



Summary
2000 Program Review for Global 2000 River Blindness Programs
Cameroon, Ethiopia, Nigeria, OEPA, Sudan, and Uganda
26-28 February 2001
The Carter Center
Atlanta, GA

September 12, 2001

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Acronyms

arv	at-risk villages (villages requiring community-wide active mass therapy)
ATO	Annual Treatment Objective
APOC	African Program for Onchocerciasis Control
CBD	Community-based Distributors (pre-APOC strategy)
CDC	Centers for Disease Control and Prevention
CDD	Community-Directed Distributors (APOC strategy)
CDTI	Community-directed Treatment with Ivermectin
CFA	Central African Francs
CNS	Central Nervous System
earp	eligible at-risk population
DEC	diethylcarbamazine
FMOH	Federal Ministry of Health of Nigeria
GOS	Government of Sudan
GRBP	Global 2000 River Blindness Program of The Carter Center
GSK	GlaxoSmithKline
HNI	HealthNet International
HQ	Headquarters
Hrv	(OEPA term) highest risk villages for morbidity, prevalence of microfilaria in skin greater than 59%
ICT	immunochromatographic card test
IDB	InterAmerican Development Bank
IDP	Ivermectin Distribution Program
IEC	Information, Education, and Communication
IACO	InterAmerican Conference on Onchocerciasis
LCIF	Lions Clubs International Foundation
LF	Lymphatic Filariasis
LGA	Local Government Area (Nigeria)
MDP	Mectizan Donation Program
MEC	Mectizan Expert Committee
Mectizan®	Ivermectin (Merck & Co. product name)
MOH	Ministry of Health
NGDO	Nongovernmental Development Organization
NOCP	National Onchocerciasis Control Program
NOTF	National Onchocerciasis Task Force
OEPA	Onchocerciasis Elimination Program of the Americas
OLS	Operation Lifeline Sudan
OV	<i>Onchocerca volvulus</i>
PAHO	Pan American Health Organization
PCC	Program Coordination Committee of OEPA
PCR	Polymerase Chain Reaction
PHC	Primary Health Care
RBF	River Blindness Foundation
REA	Rapid Epidemiological Assessment
REMO	Rapid Epidemiological Mapping of Onchocerciasis
SAE	Severe Adverse Effect

SH..... *Schistosomiasis haematobium* (urinary schistosomiasis)
SMTC..... Sustainable Management Training Center, Jos, Nigeria
SRRA..... Sudan Relief and Rehabilitation Association
SSOCP..... South Sudan Onchocerciasis Control Program
TCC..... Technical Consultative Committee of APOC
TX..... treatments
UNICEF..... United Nations Children’s Fund
UTG..... Ultimate Treatment Goal
WHO..... World Health Organization
WVI..... World Vision International

ABSTRACT

The vector born parasite *Onchocerca volvulus* (causing river blindness) infects about 18 million people in 37 countries, 770,000 of whom are blinded or severely visually impaired. Periodic mass treatment with ivermectin (Mectizan®) in disease-endemic communities prevents eye and skin disease caused by this infection. As part of a global effort to eliminate onchocerciasis as a public health problem by the year 2007, the Global 2000 River Blindness Program (GRBP) of The Carter Center collaborates with the ministries of health of 11 countries, maintains field offices in Guatemala, Cameroon, Nigeria, Sudan, Kenya, Ethiopia and Uganda, and belongs to international coalitions that include the Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), the World Bank, the InterAmerican Development Bank (IDB), Merck & Co., international bilateral donors, and other nongovernmental development organizations (NGDO). Special GRBP partners include the Lions Clubs International Foundation (LCIF), and the African Programme for Onchocerciasis Control (APOC). In October 1999, The Carter Center and Lions Clubs announced the Lions-Carter Center Sight First Initiative to increase our collaboration in the global effort for onchocerciasis control, including the establishment of a new river blindness control program in Ethiopia.

The Carter Center hosted its fifth annual Review for 2000 program activities of its GRBP on February 26-28, 2001 in Atlanta. The objectives of the Program Review were to: 1) assess the status of each program, 2) identify impediments and problems in program implementation and potential solutions, and 3) promote sharing and standardization of information. Each GRBP-assisted program reported on the number of assisted Mectizan treatments provided, training, research and development activities, and surveillance for adverse reactions to treatment. The African programs also reported on their APOC experiences. The Nigeria program reported on the pilot initiatives for combining lymphatic filariasis elimination and schistosomiasis control with onchocerciasis control activities. Key aspects of the discussions are summarized in this report.

Since its launching in 1996, GRBP has assisted in providing over 28.4 million Mectizan treatment encounters. In 2000, 7,229,829 persons were treated (97% of the 2000 annual treatment objective [ATO]) in GRBP-assisted programs, a 9% increase in treatments over 1999. This represents 77% of the Ultimate Treatment Goal (UTG) for GRBP-assisted programs. As in previous years, 65% of all GRBP treatments were in Nigeria. Of the treatments in 2000, 7,015,575 (97%) were accomplished in partnership with the LCIF Program in Nigeria, Cameroon, Uganda, Sudan, and the Onchocerciasis Elimination Program for the Americas (OEPA). The GRBP ATO for 2001 is about 8 million treatments, an 8% increase over 2000 treatments. Priorities for GRBP in 2001 include: 1) maximizing treatment and health education efforts to reach ATO's and UTG's, 2) monthly reporting of Mectizan treatments, 3) documenting interruption of transmission in the Americas, 4) initiation of treatments in Ethiopia, 5) sustainability of treatment coverage and 6) adapting Mectizan distribution and health education methods to lymphatic filariasis elimination and schistosomiasis control.

EXECUTIVE SUMMARY

The Program Review

The GRBP hosted its fifth annual Program Review on February 26-28, 2001 at The Carter Center in Atlanta. The review is modeled after similar reviews developed for national Guinea Worm Eradication Programs by The Carter Center's Global 2000 program and CDC, beginning with Pakistan in 1988. The main purposes of the review, which was chaired by Dr. Frank Richards (Technical Director, GRBP), were to assess the status of each program and to determine impediments and problems in program implementation. In attendance (Annex 1) were GRBP country representatives Dr. Albert Eyamba (Cameroon), Mr. Teshome Gebre (Ethiopia), Mr. Moses Katarwa (Uganda), Dr. Emmanuel Miri (Nigeria), Dr. Mauricio Sauerbrey (Onchocerciasis Elimination Program for the Americas [OEPA]), Mr. Elvin Hilyer (Sudan/Khartoum), Ms. Kelly Callahan (Sudan/Nairobi), as well as Prof. Mamoun Homeida, (Chairman, National Onchocerciasis Task Force [NOTF], Sudan), Ms. Irene Mueller (Program Manager, HealthNet International [HNI], Sudan), and Global 2000 Atlanta headquarters staff. Special guests included Mr. Peter Lynch (LCIF), Ms. Minnie Iwamoto (Manager of Lymphatic Filariasis, GlaxoSmithKline [GSK]), Dr. Dan Colley (Director, Division of Parasitic Diseases, CDC), Dr. Steve Blount (Director of Global Health, CDC), Mr. Ross Cox (Deputy Director of Global Health, CDC), Dr. Danny Haddad (Helen Keller Worldwide [HKW]), Drs. Beatrice Bezamalinovic and Allan Fenwick (Harvard School of Public Health), Dr. Ed Cupp (Auburn University, Auburn, Alabama), Dr. Tom Unnasch (University of Alabama at Birmingham), Dr. Deborah McFarland (Emory University), Dr. Tovi Lehmann (CDC Entomologist), Dr. Mary Alleman (Mectizan® Donation Program), and Dr. Charles Mackenzie (Michigan State University), among other observers.

Each program made a three hour presentation (Annex 2), with discussions focused on treatment and training activities, 2000 and 2001 ATO's, UTG's, health education, sustainability issues, Mectizan security, epidemiological assessment activities, operations research, and administrative issues. Key aspects of the Program Review, supplemented by updated treatment data provided since the meeting, are summarized in this report, as are recommendations for GRBP actions in 2001.

River Blindness: The Disease and its Control

Infection with the vector-borne parasite *Onchocerca volvulus* (causing human onchocerciasis) is characterized by chronic skin and eye lesions. The World Health Organization estimates that at least 17.7 million people are infected, 500,000 are visually impaired and another 270,000 are blinded from onchocerciasis in the 37 endemic countries. Approximately 123 million people live in endemic areas worldwide and are therefore at risk of infection; over 95% reside in Africa. Onchocerciasis is transmitted by small black flies that breed in rapidly flowing rivers and streams, thus leading to the common name for the disease, "river blindness." The adult parasites are long-lived (between 8-15 years), and the prelarval forms (called *microfilaria*) released by the thousands by female worms enter into the skin and eyes and cause inflammation and disease. Mectizan (ivermectin) a microfilaricidal drug that can be given as a single

oral dose annually in "mass" community-based treatment programs, while not being curative can prevent disease from developing in those who are infected. In 1987, Merck & Co. decided to donate Mectizan, for as long as necessary, to all people affected by onchocerciasis. This donation was an important stimulus for the current initiative to globally control onchocerciasis using a strategy of community-based treatment.

The Carter Center and River Blindness: In 1987, Merck approached then executive director of The Carter Center Dr. William Foege for assistance in organizing the global distribution of Mectizan. The MEC/MDP was created in 1988 and housed at the Atlanta-based Task Force for Child Survival and Development, an independent partner of The Carter Center. The global initiative has grown to one that has enabled about 30 million treatments per year since 1996 and over 150 million treatments since the MDP began. Indeed, the donation has stimulated what is widely considered a model of how industry, international organizations, donors, and national ministries of health can successfully work together toward a common goal.

In 1996, The Carter Center expanded its role in the coalition fighting river blindness by acquiring most of the operations of the River Blindness Foundation (RBF), a nongovernmental development organization (NGDO) founded by John and Rebecca Moores in 1990. The GRBP was established at The Carter Center to assume the field activities of the RBF. GRBP's primary aim is to help residents of affected communities and local health workers establish and/or sustain Mectizan distribution and related health education activities. The office in Guatemala serves OEPA, which coordinates activities to completely eliminate the infection in all six onchocerciasis-endemic countries in the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico, Venezuela). In 1997, GRBP expanded to a collaborative program in Sudan (with support of Lions Clubs SightFirst) as a part of The Carter Center's peace initiative and Guinea worm disease eradication efforts there. In 1999, with expanded support from LCIF (under a new Lions-Carter Center Sight First Initiative), The Carter Center accepted an invitation to assist in onchocerciasis control activities in Ethiopia.

Partnerships:

The GRBP of the Carter Center works in partnerships at all levels. In all cases, the program works with ministries of health (MOHs) and their national onchocerciasis control programs executed within and through the indigenous primary health care system. GRBP staff work in the field with the rural communities using information, education, and communication techniques (IEC) to improve understanding and empowerment of people to be full partners in the program and the drug delivery process. As mentioned above, GRBP has a long and evolving partnership with Lions Clubs and the Lions' SightFirst Program. Another key partner is the Division of Parasitic Diseases at the CDC, where GRBP technical staff members are housed. GRBP works closely with the MDP, at the Task Force for Child Survival and Development, also in Atlanta.

Partners in the African Programs: In Africa, GRBP partners include the MOHs in host countries (Cameroon, Ethiopia, Nigeria, Sudan, and Uganda), United Nations

organizations (WHO, UNICEF, and the World Bank), and other NGDO's. In 2000, The Carter Center's relationship in Africa with the Lions Clubs expanded from GRBP-assisted activities in Cameroon, Nigeria, and Sudan, to include Uganda and Ethiopia. GRBP is a member of the NGDO Coalition for Mectizan Distribution that includes (among others) Christoffel Blindenmission, Helen Keller Worldwide, Interchurch Medical Assistance, International Eye Foundation, HealthNet International, Lions Clubs International Foundation, l'Organisation pour la Prevention de la Cecite, Sight Savers International, and the US Committee for UNICEF. Another important partner is APOC, which is executed by WHO and funded through a trust fund housed at the World Bank. APOC, a \$124 million dollar, twelve-year program launched in 1995, aims to establish by 2007 "community-directed" river blindness treatment programs in an estimated 19 African countries. The APOC provides funds and technical/managerial support to five year Mectizan distribution projects carried out by ministry of health/NGDO partnerships. The Carter Center currently has 13 projects assisted by APOC, in five African countries. The Carter Center also plays a special institutional role in APOC through a standing seat on the APOC technical steering committee (the Technical Consultative Committee). Within the national coalitions, GRBP country representatives currently chair the Uganda and Cameroon national NGDO coordination groups.

