percentage accounted for by each component in a final selling price of 100.

The table is incomplete insofar as it excludes the proportion of pharmaceutical turnover corresponding to the 15 per cent margin which private and cooperative retail outlets, authorized by Pharmacie Populaire in localities where it does not operate branches, are allowed to retain. The 15 per cent is computed with respect to controlled retail prices, and means that, where it acts as importer and wholesaler only, Pharmacie receives 85 per cent of those prices to cover purchase and distribution costs. It is the authors' understanding that Pharmacie Populaire itself retails well over half of its turnover. Inclusion of the 15 per cent agents' commission would increase item 13, sales proceeds, which would thus no longer reflect exclusively Pharmacie's own receipts.

Item 16, column 2 (39.1 per cent) shows that Pharmacie is operating just below the 40 per cent limit on domestic costs including profit as a percentage of f.o.b. purchase cost.

To the extent the 1.5 price control rule is adhered to, Pharmacie's f.o.b. purchase cost would be around 16-17 per cent below the French prix de vignette, given by 180/1.5 = 1.2; 100.0/120.0 = 0.833, or 16-17 per cent less than unity. Obviously French pharmacies receive a larger discount than this; Pharmacie Populaire must pay handling and transport costs up to ports of exit.

Comparing the PSR data in Table 12 with Table 13, the figures in column 3 of the former--c.i.f. Bamako prices as a percentage of the PPM retail price--correspond to item 3, column 3 of Table 13, i.e. 63.6 per cent. It is evident that only in the case of chloroquin does the c.i.f. Bamako price of the U.S. product procured under PSR approach that of its French counterpart, nivaquine. (60.6 is 95 per cent of 63.6). The c.i.f. cost of the penicillin product used in PSR is only <u>14 per cent</u> that of the French equivalent (= 8.9/63.6), while aspirin and sodium suphate cost the PSR 21 and 70 per cent,

Table 13

rice Structure of Pharmacie Populaire du Mali (PPM)

(see methodological note below)

Cost item	(1) Actual transactions in 1979 according to PPM annual report (FM millions)	(2) Components of markup as percentages of an f.o.b. price, France, equal to 100	(3) Components of a retail price in Mali equal to 100
1. PPM purchase cost f.o.b.	2,970	100.0	57.3
2. Transport, international and domestic	327	11.0	6.3
3. Subtotal (approx. equal to c.i.f. cost Bamako)	3,297	111.0	63.6
4. Taxes and duties, total	728	24.5	14.0
5. ... of which import duties	(672)	(22.6)	(12.9)
6. Subtotal (approx. equal to tax-paid c.i.f. cost)	4,025	135.5	77.6
7. Subtotal (ditto) for products sold in 1979	3,376	135.5	77.6
8. Personnel	365	14.7	8.4
9. Maintenance and repairs, materials, services purchased	248	10.0	5.7
10. Miscellaneous management costs	75	3.0	1.7
11. Financial expenses	16	0.6	0.4
12. Depreciation	65	2.6	1.5
13. Subtotal, items 7-12	4,145	166.4	95.3
14. Sales proceeds, 1979	4,350	174.6	100.0
15. Profit	205	8.2	4.7
Memorandum items			
16. Subtotal, items 8-12 & 15 (PPM domestic costs including profit)	974	39.1	22.4
17. Subtotal, item 16 + estimated FM 611 taxes on products sold in 1979 (equals domestic costs plus taxes)	1,585	63.6	36.4

Methodological note (see page 136)

Table 13 (continued)

Methodological note. Items 1-5 in column 1 represent actual purchases in 1979, of which FM 649 million (f.o.b. cost plus taxes and transport) comprise an increase in stocks. Items 1-6 in column 2 are calculated as percentages of the total purchase value of 2970; conversely items 8-12 and 15-17 are calculated with respect to the f.o.b. value of purchases sold in 1979, obtained by multiplying 2970 by 3376/4025, which yields 2491.

Items 1-6 in column 3 are calculated over a denominator of 4350 (1979 sales proceeds), the numerators being the corresponding values in column 1 times 3376/4025.

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respectively, of the corresponding French prices.[74]

Turning to the final column in Table 12, gross profit margin, it should be noted that these figures are net of the 15 per cent retailer's commission which, in the case of PSR, remains with the village for use according to local decision. To derive a corresponding value from Table 13 we must subtract 15 per cent from the final figure in the table, i.e. the 36.4 per cent of retail value comprising domestic costs and taxes, obtaining a residual of 21.4 per cent, of which almost two-thirds (14 per cent--see item 4) represents Malian taxes.

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74 PSR uses penicillin tablets while the French product distributed through Pharmacie Populaire is an injectible fluid, obviously more costly for a given pharmaceutical content. Considering the controversy surrounding use of penicillin in the PSR, and the fact that no evidence yet exists concerning the effectiveness of PSR's tablets in the rural Malian milieu, too much should not be made of this particular cost comparison.

Thus the margin left to Pharmacie Populaire to cover management and distribution costs (exclusive of transport, covered in item 2) is only 7.4 per cent of retail value. Assuming that domestic transport accounts for as much as one point in the 6.3 per cent figure relating mainly to international freight, Pharmacie's margin for domestic costs in respect of products distributed through agents, as opposed to its own branches, is still only about 8½ per cent of retail value. One suspects that Pharmacie Populaire may be cross-subsidizing these transactions with profits earned on sales through its own branches; even so, the 50 per cent of PSR's gross profit margin that Sissoko-Kelly allowed for domestic handling and transport, corresponding to 33 per cent of the first year's sales by PSR/Koro village pharmacies (see page 130 above), appears excessive by a wide margin.[75]

A reasonable guess might be that Pharmacie's fully-allocated average cost for domestic handling and distribution of drugs to agents is 10 to 12 per cent of retail value. The question arises as to what PSR/Koro would have to spend in the long run to keep the AM's stores properly supplied, and more broadly, what it would cost a PSR operating nationwide to supply the district health services.

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[75] It would not be excessive if Sissoko-Kelly were talking about distribution costs within PSR/Koro litself, however by implication they are talking about costs not taken into account in their own itemization, summarized in Table 3, pp. 45-46 above. In other words the 50 per cent "guestimate" corresponds to costs of moving drugs from Bamako airport to the Koro AM, with storage in Bamako and Mopti along the way.

To measure the present cost of handling and distributing PSR's drugs between Bamako airport and the Koro and Yélimané AMs would be a hopelessly complex task of cost accounting. Transport from Bamako airport into town involves a measurable marginal cost, but thereafter all the handling is done by PSR and technical assistance personnel as only one of many responsibilities, and shipments to the field nearly always "piggy-back" on transport whose primary purpose is movement of project personnel. One is therefore faced with choices that range from assigning zero marginal cost to attributing time and space on the basis of time and motion studies.

Trying to project a future equilibrium, however, one can say with confidence that a PSR financing its recurrent costs locally would have to devise a system whereby Malian personnel maintained stocks, processed orders and shipped drug supplies via a reliable transport network charging full cost for its services. Would unit costs in such a system be higher or lower than the Pharmacie Populaire's? Certainly if Pharmacie is performing with reasonable efficiency, given the volume of its business and the fact that it specializes in this field of endeavor alone it should be operating at lower cost than PSR could hope to achieve. On the other hand, at some level of turnover Pharmacie's apparent economies of scale could become diseconomies, imposing a burdensome bureaucracy on pharmaceutical distribution in Mali.

Short of undertaking an efficiency analysis of the enterprise the authors are in no position to evaluate these questions.

One administrative cost which as far as the authors are aware has never been considered in discussions of PSR's pharmaceutical component is that of procurement. At present procurement is carried out on behalf of USAID/Mali by a U.S. government domestic agency intervening in a market for generic drugs whose competitiveness it devotes much energy to ensuring. It is clear that one reason why Pharmacie Populaire remains tied to high-cost suppliers of French proprietary drugs (at least in respect of three of the products distributed by PSR/Koro) is that its procurement proceeds with a minimum of effort through well-worn channels.

In the absence of more precise data the authors will assume rather notionally that PSR would find itself obliged to budget 15 per cent of retail value for domestic costs for which Pharmacie Populaire now receives only 3½ per cent, as described on page 137 above. Applied to a pattern of drug sales such as reported by Sissoko-Kelly, this leaves PSR a margin of 66 - 15 = 51 per cent--say half--of a per capita retail value of FM 118, or FM 59, say 60, which comprises 63 per cent of a current incremental recurrent cost of FM 95 per capita, and about one-third of the estimated cost of FM 183 per capita for an expanded PSR as described in Table 7, p. 76b.