Partners in the American Programs: GRBP/The Carter Center provides the administrative framework for OEPA. Headquartered in Guatemala, OEPA is the technical and coordinating body of a multinational, multiagency coalition working for the elimination of all onchocerciasis morbidity and transmission from the Americas by the year 2007. Regional technical and programmatic goals are developed by a Program Coordinating Committee (PCC) with representation from key members of the initiative (and on which The Carter Center holds two institutional seats). GRBP works with the Pan American Health Organization (PAHO), the CDC, and several US and Latin American universities. The Carter Center has partial funding for OEPA from the InterAmerican Development Bank. Through the OEPA initiative, GRBP indirectly partners with the national programs and MOHs of all six endemic countries of the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela). In 2000, The Carter Center's partnership with Lions Clubs expanded to include OEPA; the Lions now hold an institutional seat on PCC.

Assisted Treatments

Nomenclature used by the GRBP program: A major focus of GRBP is on routine reporting by assisted programs. The reader is referred to Annex 3 for a discussion of the GRBP reporting process, and treatment indices used by the program and in this report. Important terms include the treatments achieved (TX), ultimate treatment goal (UTG), annual treatment objectives (ATO), eligible at risk population (earp), at risk villages (arv), and full coverage (defined as 85% achievement of the UTG).

Treatments Assisted by the Program: In 2000, the GRBP program had reached 77% of its overall UTG of 9,339,279 by assisting in Mectizan treatments of 7,229,829

persons (Figure 1). The Uganda program reached 96% of its UTG and Nigeria reached 88%. Programs in need of additional growth included Cameroon (58% of UTG) and Sudan (61%).

In 2000, GRBP assisted in providing health education and Mectizan treatments to a total of 7,229,829 eligible at risk persons in 14,804 arv's in 10 GRBP-assisted country programs (97% of the 2000 treatment objective); this represented a 5% increase in treatments over 1999 (Figure 2). Summary tables of monthly treatments of eligible at-risk populations (earp) and arv's by program are provided for the years 1999 and 2000 (Tables 1 and 2). Most (65%) treatments in 2000 were in Nigeria (Figure 3); treatments had not yet begun in Ethiopia. Of all treatments in 2000, 7,015,575 (97%) were accomplished in partnership with LCIF (Figure 4). Since its launching in 1996, GRBP has assisted in providing over 28.4 million treatments with Mectizan, 75% of which have been in partnership with Lions Clubs (Figure 5).

The GRBP Annual Treatment Objective (ATO) for the eligible at risk population (earp) projection for 2001 is 7,995,927 million treatments with Mectizan (Figure 2). Table 3 shows GRBP ATO's in recent years. GRBP projected a 35% growth in earp treatments between years 1996-97, a 12% increase for 1997-98, an 11% increase between 1998-99, an 8% increase between 1999-2000, and an 8% increase between 2000-2001. Many GRBP-assisted programs (Nigeria, Uganda, Mexico, Ecuador, and Colombia) have or are reaching their UTG in their areas of operation, and thus theoretically have reached full treatment coverage (Once the UTG is reached no further growth would be expected in future years, other than that represented by routine population growth of 2-4% annually). GRBP-assisted areas in need of ATO expansion toward the UTG include Cameroon, Sudan, Ethiopia, Venezuela, Guatemala, and Brazil. The overall 2001 ATO of 8,016,909 will aim to reach 86% of the GRBP UTG of 9,339,279 treatments (Figure 2 & Table 4). Attaining full coverage quickly is especially urgent in the Americas because of the goal to eliminate onchocerciasis transmission and morbidity by 2007 there.

The cost per treatment in GRBP-assisted African programs was approximately \$0.20 in all African countries except Sudan (Figure 6) due to the war. Cost per treatment decreased in 2000 compared to 1999 in Cameroon and Uganda, but increased in Nigeria and Sudan.

Sustainability of treatment activities: In Africa, Mectizan delivery must be sustained indefinitely since the APOC program strategy (annual treatment only in highly endemic villages) does not aim to interrupt all transmission of the *O. volvulus* parasite. Fundamental to APOC, therefore, is establishing "sustainable" Mectizan delivery systems that will continue after the withdrawal of external funding. APOC advocates "Community Directed Treatment with Ivermectin" (CDTI) as the favored distribution method over "community-based" or "mobile distribution". CDTI focuses on the empowerment of communities to make informed decisions regarding the mass treatment process (timing, location, distributors, remuneration, etc). It is thought that such empowerment will result in Mectizan distribution that will continue in those at risk areas long after APOC external support ceases. The interested reader is referred to the

special volume on the Mectizan program that appeared as a supplement to the *Annals of Tropical Medicine and Parasitology*, April 1998: 92, Supplement 1. Monitoring progress toward sustainability is an important element of APOC's program evaluation. GRBP also is trying to monitor indicators of the ability of the program to continue after external funds are withdrawn (see Annex 3), including community and government support for the program, and estimates of costs per treatment. In contrast, establishing indefinitely sustained treatment programs is not the goal of OEPA, since the strategy promoted in the Americas (twice per year community-wide active mass therapy in all endemic villages) is designed to interrupt the transmission of the onchocerca parasite. If OEPA is successful, at some point mass Mectizan treatments can be halted.

Adapting Mectizan distribution and health education methods to lymphatic filariasis and schistosomiasis: The main strategies for the control of onchocerciasis and schistosomiasis morbidity and the elimination of lymphatic filariasis transmission are health education and annual mass chemotherapy with the safe oral drugs ivermectin (Mectizan), albendazole, and praziquantel. GRBP is assisting the Nigeria Federal Ministry of Health in a pilot initiative to incorporate lymphatic filariasis (LF) elimination and urinary schistosomiasis (SH) control into the onchocerciasis control program in Plateau and Nasarawa States. Interventions for SH commenced in villages with an SH prevalence of over 20% in October 1999, and by the end of 2000, 52,480 cumulative praziquantel treatment encounters have been provided since the launching of that intervention. Treatment for both onchocerciasis and LF is being carried out since March 2000 with a combination of Mectizan and albendazole; 159,555 persons were treated as of December 2000. There were no serious adverse reactions and no negative impact on the coverage of the onchocerciasis program by the addition of LF and SH activities.

GRBP PRIORITIES for 2001

Coverage:

- Seek to reach the UTG's that define "full treatment coverage" of GRBP-assisted areas, especially in the Americas, and sustain maximum health education and treatment coverage of the earp's and at risk villages in areas of GRBP-assisted activity.

Elimination:

- Move toward the goal of elimination of onchocerciasis transmission throughout the Americas, promoting a strategy of semiannual treatment and maximum coverage (85% of UTG in each of two treatment rounds per year).
- Help PAHO/WHO to establish a process by which to certify elimination.
- Document the impact of Mectizan distribution on transmission in Africa, and promote the idea that the APOC program should focus more on the opportunities to interrupt transmission (and so eliminate) onchocerciasis.

Reporting:

- Continue to emphasize monthly reporting of Mectizan treatments, using GRBP established nomenclature and indices.
- Improve financial reporting to APOC and the IDB.

APOC:

- Evaluate the transition to the APOC strategy of "CDTI" on treatment coverage of GRBP programs.
- Focus training in the GRBP-assisted states on reorienting health workers and villagers to the APOC CDTI strategy.
- Work with all partners to resolve the administrative bottlenecks posed by the APOC funding process.
- Evaluate results from APOC sponsored monitoring exercises of GRBP assisted programs.
- Encourage government contribution to onchocerciasis programs.

Mectizan Accountability:

- GRBP national and HQ financial staff should continue to evaluate samples of records (related to Mectizan inventory) on an ongoing basis, including random spot checks.
- GRBP ATO's should be the same as those on file with the MDP.

Lymphatic Filariasis and Urinary Schistosomiasis:

- Expand the lymphatic filariasis elimination (Mectizan/albendazole) and schistosomiasis control (praziquantel) efforts in Nigeria.

Figure 1

GRBP-Assisted Programs: Percent of Ultimate Treatment Goals reached in 2000

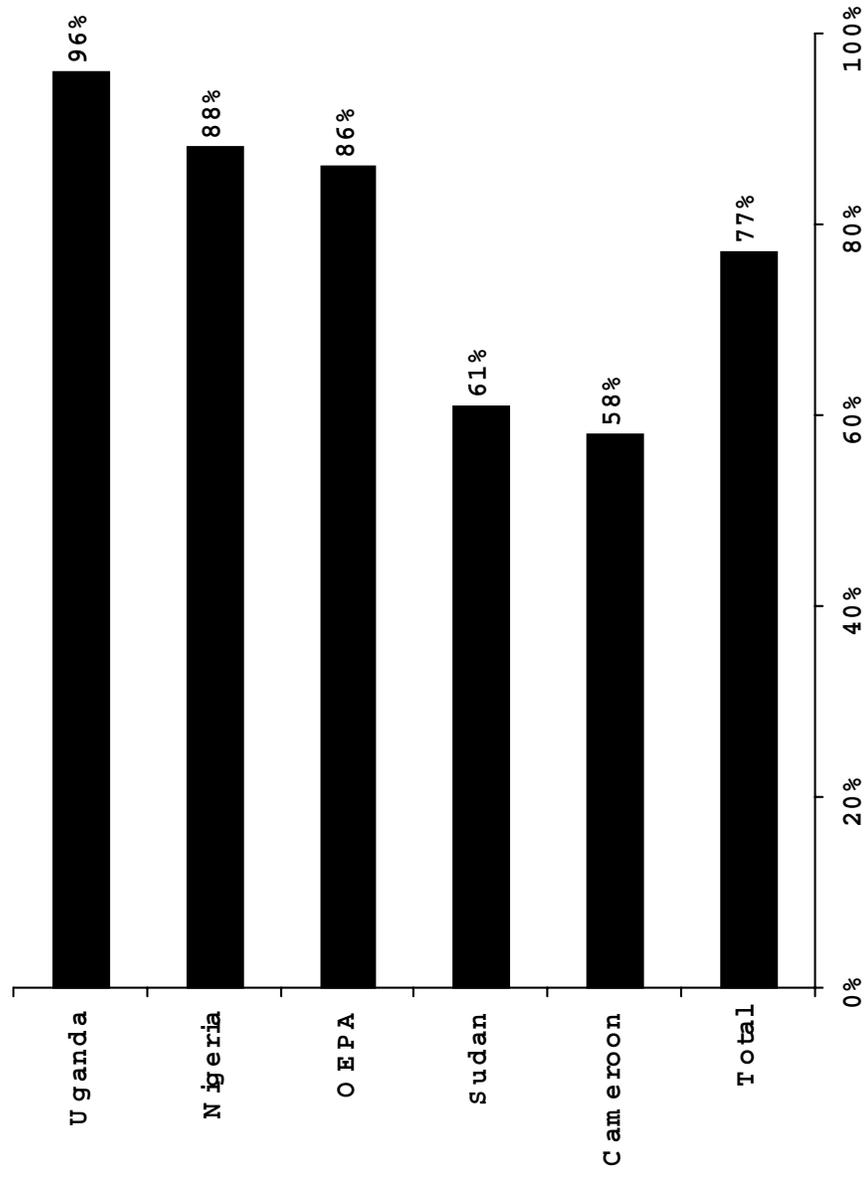


Figure 2

GRBP-assisted Programs: Mectizan Treatments 1996 - 2000, with the 2001 Annual Treatment Objective and Ultimate Treatment Goal (UTG)