Using the lower figure of FM 85 for per capita drug sales and the gross profit margin of 60 per cent implied by Letarte's data, the 15 per cent cost deduction (not to be confused with the 15 per cent margin for village use, which remains in effect) leaves a net margin of 45 per cent times FM 85 = FM 38 or 40 per cent of PSR/Koro's current incremental recurrent cost and one-fifth of the cost of the expanded project.

The upshot is that, even with these more favorable results than the net profit implied by Sissoko-Kelly's "gustimate" of domestic handling and transport costs, the drug margin is far from sufficient to carry the PSR's incremental recurrent costs.

At the same time there remains a policy question as to whether the current margin on drug sales should be relied on for even partial financing of the PSR. This question has two components: firstly, the issue of import duties and other taxes on drugs, and secondly, that of future Malian government policy vis-a-vis the pharmaceutical industry.

On the question of taxes, we saw in Table 13 that these currently account for 14 per cent of the gross value of Pharmacie Populaire's sales, the proportion of total retail value being less (but not below 13 per cent) insofar as Pharmacie wholesales a portion of its volume. Total taxes and duties of FM 728 million paid by Pharmacie Populaire in 1979 amounted to 1.3 per cent of the government's ordinary revenues in that year and 1.0

per cent of total expenditure.[76]

In contrast Pharmacie d'Approvisionnement (Pharmapro), the government agency responsible for supplying the nation's hospitals, health centers and dispensaries with medicines for free distribution to patients, imports its drugs free of taxes. Pharmapro's 1979 budget allocation for drug purchases was FM 750 million, or just 3 per cent more than Pharmacie Populaire paid in taxes and equal to 23 per cent of the c.i.f. value of Pharmacie Populaire's drug imports in that year. Thus, although the authors heard of no explicit policy to this effect, the government is in effect financing drug supplies to health facilities by means of taxes on the 80 per cent of the nation's drug imports (c.i.f. value) that is sold through Pharmacie Populaire.

However, there is a consensus that the dual system of drugs sold commercially through Pharmacie Populaire and distributed free to patients in health facilities has not worked. The health facilities are chronically short of basic medicines, and doctors have to advise patients to purchase their drugs (or get family members to fill prescriptions for them) at the local Pharmacie outlet. [77] In lieu of receiving, in response to their orders, the basic drugs required for everyday practice, physicians open their shipments

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[76] Government of Mali, Budget d'Etat 1981, shows 1979 ordinary revenues as FM 54.9 billion and total expenditure as FM 72.5 billion.

[77] Pharmapro's pharmacist for Mopti region, Dr. Doumbia, advised the authors that a maximum of ten per cent of hospital patients were now receiving free drugs.

from Bamako to find remnants of Pharmapro's slow-moving stocks of esoteric medicines.[78]

Accordingly the government has decided to establish a Malian Pharmaceutical Agency (Office Malien de Pharmacie, or OMP) to supply drugs at cost, tax-free, to health care facilities, which will collect the proceeds from patients along with their hospitalization fees. Referring to Table 13, if OMP's administrative costs are financed by the government budget, and it draws on the same sources of supply as Pharmacie Populaire, hospital patients would pay about 60 per cent of controlled retail prices. The system will retain its dual character but presumably the leakage will diminish and hospitals and health centers will be better supplied.

Inevitably Pharmacie Populaire will continue to insist, as it has successfully up to now, that any drugs retailed on the open market through arrangements such as the PSR should sell at its own government-approved prices. Otherwise the threat of unfair competition to retail outlets of Pharmacie and its agents is obvious. In the situation we are examining the ground for tax exemption that PSR's drug imports are being financed by foreign aid will no longer apply. If Pharmacie Populaire takes over PSR's drug supply function tax exemption becomes not only a debatable exception but adds a new administrative burden.

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[78] Apart from a few jars of antiseptics the only drug in stock at Toroli dispensary at the time of the authors' visit on April 1 was Hydergine, a cerebral oxygenator.

If on the other hand the task is handed over to OMP, will the Ministry of Finance agree to tax exemption for drugs that are eventually sold at maximum permissible retail prices? Even should the National Directorate of Public Health take over the PSR drug supply function itself--a questionable allocation of its administrative resources, one might add--the Ministry of Finance might object to tax exemption for PSR drugs as an erosion of fiscal integrity. Allocation of the correponding 14 per cent (of retail value) should be effected as part of the budget process, so the argument might run, not by unilateral decision of an operating agency.