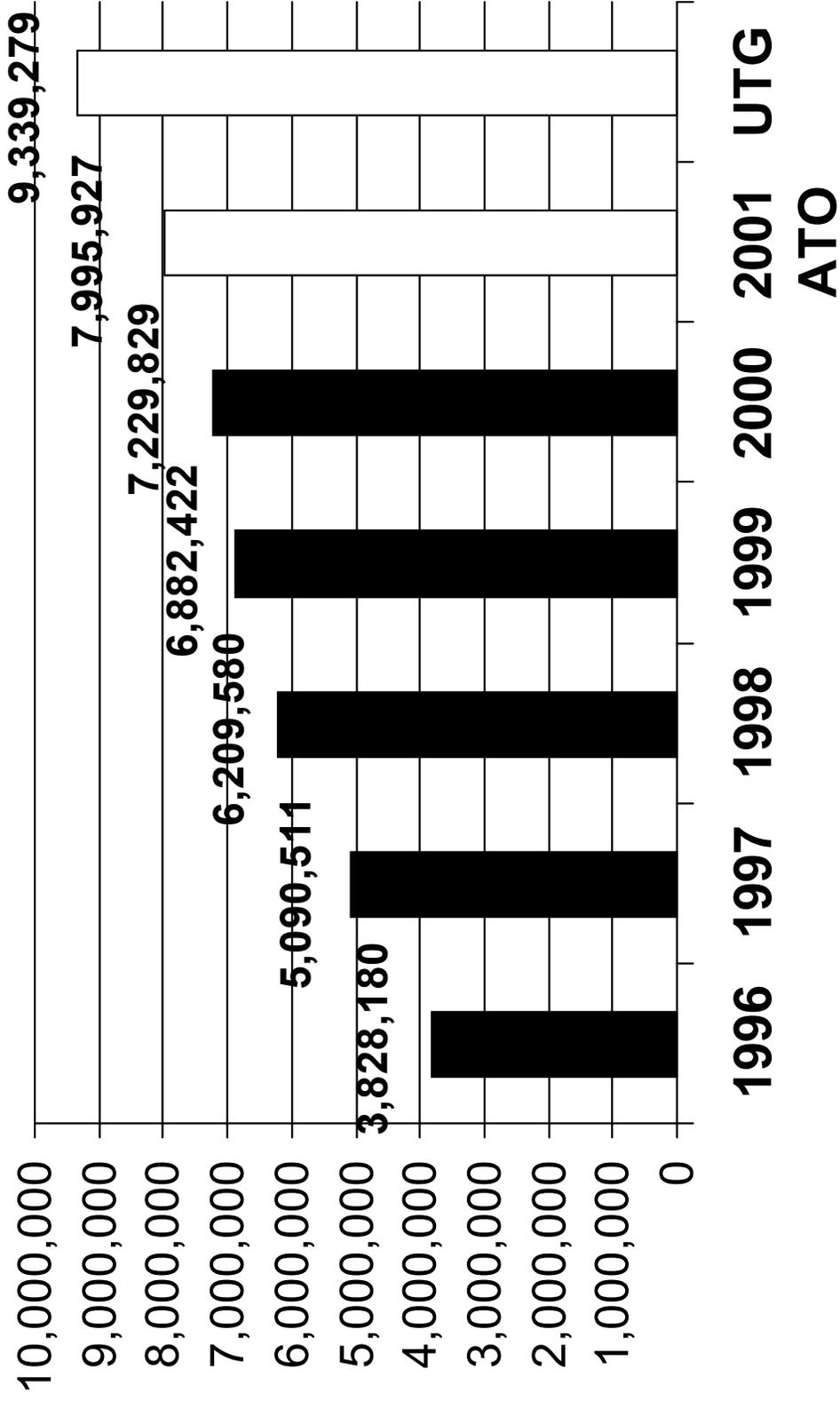


Figure 3

GRBP-assisted Programs: 1996 - 2000 Mectizan Treatments, and 2001 ATO, by program

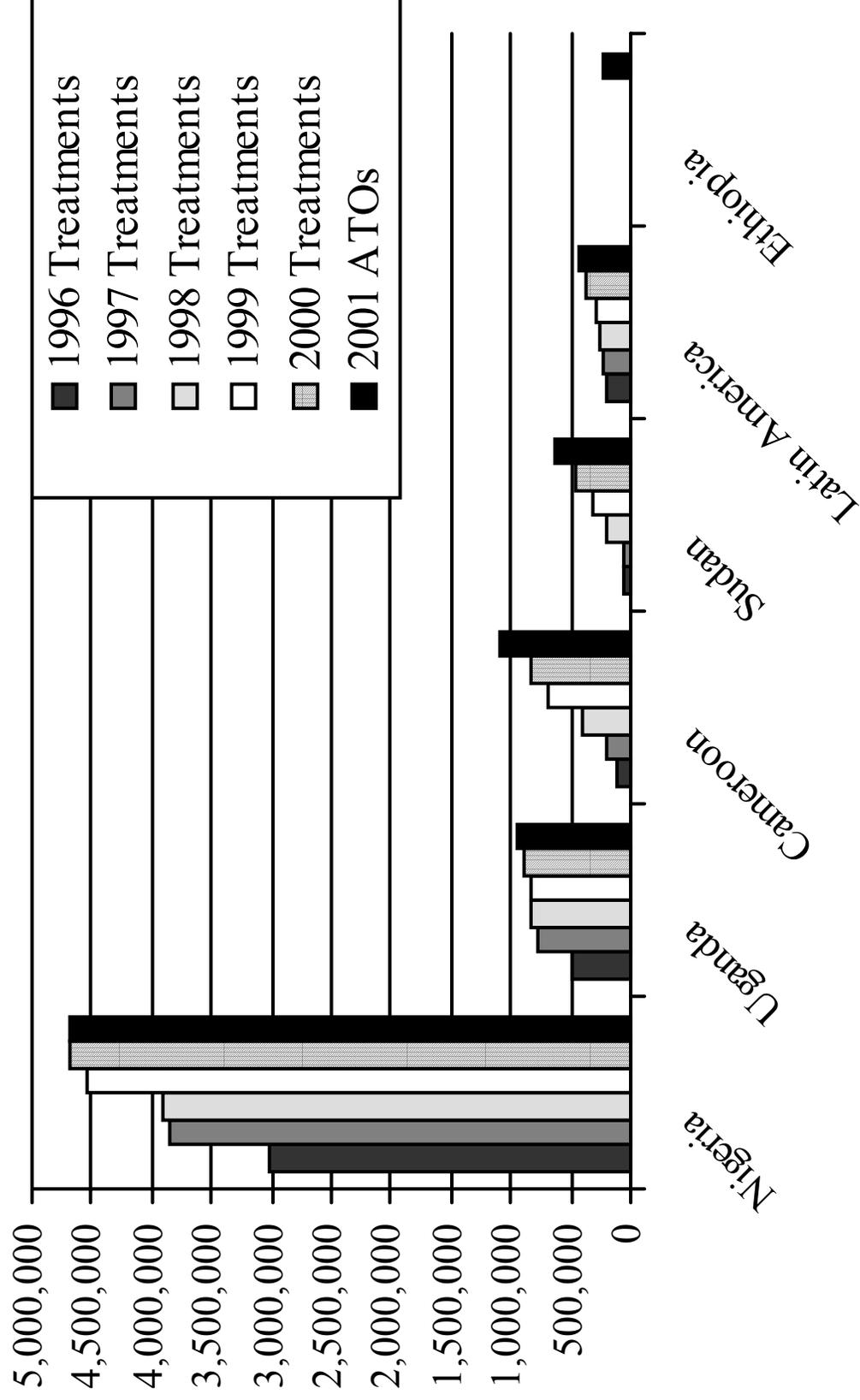


Figure 4

Cumulative Mectizan Treatments, Carter Center (GRBP)-Assisted and Carter Center / Lions-Assisted Programs

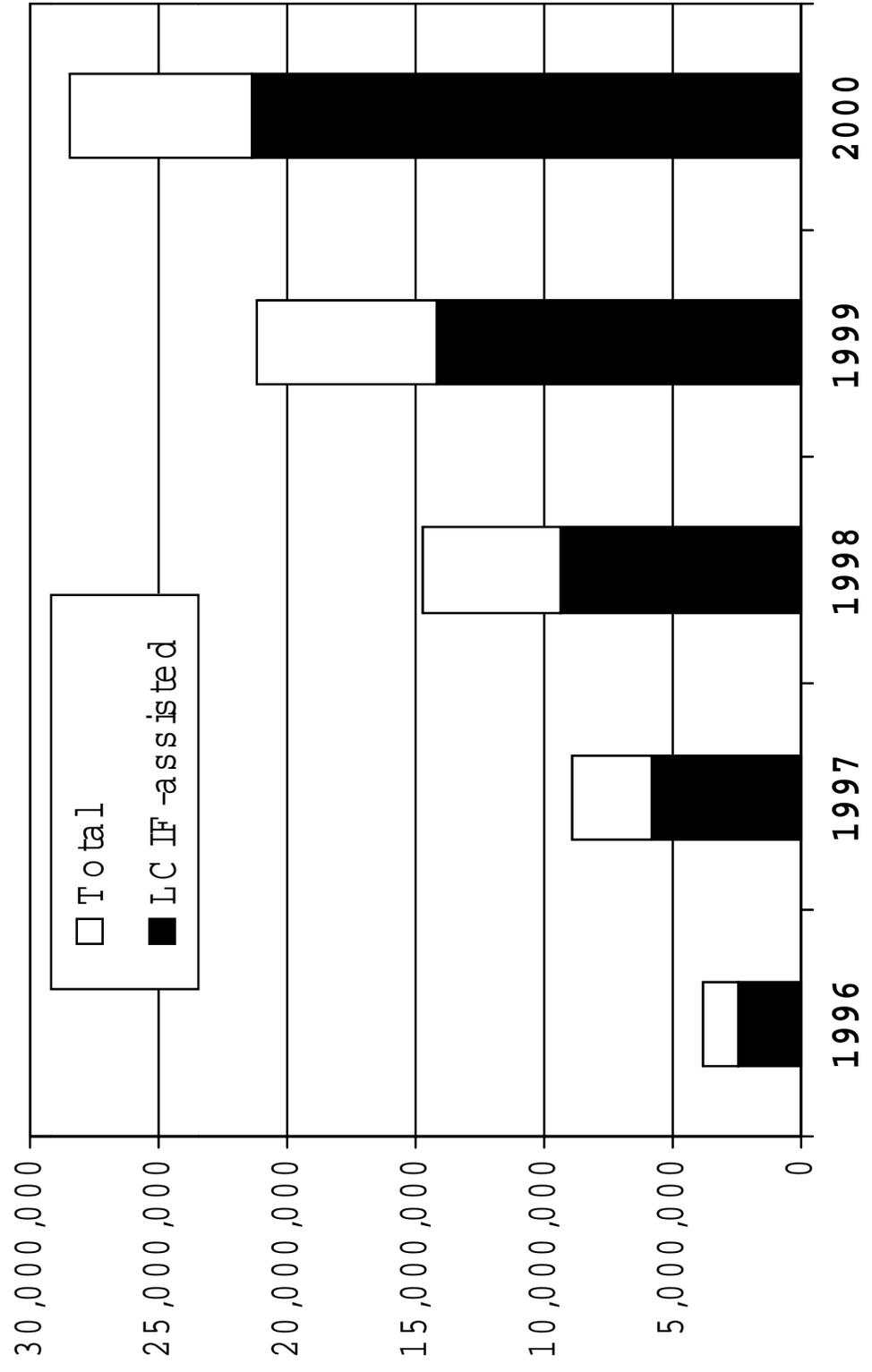


Figure 5

Cumulative Mectizan Treatments Delivered by Carter Center
(GRBP)-Assisted Programs