The long-run policy issue to be addressed here concerns drug procurement by both Pharmacie Populaire and Pharmapro or OMP and its relation to the structure of the Malian pharmaceutical supply industry. In the authors' view the price discrepancy between drugs procured through PSR and those imported by Pharmacie Populaire, as revealed initially by Sissoko-Kelly and analyzed further above, poses a serious challenge to Malian public policy. Stated baldly, government policy is that the Malian consumer pays fifty per cent more for any drug than his French counterpart.[79]

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[79] The 1.5 price control formula was adopted in 1978. For several years prior to that it was 1.38.

About 20 points out of the 50 correspond to taxes.[80] On the other hand the French consumer also pays tax on his drugs via a Value Added Tax of close to 15 per cent; we can therefore still say that official policy accepts as unavoidable that Malian consumers pay 50 per cent more than French consumers, both net of tax.

Now along comes PSR and shows the government that equivalents for three basic drugs can be imported, by air, substanitially more cheaply from the United States. Neither the United States nor France is generally regarded as a low-cost drug supplier in the world market. Why don't the Malian authorities take this information and start shopping around for cheaper drugs to relieve an oppressive burden on one of the poorest populations in the world? The answer, in the authors' view, lies in the monopoly position enjoyed by the state enterprise, Pharmacie Populaire, coupled with a price control policy designed to limit Pharmacie's margins.

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[80] Adding 5% to 1979 PPM sales of 4,350 (Table 13) to include non-PPM retailer margins gives 4,567. Dividing this by 1.5 gives the equivalent at French prix de vignette, 3,045; divided into estimated tax payments of 611 on 1979 sales this gives 20 per cent.

The managers of Pharmacie Populaire have little incentive to seek cheaper sources, because once they find them, down come the controlled prices, and Pharmacie's margin remains as narrow as before.[81]

Pharmacie personnel justify their close ties to French sources on the ground that Malian doctors are familiar with their products (though by now over half the country's physicians have received no training in France, being educated at the Bamako medical school), and French drug salesmen have the country more or less to themselves. The authors were told that Pharmacie once attempted to place an order in Yugoslavia, but the Yugoslavs would not accept Pharmacie's terms of payment. Yugoslavia is, of course, known as an aggressive exporter of generic drugs; that Pharmacie could not consummate the purchase suggests more about its lack of interest in departing from the familiar, comfortable ground of the French market than it does about the severity of Yugoslavia's payment terms.

The question arises: what should be done about it? Two basic alternatives suggest themselves: (1) the government relaxes Pharmacie's monopoly and allows private traders to enter the market where they seek cheaper foreign sources in an effort to enlarge their market share and profits; or (2) the government establishes a capability, presumably in the Ministry of Finance's Directorate of Economic Affairs (though the Ministry of Public Health's Planning Directorate

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[81] As shown by Table 13, Pharmacie earns about 5 per cent on its turnover. To the extent that depreciation of assets is figured on a basis of historical acquisition cost that understates replacement value, its true profit margin is still lower.

would be another possibilitty), to identify low-cost sources of reliable generic drugs, and then pressure Pharmacie Populaire to buy from them.

Neither solution offers a panacea . "Privatization" of the drug market opens up several pitfalls. Multinational drug concerns have substantial resources at their disposal, as well as much relevant experience, to help them establish control over local importers and close off channels to low-cost generic suppliers. The same resources can be and are used to induce physicians to prescribe only proprietary products and to raise the spectre of unreliable, even dangerous materials being supplied by low-cost competitors. On the other hand, in the absence of some measure of government regulation an open market attracts unscrupulous operators flogging expired or counterfeit products, and physicians as well as their patients justifiably prefer the reliability of proprietary drugs.

The alternative of government intervention to find low-cost supply sources and push the national drug monopoly into them has its own drawbacks. The field is a highly specialized one where inexperienced civil servants, changing jobs with the frequency characterizing that breed in most countries, are easily misled. Keeping track of developments in a fast-changing market requires complementary inputs--tele-dommunications services, frequent air travel, foreign consultants--that no Malian agency is given the resources to obtain.

The authors' terms of reference do not include the possibility of reorganizing Mali's drug import system and they therefore abstain from recommending any particular alternative in this regard. Nevertheless they express the view that, if the PSR has opened up a channel to reliable generic drug supplies at substantially lower prices than Mali is otherwise paying, then the country's regular supply system should be moving to exploit those and other, still lower-cost sources. At the price differentials identified by PSR such problems as resistance of consumers and their physicians, discrepancies in dosages, non-French labelling, etc. can and should be quickly overcome. In any case the PSR should not be made financially dependant on the persistence of such price differentials over the long run.

Conclusions on PSR financing

The foregoing subsections have ruled out assumption of PSR's incremental recurrent costs in the national and regional government budgets, and advised against making the project financially dependant on current price differentials between drugs imported by PSR and Pharmacie Populaire, which are in any case inadequate to cover the costs estimated in Section III. The only alternative posed in this section that was not ruled out is for the government to impose a levy (earmarked tax) on village taxpayers similar to the existing ones listed in the bottom half of Table 11, p. 112. Accepting Section III's cost estimates, a levy of 200 per taxpayer, applied only in villages served by VHWs, would cover the PSR's present incremental recurrent costs, while a FM 400 levy would enable the project to expand so that

60 per cent of Koro district villagers would have access to primary health care in their home localities.

It was also noted that, while government might want to consult village authorities and try to gauge their degree of appreciation for the benefits of PSR before deciding to impose a levy, the project would not be financially viable if villages had the right to opt out of paying it whenever they felt the benefits fell below the marginal utility of other uses for the money. In this connection we reviewed a number of indicators suggesting that, given present conditions in Koro, acceptance of a PSR levy by either government and/or participating villages was by no means a foregone conclusion; on the other hand neither was it ruled out.

This concluding subsection deals with the question as to what residue from the present PSR program might survive, or could be helped by specific actions of PSR's sponsors to survive, in the event government decided against a PSR levy, USAID funds were no longer forthcoming to support incremental recurrent costs, and accordingly, as predicted by the authors, the supervision program described in Section II came to a halt.

The authors did not have an opportunity to observe first hand the sites of other primary health care interventions in Mali, based like the PSR on organized training of village health workers followed by establishment of rudimentary village pharmacies.

Such activities have gotten underway in several districts, usually with an infusion of foreign aid to pay for the training, initial provision of the pharmacies and staff vehicles.

The largest single effort is that mounted in 1979 by the Compagnie Malienne de Développement Textile (CMDT) in cotton-growing areas of Sikasso region with the help of financing from BADEA (Arab Bank for African Economic Development); the authors were told that 400 VHWs had been trained in two-week courses, and pharmacies dispensing ten different products (as against Koro's four) established in 110 villages. The H-Ss replenish drug supplies at their divisional cooperative outlets (run by the Fédérations des Groupments Ruraux or FGRs). Supervision visits are quarterly, and are limited to checking on drug distribution. All H-Ss are supposedly literate in Bambara and keep records of drugs dispensed. A field survey to assess the results of the project has been scheduled. It will be useful from PSR's viewpoint to examine, among other things, the success of the drug resupply system.

The authors spoke with individuals who had observed other, less ambitious programs, some of which had been launched with considerable promise but were by now reported to have lapsed into relative inactivity. According to some knowledgeable informers, the major stumbling block to perseverance of the H-Ss was difficulty in replenishing their drug supplies. The stocking of most FGR outlets was sporadic, and many H-Ss living relatively far from their district capitals were unable to keep the village pharmacies going.

Without drug supplies to back them up, these VHWs lost credibility with the population and became demoralized.

If the finances of the PSR should ever reach a state where the present Koro supervision program had to be drastically curtailed, the major casualty would clearly be the drug resupply system. As shown in the earlier discussion (pp. 80-85 above) of possible cost reduction through lessened intensity of supervision, other benefits would also be sacrificed, but the Yélimané experience as reported by Daulaire-Taylor and Baudouy suggests that H-Ss retain some knowledge and continue functioning albeit with reduced effectiveness, even in the absence of supervision, provided they have access to drugs.

All this raises the question as to whether a system of replenishing Koro's village pharmacies other than by AM staff on supervision visits might be devised.