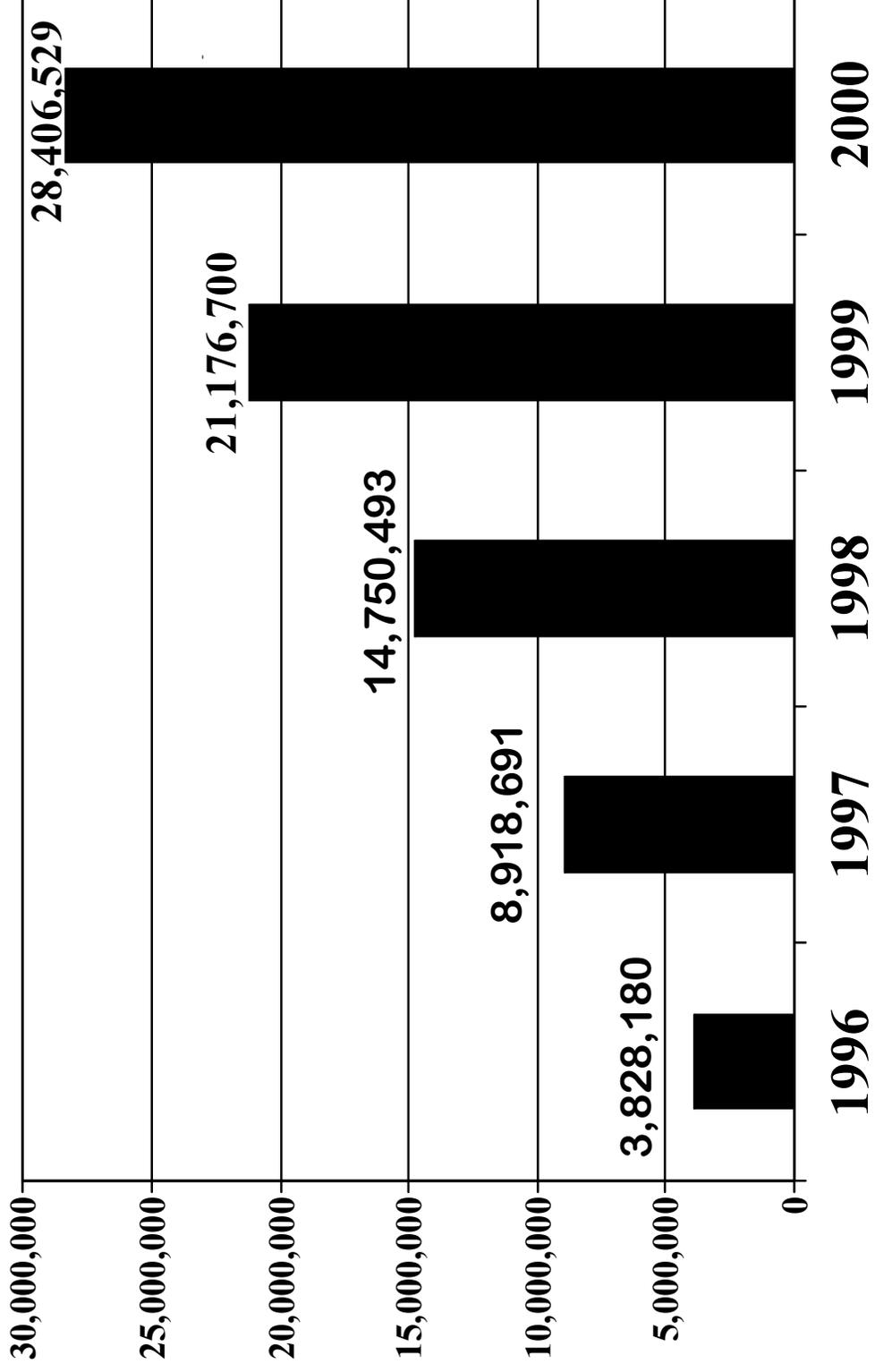


Figure 6

Cost per Treatment in GRBP-assisted African Programs, as reported at the 1998, 1999 and 2000 Program Reviews

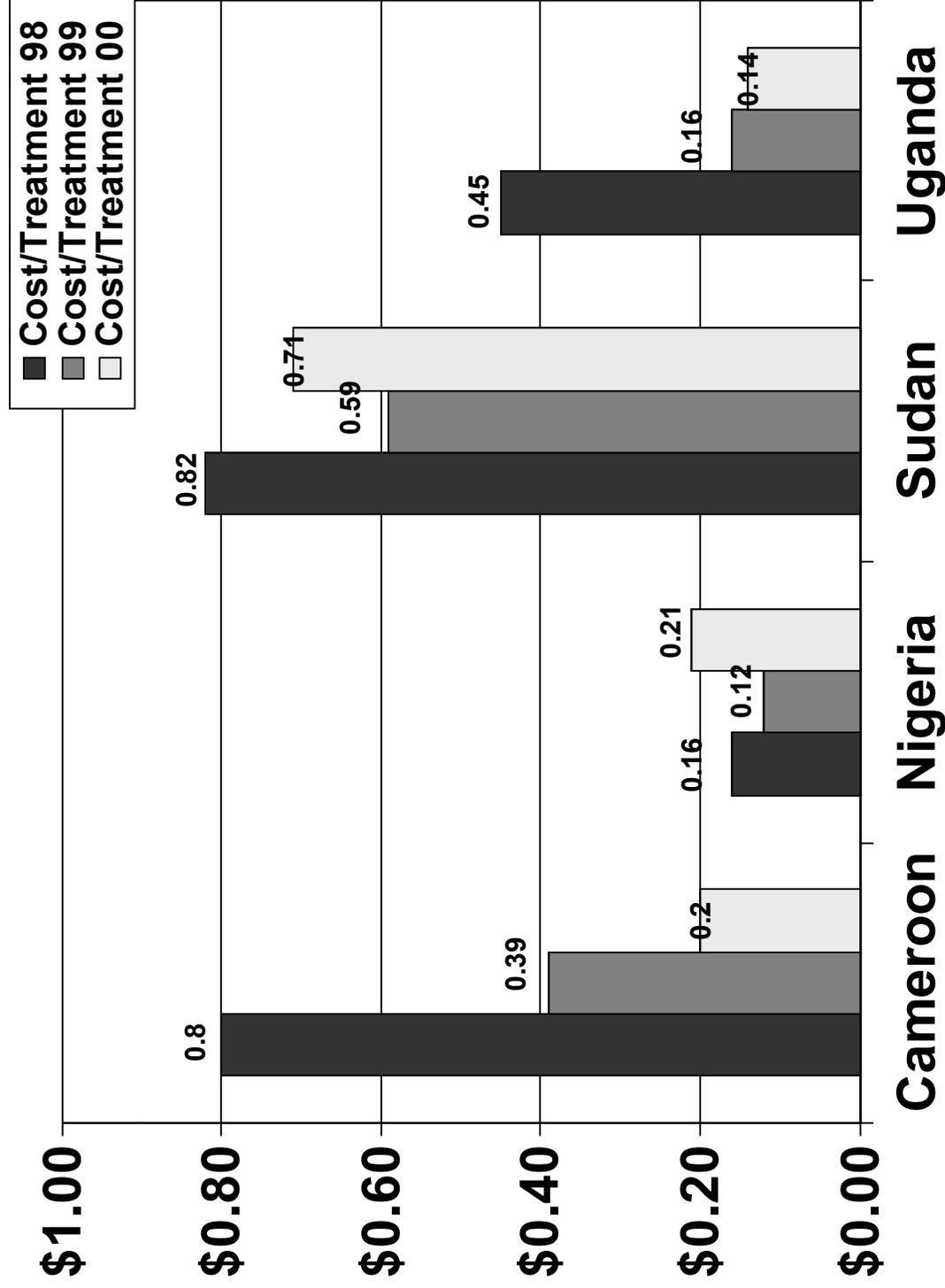


Table 1: Onchocerciasis: 1999 Mectizan treatment figures for Global 2000 River Blindness Program (GRBP)-assisted areas in Cameroon, Nigeria, Uganda, and Collaborative Programs in Latin America and Sudan

Country/TX Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	% ATO	% ALL GRBP TX	
NIGERIA	4,475,000		10,852													
TX(earp)	694	58,917	725,212	286,772	435,729	1,046,684	376,844	522,614	445,982	138,233	366,456	128,540	4,532,677	101%	69%	
TX(arv)	2	164	1,385	498	845	1,664	704	828	806	115	800	113	7,924	73%	59%	
UGANDA	868,466		1,730													
TX(earp)	0	13,966	173	16,230	145,995	135,944	68,869	34,477	99,827	164,298	139,440	248	819,467	94%	12%	
TX(arv)			31	166	166	255	344	50	171	299	248	0	1,730	100%	13%	
CAMEROON	817,134		2,611													
TX(earp)	72,902	28,849	20,325	20,015	56,551	32,367	65,069	85,704	104,671	116,336	38,729	36,926	678,444	83%	10%	
TX(arv)	210	155	85	109	134	77	150	501	298	134	49	265	2,167	83%	16%	
OEPA*	345,512		1,777													
TX(earp)			126,987			1,479				139,727		5,682	273,875	79%	4%	
TX(arv)			986							499		69	1,554	87%	12%	
SUDAN	376,310		32,108													
TX(earp)	6,689	8,556	23,045	44,261	44,261	28,017	0	1,072	7,379	0	0	175,652	326,779	87%	5%	
TX(arv)																
Cumulative totals	6,882,422		16,970													
TX(earp)	80,285	110,288	895,742	355,125	682,536	1,382,739	510,782	643,867	657,859	558,594	544,625	347,048	6,631,242	96%	100%	
TX(arv)	212	319	2,487	773	1,145	1,996	1,198	1,379	1,275	1,047	1,097	447	13,375	79%	100%	

ATO: Annual Treatment Objective TX: Number Treated earp: Eligible At Risk Population arv: At Risk Villages

*OEPA figures reported quarterly

Table 2: Onchocerciasis: 2000 Mectizan treatment figures for Global 2000 River Blindness Program (GRBP)-assisted areas in Cameroon, Nigeria, Uganda, and collaborative programs in Latin America and Sudan

Country/Tx Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	% ATO	% ALL GRBP TX	
NIGERIA	*ATO(earp)=	4,586,500	7,712													
TX(earp)	3,062	2,886	165,965	199,437	354,349	681,933	192,794	446,088	349,910	725,533	954,495	596,783	4,673,235	102%	65%	
TX(arv)			218	303	637	1,524	432	1,210	861	1,101	1,257	531	8,074	105%	57%	
UGANDA	*ATO(earp)=	931,568	1,890													
TX(earp)	12,539	817	776	156,414	97,087	150,257	189,757	80,853	134,964	41,985	18,344	19,636	903,429	97%	12%	
TX(arv)			490	2,611	162	339		134	221	544	0		1,890	100%	13%	
CAMEROON	ATO(earp)=	1,047,135	2,611													
TX(earp)					196,201	127,957	128,018	57,028	43,509	111,312		169,948	833,973	80%	12%	
TX(arv)					755	571	345	225	170	130			2,315	89%	16%	
OEPA*	ATO(earp)=	408,164	1,998													
TX(earp)			188,238			101,024			31,171			47,186	367,619	90%	5%	
TX(arv)			1,053			343			222			148	1,766	88%	13%	
SUDAN	ATO(earp)=	489,232	593													
TX(earp)	20,677	51,388	90,232	38,196	33,424	6,384	37,092	31,490	14,489	55,616	14,144	58,441	451,573	92%	6%	
TX(arv)																
Totals	ATO(earp)=	7,462,599	14,804													
TX(earp)	36,278	55,091	445,211	394,047	681,061	966,531	547,661	615,459	574,043	915,922	986,983	891,994	7,229,829	97%	100%	
TX(arv)	0	0	1,271	793	1,554	2,434	777	1,569	1,474	1,775	1,257	679	14,045	95%	100%	

ATO: Annual Treatment Objective, TX: Number Treated, earp: Eligible At Risk Population, arv: At Risk Villages (mass Mectizan treatment is provided)

*OEPA figures reported quarterly

Table 3
Programs, 1996-2001

	1996	1997	% change	1998	% change	1999	% change	2000	% change	2001	% change
Nigeria											
ATO(earp)	2,947,000	3,720,000	26%	4,030,000	8%	4,475,000	11%	4,586,500	2%	4,676,586	2%
ATO(arv)	7,014	8,207	17%	10,524	28%	10,852	3%	7,712	-29%	7,832	2%
Uganda											
ATO(earp)	648,514	900,414	39%	845,000	-6%	868,466	3%	931,568	7%	945,163	1.5%
ATO(arv)	1,418	1,933	36%	1,804	-7%	1,730	-4%	1,890	9%	1,890	0%
Cameroon											
ATO(earp)	207,021	585,085	183%	599,395	2%	817,134	36%	1,047,135	28%	1,079,189	3%
ATO(arv)	620	706	14%	2,053	191%	2,611	27%	2,611	0%	2,708	4%
Ethiopia											
ATO(earp)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	239,436	n/a
ATO(arv)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	247	n/a
OEPA											
ATO(earp)	328,576	361,851	10%	358,875	-1%	345,512	-4%	408,164	18%	429,920	5%
ATO(arv)	1,659	1,928	16%	1,799	-7%	1,777	-1%	1,998	12%	1,969	-1%
Sudan											
ATO(earp)				376,310		376,310	0%	489,232	30%	625,633	28%
ATO(arv)								593			
TOTAL											
ATO(earp)	4,131,111	5,567,350	35%	6,209,580	12%	6,882,422	11%	7,462,599	8%	7,995,927	7%
ATO(arv)	10,711	12,774	19%	16,180	27%	16,970	5%	14,804	-13%	14,646	-1%

ATO: Annual Treatment Objective TX: Number Treated

earp: Eligible At Risk Population

arv: At Risk Villages

Table 4: Treatment Goals and ATOS for GRBP-Assisted Programs

	Nigeria	% UTG	Uganda	% UTG	Cameroon	% UTG	Sudan	% UTG	OEPA	% UTG	Ethiopia	% UTG	TOTALS	% UTG
UTG	5302622	100%	945163	100%	1439472	100%	743230	100%	429920	100%	478872		9,339,279	100%
2001 ATOs	4676586	88%	945163	100%	1079189	75%	625633	84%	429920	100%	239436	50%	7,995,927	86%
2000 ATOs	4586500	86%	931568	99%	1047135	73%	489232	66%	408164	95%	--	--	7,462,599	80%
1999 ATOs	4475000	84%	868466	92%	817134	57%	376310	51%	345512	80%	--	--	6,882,422	74%
1998 ATO	4030000	76%	845000	89%	599395	42%	376310	51%	358875	83%	--	--	6,209,580	66%
2000 TXs	4,673,235	88%	903,429	96%	833,973	58%	451,573	61%	367,619	86%	--	--	7,229,829	77%

NIGERIA

Nigeria is the most highly endemic country in the world for river blindness, having as much as 40% of the global burden. It is estimated that 27 million Nigerians need treatment with Mectizan for onchocerciasis (i.e., the Ultimate Treatment Goal [UTG] is 27 million). The National Onchocerciasis Control Program (NOCP) began in 1989 with Mectizan treatments of about 49,566 persons, progressing to provide over 15 million treatments in 2000.

The Global 2000 River Blindness Program (GRBP) Nigeria has offices in Jos, Lagos, Owerri, Benin City, and Enugu. The primary activities consist of: 1) direct assistance to treatment activities in nine of the 32 onchocerciasis endemic states in Nigeria (Abia, Anambra, Delta, Ebonyi, Edo, Enugu, Imo, Nasarawa, and Plateau States), 2) helping to implement nationwide onchocerciasis control in partnership with the Nigerian government and the National Onchocerciasis Task Force (NOTF) through a coalition of Nongovernmental Development Organizations (NGDOs) including GRBP, Helen Keller Worldwide, Christoffel Blindenmission, MITOSATH, International Eye Foundation, SightSavers, and UNICEF, 3) working to implement and evaluate the African Program for Onchocerciasis Control (APOC) strategy of Community Directed Treatment with Ivermectin (CDTI) programs and maintaining a training center to support country-wide instruction in management issues related to Mectizan program administration. A major GRBP-partner in seven states in southeastern Nigeria (Abia, Imo, Edo, Delta, Anambra, Ebonyi, and Enugu States) has been the Lions Club International Foundation (LCIF) SightFirst Program. The Lions Clubs District 404, with LCIF support, is actively involved in the mobilization, health education, and treatment activities in those seven states. The new Lions-Carter Center SightFirst Initiative partnership expanded LCIF SightFirst support in 2000 to all GRBP-assisted programs in Nigeria.

Treatment Activities: In 2000, GRBP Nigeria helped provide health education and Mectizan to 4,673,235 persons (Table 5), 102% of the ATO for 2000 (4,586,500). GRBP-assisted treatments represented 30% of the 15,486,245 treatments provided in Nigeria in 2000 (Figure 7). Mass treatment activities took place in 8,074 at-risk villages. The number of persons being treated annually in GRBP-assisted projects in Nigeria is approaching the UTG for those areas. Treatments by state and year are shown in Figure 8. The 2001 annual treatment objective (ATO) target for GRBP is to assist 4,676,586 Mectizan treatments. The UTG for GRBP Nigeria is 5,302,622 treatments, meaning that the 2001 ATO aims to reach 88% of that full coverage goal.

Training/Retraining: Training for over 19,393 health workers involved in Mectizan distribution and health education activities was conducted in all nine states in 2000. This represented 104% of the training target for the year. Most of those trained (18,140 or 94%) were community directed distributors; there were also 29 State Onchocerciasis Coordinators, 533 Local Onchocerciasis Control Coordinators, and 691 District Health Staff trained. In addition, numerous advocacy visits were made to decision makers in all assisted states and Local Government Areas (LGAs) to solicit their support of the program. A special training workshop was organized for State Program Officers, State Onchocerciasis Coordinators, Local Onchocerciasis Control Coordinators, and other

health care workers in Plateau and Nasarawa States. The workshop was designed to further acquaint upper level health workers with APOC's CDTI strategy.

Mectizan: In 2000, GRBP received a total of 13,759,500 3-mg Mectizan tablets. The (3- mg) tablet per person index was calculated to be 2.91 for Nigeria. There were no severe adverse reactions reported in GRBP-assisted programs in Nigeria, including in Delta State, where the filarial parasite *loa loa* is known to occur (Note: persons infected with *Loa loa* are at risk of having more serious adverse reactions when treated for the first time with Mectizan - see Annex 4). Close monitoring for secondary reactions according to MDP recommendations will continue in these states, although all these areas are now entering into fourth and fifth round therapy, so the risk of reaction is low. Currently, all Mectizan for mass treatment in Nigeria is imported by UNICEF and stored at the UNICEF warehouse prior to distribution to the various partners. The entire shipment of tablets needed for GRBP assisted programs in 2001 (14,029,500) was received in late 2000.

APOC: All GRBP projects in Nigeria are now in the process of transitioning to the APOC CDTI strategy. Two different groups of independent monitors were in Edo and Delta States to monitor CDTI activities, and Professor Ransome-Kuti and Dr. Deborah McFarland conducted an evaluation of CDTI in Imo and Abia States under the auspices of APOC. Overall these monitoring activities found that there needs to be increased sensitization and mobilization of the communities and increased training and supervision at all levels to further enhance integration in PHC. A comparison of treatment activities by month (Figure 9) in 1999 and 2000 shows that a majority of treatments conducted in 2000 occurred later in the year than usual. This was due to new APOC requirements mandating training activities at the community level (over 10,000 need training), which caused delays compared to previous years.

Jos Training Center: The Sustainable Management Training Center (SMTC) is a project carried out in collaboration with the CDC and Emory University with the goal of developing better management skills for project planning and implementation (e.g., problem solving, financial management, the use of data in decision making, and logistics). GRBP interest in the SMTC is related to the training needed for personnel at the periphery of the MOH health system to support the community level distribution as envisioned by the APOC CDTI strategy. SMTC was originally supported by a grant from the Shell Foundation that ended in 1998. Since then, The Carter Center has supported much of the core in country funding (salaries, offices, logistics etc) for the SMTC, although students pay tuition to attend the training sessions. To date, the SMTC has trained 268 participants in all States of Nigeria except Akwa Ibom and Rivers. Unfortunately, as a result of decreased funding, the SMTC in 2000 held only one management training workshop (compared to four in 1999 and seven in 1998).

Sustainability Indices:

Community support: The degree of participation of community members in the CDTI process remains a challenge, and communities often see the program as belonging to the government rather than to the communities. For 2000, 60% of the communities were involved in planning and implementation of CDTI. All communities have formed VHCs and all were involved in the selection of their CDDs, however, only 68% of the communities have provided monetary support for their CDDs (Figure 10).

Government support: All CDDs, selected by their respective communities, were supervised by governmental primary health care (PHC) workers in 2000. With the exception of Enugu, LGAs made greater monetary contributions than did the States (Figure 11). In addition, most GRBP-assisted LGAs had a line item for onchocerciasis control in their 1999 budgets, with 60 (66%) of the 99 endemic LGAs releasing some funds for onchocerciasis control activities. The best GRBP experience with LGA support in 2000 has come in Imo, Abia, Edo, Nasarawa, and Anambra States (Figure 12). State government support for onchocerciasis control activities has been poor. Of the nine GRBP-assisted states, only six budgeted for onchocerciasis activities, but actual releases of funds only occurred four of those states and in Abia, which had not budgeted for onchocerciasis activities but released a small amount after an advocacy visit (Figure 13).

Cost per treatment: The overall cost per treatment in GRBP-assisted states in Nigeria was US\$ 0.21 in 2000. This was an increase in costs compared to 1999 at US \$0.12 (Figure 14). The increase primarily due to intensive field activities implemented to address the concerns of APOC's independent monitoring teams.

Lymphatic filariasis/schistosomiasis initiative in Plateau and Nasarawa States:

With financial support since 1998 from SmithKline Beecham (now GlaxoSmithKline–GSK), the manufacturer of albendazole, GRBP Nigeria has worked with the Federal Ministry of Health of Nigeria (FMOH) and local and state governments to provide annual combination Mectizan /albendazole treatment for Lymphatic Filariasis (LF) and praziquantel treatment for urinary schistosomiasis in Plateau and Nasarawa States. Health education is an integral part of both components of this initiative. A report of 2000 activities related to this initiative is found in Annex 5.

Challenges to the Onchocerciasis Program:

- Ensuring the sustainability of the program. This includes the integration of CDTI into a functional primary health care system. This integration remains a major challenge and management training could be an important element of this. However, lack of financial support for the SMTC resulted in decreased training sessions in 2000, which is likely to continue in 2001.

- The release of budgeted State and LGA counterpart funding remains a problem.

RECOMMENDATIONS 2001 for GRBP NIGERIA

Management training:

- State and LGA onchocerciasis control personnel need to be trained in APOC and Global 2000 management and budgetary procedures.
- The Sustainable Management Training Center must receive more external support if it is to continue in 2001.

Treatments:

- Further refine UTGs.
- Report by state rather than by project.
- Devise a reporting system for monitoring CDD attrition and replacement.
- Monitor adverse reaction reports, especially in areas where *Loa loa* is highly prevalent (no SAEs due to *Loa loa* have been reported in Nigeria's GRBP program).

Lions:

- Work with the local Lions District 404 to define their continued role in the Nigeria program.

Government support:

- Nigeria should provide more financial and material support for the program from all levels of Nigerian government (Federal, State and Local). With few exceptions, State government has contributed only minimally to the onchocerciasis effort so far.

Transmission impact:

- Analyze data from the sentinel village evaluations in Plateau and Nasarawa States, supplemented by additional field observations and studies, with focus on the impact of treatment on reducing the transmission of onchocerciasis. Some of this work could be linked to the LF transmission evaluation impact studies.