One hypothesis, advanced in particular by the foreign author, is that the present tight control over commercial distribution of drugs, exercised by Pharmacie Populaire, might be relaxed to the extent of authorizing private traders to (1) open outlets in divisional capitals even in competition with existing FGR depots, handling a limited range of products--certainly aspirin, nivaquine, and sodium sulphate drops or ointment, leaving a question mark after penicillin, and/or (2) pari passu with setting up the stalls where they peddle other goods at weekly village markets, carry authorized products to the village pharmacists. Shipments from Pharmacie Populaire depots in district or regional capitals to the divisional centers would be handled by the existing private motor transport

network in an efficient manner--no trader incurs higher transport expense than he expects to recoup through sales--while the marginal transport cost of further distributing the drugs to the village pharmacies would be virtually nil--traders carry their goods to and among village markets on bicycles.

Observing Tinsagou's weekly markets in December, the foreign author was struck by the absence of any medicinal products, even aspirin, from the traders' displays. The rigid controls which bring this situation about contrast with the popular demand for aspirin, whose sales in terms of physical volume both the Sissoko-Kelly and Letarte figures show to have been by far the highest among PSR's four drugs. Other West African countries allow greater private participation in pharmaceutical distribution, without notorious detriment to public health.

As for competing in the drug business with FGR outlets in divisional centers, it can be argued that this is a desirable outcome given their lack of interest and poor performance in the trade, noted to the authors by many obsevers. Once again the foreign author was struck by the incongruity of Mali's public sector allocating its meager quantum of resources to monopolizing areas of commerce that can be handled much more efficiently by private traders in a competitive framework.

Some thought would have to be given under this proposal to the matter of retail price levels and trading commisions. Allowing the villages to retain their present 15 per cent commission on drug sales would leave no margin for the traders under Pharmacie Populaire's policy of nationwide uniform prices. Presumably the villages would reliquish the margin, of which none were known to have yet made any use as of April 1981, rather than go without drugs. Certainly the H-Ss would prefer to do away with the margin, from which they are not allowed to benefit personally, rather than have to make uncompensated forays to divisional outlets to pick up their supplies. Alternatively village pharmacies could be permitted to tack an additional 15 per cent onto controlled price levels, in recognition of the added real cost involved in moving goods from divisional centers to outlying villages.

Should this be unacceptable to the government and/or Pharmacie Populaire, a strong case could be made for asking either one or the other to provide a 15 per cent subsidy to induce traders to move the drugs to the villages. At least it would be far cheaper than maintaining the present PSR supervision program.

In other spheres of commerce the government accepts as unavoidable a transport differential in the pricing of commoditics in isolated areas. See, for example, the FM 100/litre supplement on the gasoline price in Koro. The government is unwilling to underwrite the cost of transporting fuel to Koro for public sale, itself a fuel-intensive operation as noted in Section III.

Yet Koro residents insist on being able to purchase fuel locally. Ironically it is the very inhabitants of isolated areas, whom the government seeks to help via uniform pricing policies, who are most often left worse off because they are deprived of access to steady supplies that the private sector could assure them if allowed to cover the real costs of distribution.

To be sure there are drawbacks associated with the proposed steps towards partially "privatizing" the internal drug trade--some of them analogous to problems mentioned above in connection with the possibility of opening up drug procurement and importation to private competition. The same unscrupulous traders can peddle expired or counterfeit drugs in the villages, perhaps offering the H-Ss a "discount" for the latter to retain as compensation for an otherwise volunteer duty. Not all H-Ss will fall for such an approach, and most traders approved by Pharmacie Populaire or another appropriate authority to deal in drugs will see it in their interest to establish a relationship of trust with both sources and dispensers of drugs. Even so the public sector agencies involved must develop a capacity to conduct spot checks of village pharmacies and traders' stocks; and even if this works well, some abuses are likely to occur.

If one concludes that the harm from occasional abuses associated with liberalizing the internal drug trade is likely to outweigh the benefits from resupplying most village pharmacies in a timely manner at little cost to

government, then the alternative is to improve the performance of the FGRs (cooperatives), ensuring that they maintain adquate stocks to serve H-Ss who stop in for their supplies. In the time allotted for field work the authors were unable to examine records of the FGRs and their parent organization, the CAC, with a view to ascertaining problems that have arisen in their handling of pharmaceuticals and considering ways and means of overcoming these. Relying on FGRs to resupply the H-Ss will give rise to the same problem of prices and commissions mentioned above. At present the primary incentive to FGRs to trade in drugs is the 15 per cent margin allowed them by Pharmacie Populaire; if they are required to relinquish this to the villages their interest in the business will certainly evaporate completely.