Other diseases:

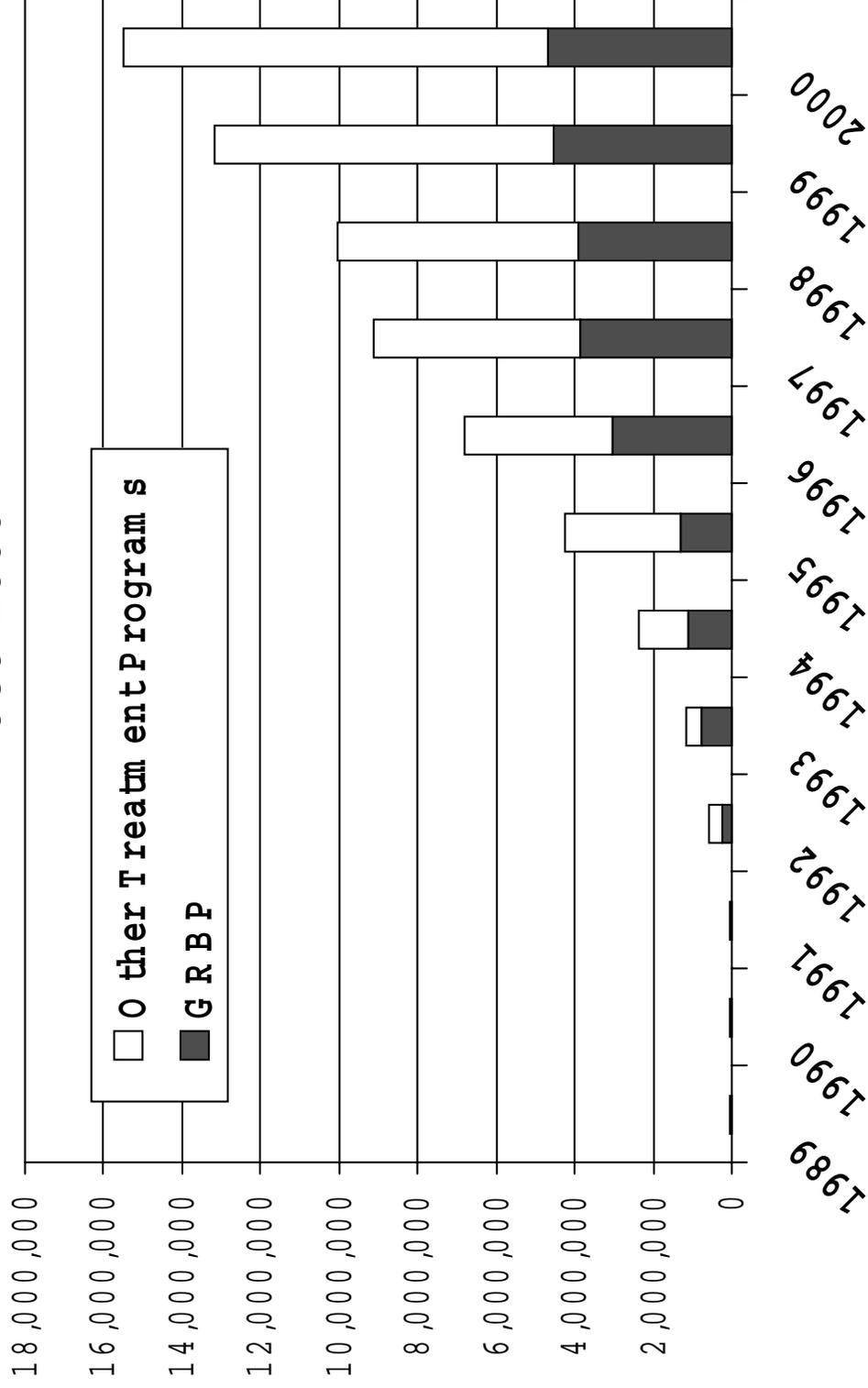
- Continue to adapt the Plateau/Nasarawa Onchocerciasis Programs to lymphatic filariasis elimination and schistosomiasis control.

Costs:

- Follow closely increased costs per treatment in Nigeria and determine reasons if this continues in 2001.

Figure 7

Global 2000 River Blindness Program (GRBP)- assisted treatments and total Mectizan treatments provided in Nigeria, 1989-2000



Treatments from 1992-1995 by RBF
Source of 1998 treatment figures: Nigeria NGDO meeting, April 20, 1999

Summary of Persons Treated in APOC / GRBP Assisted Projects in Nigeria from 1997 - 2000

Figure 8

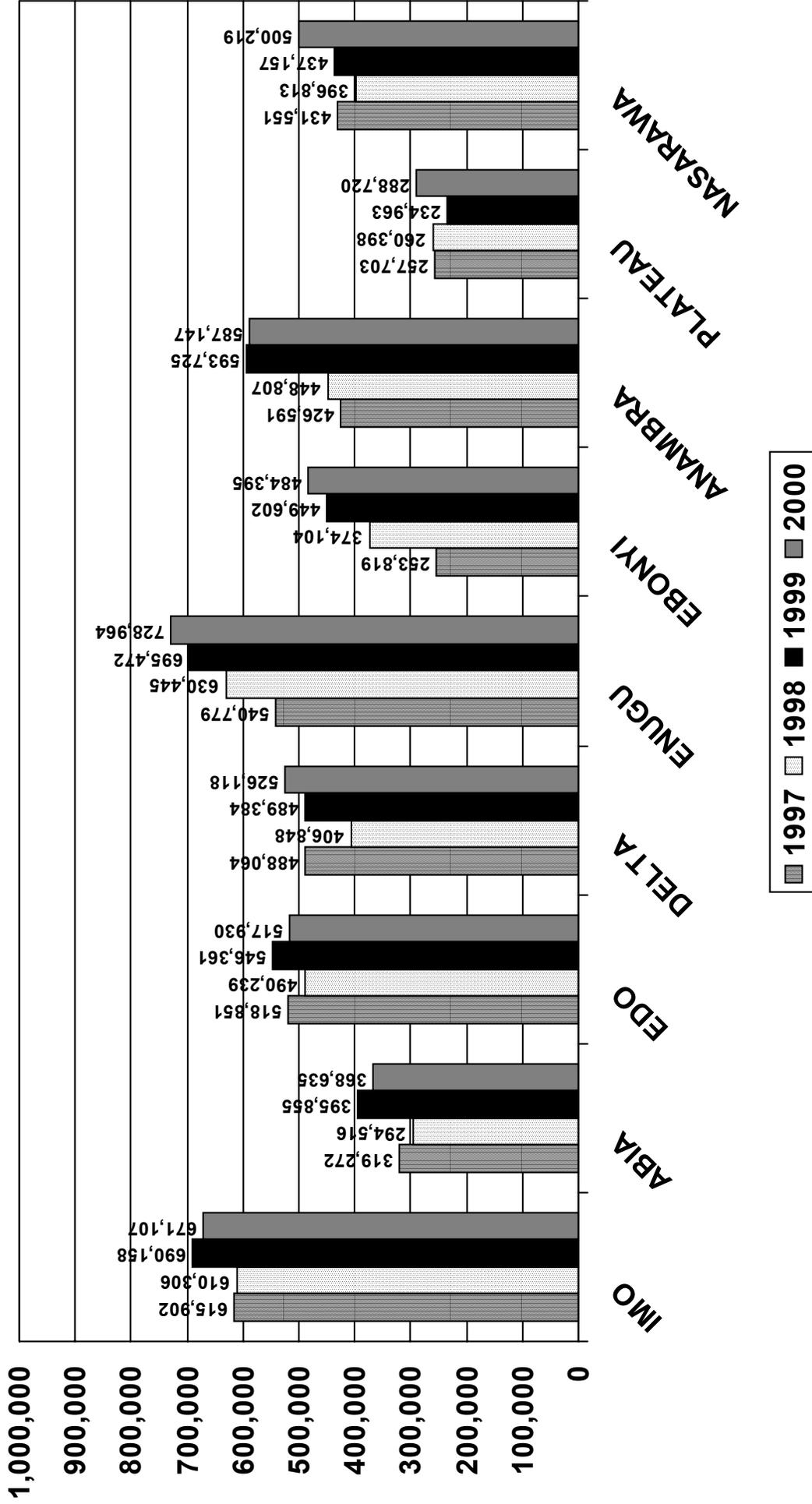


Figure 9

Nigeria: A Comparison of Persons Treated By Month in 1999 and 2000, Showing Later Treatment in 2000 Due to Delays Resulting From APOC training Demands