Even if an intensive supervision program were no longer required to effect replenishment of drug supplies periodic village tours by AM staff--at least once a year preferably more often--would surely yield benefits in excess of their cost by way of assessing VHW attrition, verifying the operation of the drug distribution machinery and maintaining the VHWs' awareness of their role in an integrated health care system. Occasional refresher courses would also serve a useful purpose. Cast in the light of upgrading the VHWs' skills, such training could be depicted as an exercise in human capital formation rather than purely maintenance of existing capacity, and might thus be eligible for foreign aid financing.

V. PROPOSALS FOR FURTHER RESEARCH ON P.S.R.

This concluding section brings together proposals for further research on PSR, primarily with respect to economic and sociological issues of the project that are either advanced explicitly at various points in the preceding four sections or else emerge implicitly from the discussion in the text. A portion of the research proposed could be carried out by members of the evaluation team scheduled to present a report in November 1981 on the basis of which the Malian government and USAID will discuss whether to continue PSR for a second phase, and if so, what changes to make in the current *modus operandi*. Other studies, if agreed to, would form part of the programme of activities for the final year of the PSR's present phase. Some could be carried out by local and expatriate staff of the PSR, others would require enlisting the services of Malian professionals, either government officials or consultants, outside the project, in some cases with a possible assist from expatriate consultants.

1. *Epidemiological surveys*. Table 1 (pp. 7-9) summarizes the findings of field surveys in Koro and Yélimané districts carried out under PSR auspices between May 1978 and April 1981. While recognizing the imprecision that characterized some of the diagnosis, the authors see enough consistency in the findings of different investigators to suggest that a tentative

baseline of pre-PSR epidemiological data does exist. Accordingly they propose that similar surveys be carried out by PSR personnel during the coming slack season (starting in November in VHW- served villages of both Koro and Yelimané.) On page 13 they raise the possibility of asking Dr. Sissoko to consult on survey design with a view to maximizing consistency in diagnostic criteria.

2. Malaria survey in Koro. Whether or not a broad-gauged epidemiological survey is carried out in Koro, a new malaria survey among the target age group of the forthcoming nivaquinization campaign (6 mos. to 4 years) has top priority in order to determine whether this type of intervention can reduce the current incidence of around 50 per cent in that group (see page 12 above) as well as its mortality.

3. PSR client satisfaction survey. The authors feel that insufficient attention has been devoted to determining how far the H-Ss' patients feel they have been helped by the advice given and drugs prescribed (pp. 14-15). They suggest that a Malian sociologist, accompanied by an interpretor, moving with as little fanfare as possible within a random sample of H-S-served villages, stating as his objective to ascertain the effectiveness of the drugs supplied, could pick up some meaningful observations.

4. Objective testing of VHWs' knowledge level. In January 1980 Daulaire and Taylor devised and administered a knowledge test among 20 H-Ss in Yélimané. Grades ranged from ... to ... out of a possible score of 20. Daulaire-Taylor found a modest correlation between scores and intensity of supervision by AM staff (see page 82 above). The authors feel it would be worthwhile to administer a new uniform test to samples of Koro and Yélimané H-Ss and TBAs, comparing the results between the two districts and once again correlating them with supervision activity.

5. Comparison of Koro VHWs on monthly and bimonthly supervision. Mention was made (see page 84) of PSR/Koro's intention in mid-1981 to initiate bimonthly supervision of H-Ss who had been functioning not less than 15 months and, within the next 12 months, to undertake some comparisons between their activity and that of their counterparts still subject to monthly supervision. By the end of June 1981 some 42 H-Ss or about half of those believed to be functioning as of April 1981 will have been on the job 15 months or longer (all except the last two training cohorts). So that the comparison may not be biased by the factor of longevity of service it might be preferable to reduce the supervision intensity in only half the villages (i.e. about ten) of this group of H-Ss.

One means of comparison would be the objective knowledge test described under (4) above. Another means would be via statistical analysis of H-S consultation, prescription and drug sales records as copied and reported back to AM headquarters by the supervisors.

Given ~~that the majority of H-Ss are illiterate~~ the considerable number of illiterate H-Ss there is a danger that such comparisons would be biased by a greater degree of incompleteness of records in the case of H-Ss who are being asked to recall two months of activity rather than only one. Supervisors will have to take particular care to impress on illiterate H-Ss the need to maintain the special register designed for them, about which many are reported to be somewhat lax.

6. Sociological questions requiring investigation. Under this heading the authors suggest two additions to the terms of reference of the sociologist who will participate in the November 1981 evaluation exercise. Indeed, together with the client satisfaction survey proposed under (3) above, these issues strike us as meriting professional input going beyond the brief time span of that exercise. The questions are:

(i) applying lessons that have been learned in sociological analysis of bureaucracies in both developed and less-developed countries, and taking into account particular problems of staff morale and productivity arising out of Mali's situation of fiscal stringency, what predictions can be made about the long-run effectiveness of the district health service staff in carrying out their tasks under PSR once the special complements available through foreign aid have been dispensed with? What degree of initiative can AM supervisors be counted on to take in analyzing the problems faced by the VHWs they deal with, what will be the normal extent of communication between supervisors and supervisees, what image do the VHWs and

village authorities now have and can be expected to acquire in future of the supervisory staff, and, finally, how will all this affect the project's productivity? At the pessimistic extreme, one can envisage a scenario where staff at this level would be too demoralized, too burdened with their own problems of daily survival, to render service commensurate with the costs of the present supervision approach. The authors feel that the goals, motivations, skills and energy of the AM staff are as important a variable for purposes of PSR evaluation as are those of the VHWs, on which attention was properly focused in the mid-term evaluation (see particularly the reports of Cissé and Correze).

(ii) much has been said, and a good deal of what has been said has been codified in the mid-term evaluation reports, to the effect that the VHWs are playing a very limited role, compared with what was expected of them in the project design phase, in raising community health consciousness and promoting sanitary practices that will reduce the incidence of disease. At one extreme, the H-Ss are sometimes described as glorified pill merchants, while the contribution to environmental sanitation made by the TBAs, the importance of whose traditional office is obvious, is said to be imperceptible. The challenge that these observations pose to our sociologist colleagues is to tell us under what circumstances one can envisage VHWs playing a significant role in environmental sanitation.

Is it realistic to expect them to prowl around the community uncovering public health hazards and chiding their neighbors and relatives for causing and tolerating them? What personal qualities motivate VHWs to play a broader community health role and give them some degree of success in it? What policy alternatives are open to the PSR management in this domain, short of promoting a process of general economic growth, accompanied (or preceded) by universal primary education, that will take many years and a huge volume of resources not visible anywhere on Mali's horizon?

7. Ascertaining the village authorities' attitude towards a regular PSR levy. In discussing ways and means of financing PSR (page 121) the authors proposed enlisting the help of the district and divisional administrations to sound out the receptivity of the village authorities to a PSR levy, parallel to the existing CAC and School & Youth levies that represent earmarked supplements to the Minimum Fiscal (head tax), as a last resort to keep the present supervision and drug resupply program in operation. The authors could identify no other way of financing the program over the long run, and feel that sooner or later such a survey will be necessary. Obviously not all direct responses can be taken at face value, but an appropriate line of questioning should succeed in deriving some impression as to whether the village authorities value the program sufficiently to accept a levy in lieu of seeing it collapse.

8. Alternatives to drug distribution by AM supervisors. Under this heading the authors raised a number of questions which they propose should be investigated by Malian economists, whether assigned by the Ministry of Public Health's National Planning Directorate or engaged as outside consultants. The topics include:

(i) How have the village pharmacies in Yèlimanè resupplied themselves in the absence of AM staff supervision? (Page 19).

(ii) Field survey of a sample of village pharmacies established under other primary health care interventions in Mali that have lost convenient access to drug supplies and accordingly ceased to function. (Pp. 148-50).

(iii) Review of drug and other retail operations of a sample of FGRs (Fédérations des Groupements Ruraux) to ascertain ways and means of making these agencies into reliable sources of resupply for the pharmacies. (Pp. 153-54).

(iv) On-the-spot observation of retail drug trade in other West African countries where private traders play a role in the distribution of basic medicines. The authors heard Benin mentioned as a relevant case, and assume other countries could be readily identified. (Page 151).

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