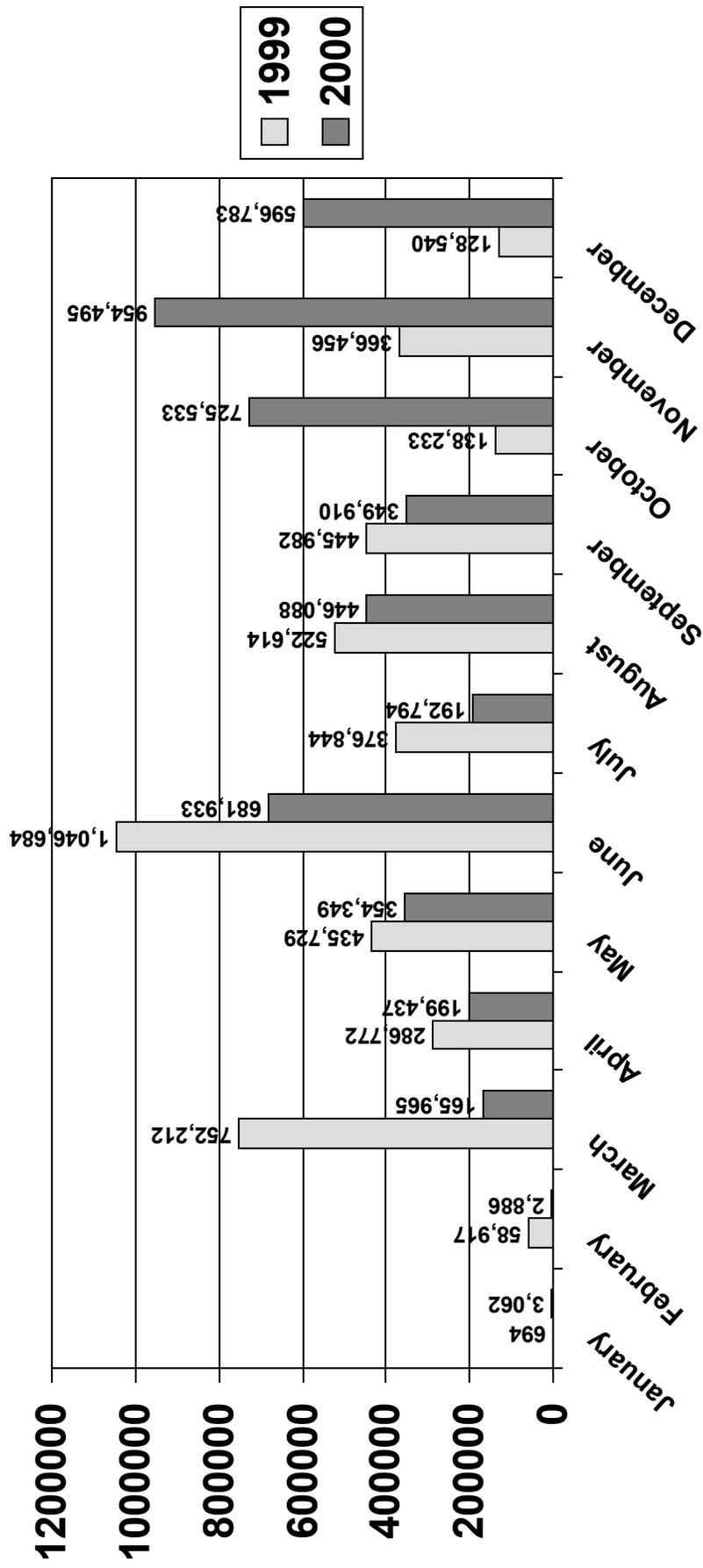


Figure 10

State Monetary Support for CDDs in GRBP – Assisted States: Nigeria 2000

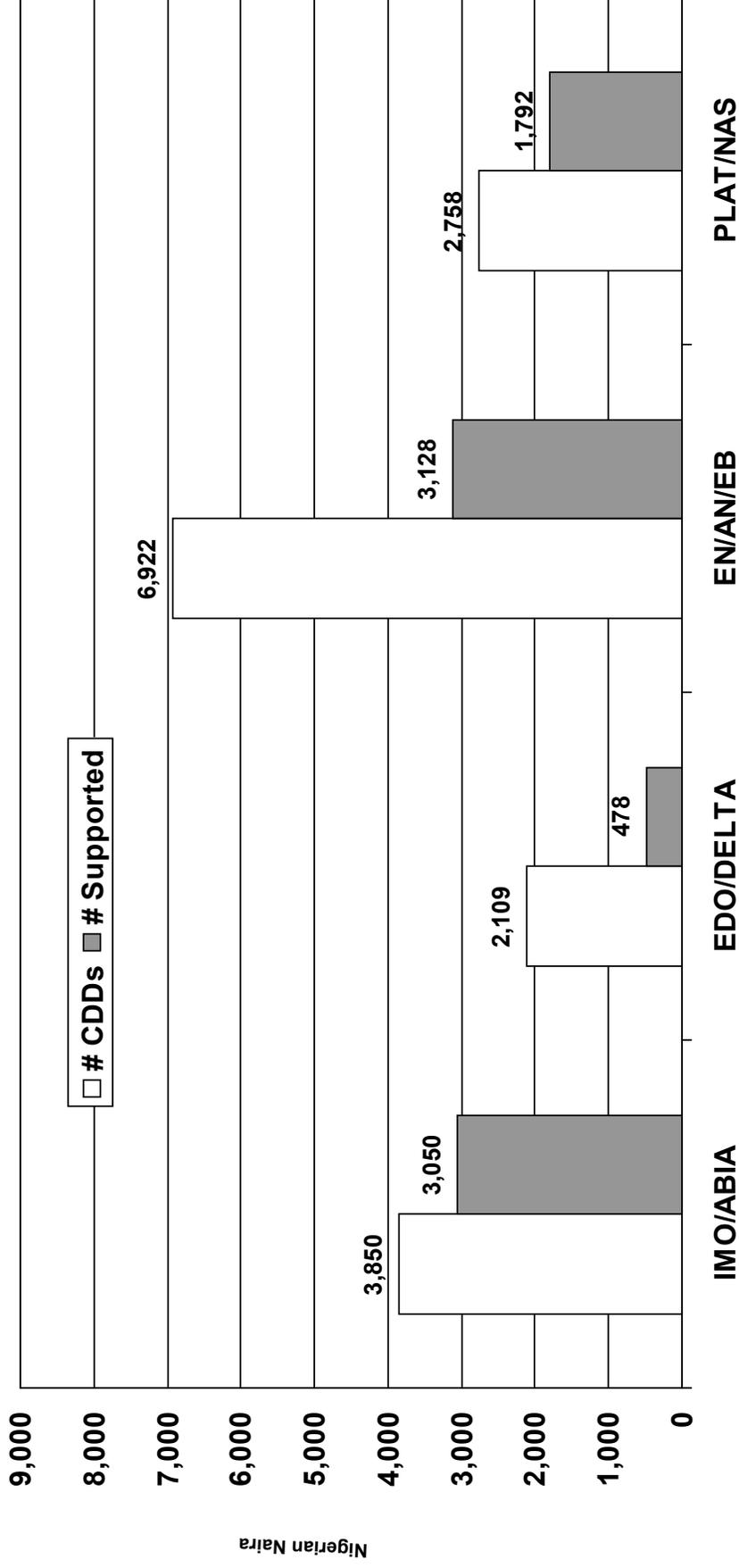
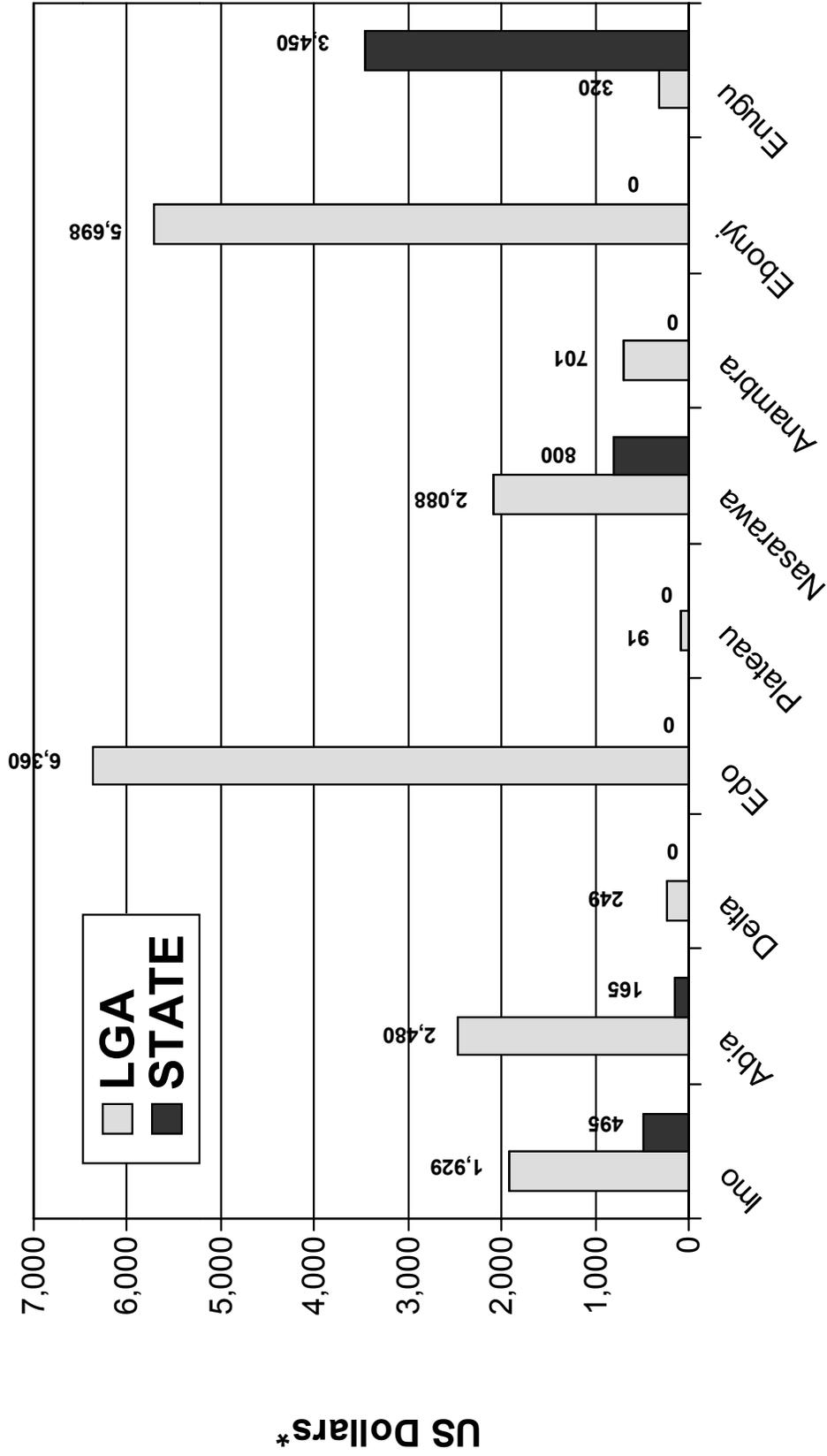


Figure 11

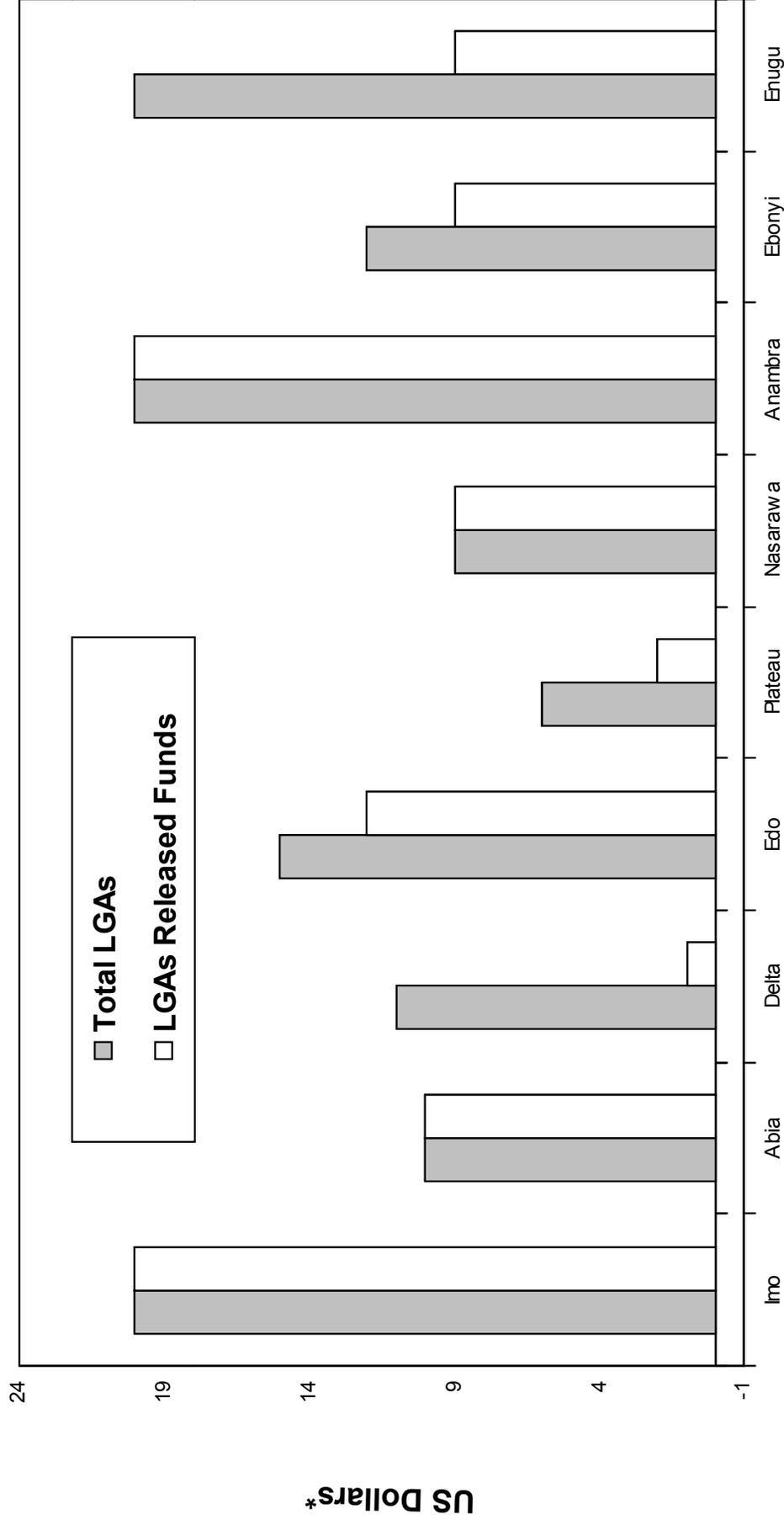
Monetary Contributions by LGA & State for CDTI in 2000



* Exchange rate: Naira 100 = 1 USD

Figure 12

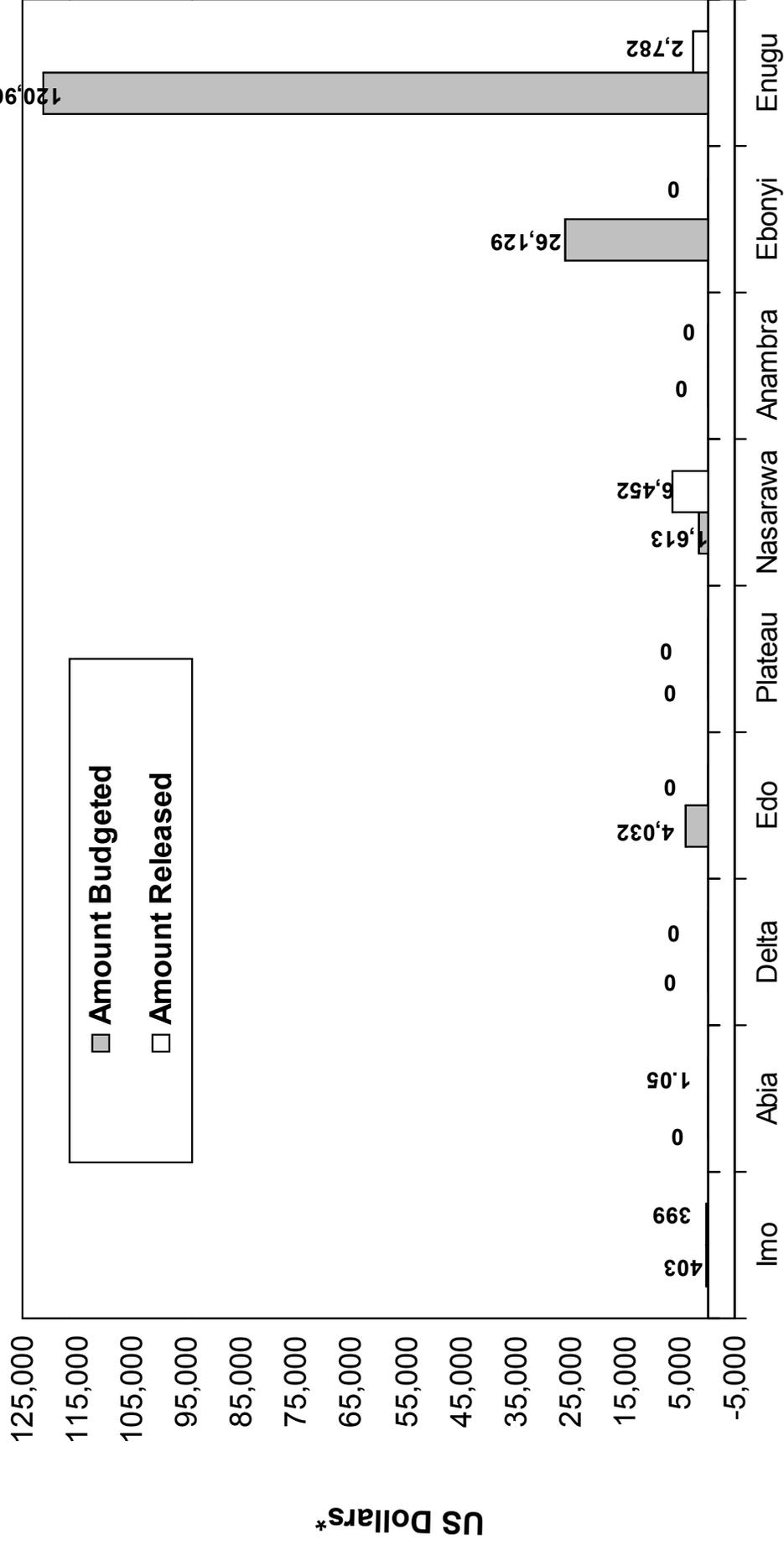
2000 LGA Financial Support for Onchocerciasis Control: Nigeria



* Exchange rate: Naira 100 = 1 USD

Figure 13

2000 State Financial Support for Onchocerciasis Control: Nigeria



* Exchange rate: Naira 124 = 1 USD

Figure 14

A Comparison of Cost per Person Treated (in dollars) in APOC/GRBP/LCIF: Nigeria 1997 - 2000

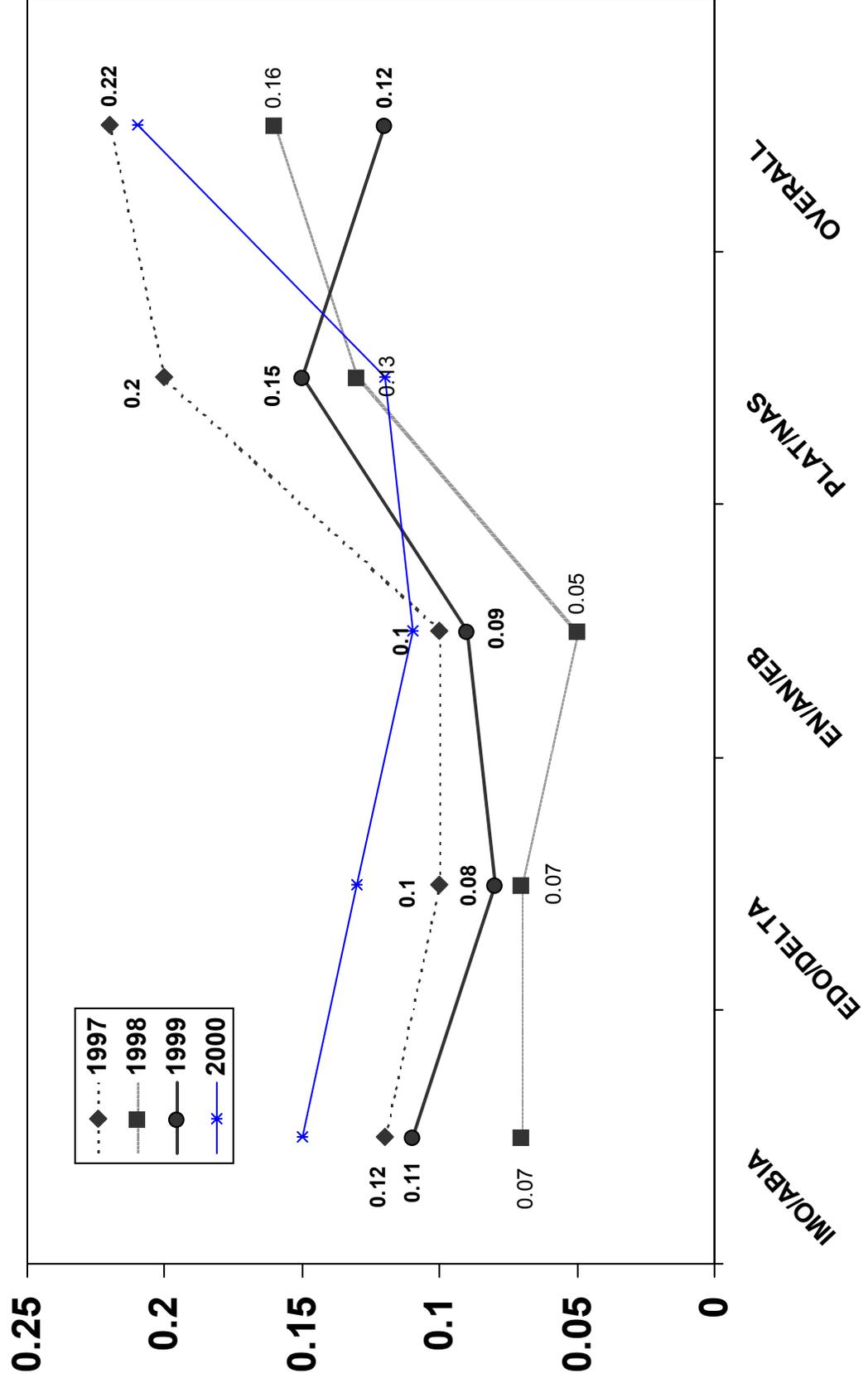


Table 5: GRBP-Assisted Nigeria Treatments, 1999 and 2000, by State

2000	ATO(earp)	TX 2000	% ATO	ATO(arv)	TX 2000	% ATO
Abia	408,000	368,635	90%	684	684	100%
Anambra	583,000	587,147	101%	1,062	1,027	97%
Delta	459,000	526,118	115%	470	550	117%
Ebonyi	459,000	484,395	106%	834	1,101	132%
Edo	561,000	517,930	92%	530	519	98%
Enugu	714,000	728,964	102%	1,377	1,443	105%
Imo	703,800	671,107	95%	1,840	1,840	100%
Nasarawa	428,400	500,219	117%	596	598	100%
Plateau	270,300	288,720	107%	319	312	98%
Total	4,586,500	4,673,235	102%	7,712	8,074	105%

1999	ATO(earp)	TX 1999	% ATO	ATO(arv)	TX 1999	% ATO
Abia	400,000	395,855	99%	684	760	111%
Anambra	550,000	593,725	108%	1,062	990	93%
Delta	450,000	489,384	109%	470	479	102%
Ebonyi	450,000	449,602	100%	898	1,139	127%
Edo	550,000	546,361	99%	530	445	84%
Enugu	700,000	695,472	99%	1,362	1,377	101%
Imo	690,000	690,158	100%	1,840	1,854	101%
Nasarawa	430,500	437,157	102%	694	585	84%
Plateau	271,500	234,963	87%	319	295	92%
Total	4,492,000	4,532,677	101%	7,859	7,924	101%

ATO: Annual Treatment Objective TX: Number Treated
earp: Eligible At Risk Population
arv: At Risk Villages

UGANDA

Onchocerciasis affects about 1.8 million persons residing in 19 districts in Uganda. The River Blindness Foundation (RBF) first began treatment activities in Uganda in 1993, with the Global 2000 River Blindness Program of the Carter Center (GRBP) assuming that role in 1996. Currently, GRBP-assisted programs are active in all four foci (Southwest, West Nile, Middle North, and Mount Elgon) of onchocerciasis in the country and in 10 endemic districts: Kisoro, Kabale, Rukungiri, and Kasese (in the Southwest focus bordering the Democratic Republic of Congo); Nebbi, Moyo and Adjumani (the West Nile focus bordering Sudan and the Democratic Republic of Congo), Gulu, Kitgum¹, and Apac (the Middle North focus); and Mbale (the Mount Elgon focus in the east, bordering Kenya).

Treatments: The program helped to treat 903,429 persons, 97% of its 2000 annual treatment objective (ATO) (Table 6), and 62% of all Ugandan treatments assisted by both indigenous and international NGOs (1,468,710) (Figure 15). Mass treatment activities took place in 1,890 at risk villages. Eight of the ten districts achieved at least 90% coverage of the eligible population and only 3.2% of the communities were below 80% coverage as compared to 10.5% in 1999. In 2001 GRBP plans to assist in treating 945,163 persons in Uganda with Mectizan, an increase of 1.5% compared to the 2000 ATO (Table 6). The ultimate treatment goal for GRBP Uganda program is 945,163 treatments per year, meaning that the 2001 ATO aims to reach 100% of that full coverage goal.

Training/Retraining: A total of 7,759 health workers were trained in 2000 in all 10 GRBP assisted districts. Most of those trained were community directed distributors (CDDs) selected by the communities, in addition to 439 supervisors, with a ratio of 1 supervisor per 4 communities. Health education was carried out at the kinship level through, drama groups, posters, radio and video.

Mectizan: In 2000, a total of 2,845,971 3mg Mectizan tablets were received by GRBP. The overall average (3- mg) tablet per person for GRBP Uganda in 2000 was 2.75.

Lions Clubs International: In 2000, three regional workshops were held for the Lions Clubs in Uganda. GRBP-Uganda assisted the Lions to formulate a plan of action which has resulted in meetings between Lions and local district onchocerciasis coordinators.

Sustainability indices:

Community support: It is believed that improved performance in 2000 was due to demarcation of communities according to kinship zones, which are now responsible for decisions regarding: 1) selection of CDHWs, 2) location center for health education, and 3) selection of the treatment center and method. For year 2000, there were 5,370 kinship zones. Use of kinship zones within individual

¹ Mectizan treatment activities in Kitgum district are restricted due to insecurity

communities as centers for decision making and health education reduced the need for monetary incentives for CDHWs and the number of days for treatment to less than a week with improved coverage. It also made health education and the treatment center more convenient and enhanced selection of CDHWs by their kinsmen. Districts with technical support trained at least one CDD at clan or kinship level within the communities.

Government support: The need for districts to begin to disburse district funds for onchocerciasis control activities is considered critical to achieving sustainability. Currently all funding requirements are met by external agencies, yet APOC stipulates that external funding must decrease over time. Most districts and the central government did not contribute funds towards CDTI activities.

Cost per treatment: Overall, cost per person during 2000 was US\$ 0.14. This index ranged from US\$ 0.08 to 0.79, primarily due to economies of scale (Table 7). APOC provided only about 50% of project costs.

Constraints:

- The system approved by the local governments for accountability of medicines at health units does not function properly, thus making accountability of ivermectin a problem. GRBP-Uganda, in consultation with district onchocerciasis coordinators and district directors of health services, have designed forms to be used to improve ivermectin accountability. Both district onchocerciasis coordinators and supervisors have been trained on the use of these forms. However, this may not be sustained by the local government without the involvement of an NGO, such as GRBP-Uganda.
- It was observed that community leaders tend to appoint distributors who are friends or relatives hoping that there are benefits from either the government or the NGDO which they could share with the distributors, without the knowledge of other community members. This affects the acceptability of distributors and the quality of their services to the community.
- Certain myths, rumors and beliefs are present, including: people will lose interest in ivermectin over the years and coverage will decline; ivermectin causes miscarriage; and ivermectin cures/causes epilepsy. Health education is being used to correct these beliefs.

RECOMMENDATIONS 2001 for GRBP UGANDA

CDTI:

- Recruit at least two female CDHWs in every kinship zone.

Sustainability:

- Selection and training of supervisors at district level for: Adjumani, Gulu, Mbale Moyo, Kasese, and Nebbi districts.
- Train district onchocerciasis coordinators in computer skills and research methods.
- Continue to publish GRBP operations research work with a focus on sustainability issues. In particular, follow retention rate of CDDs.

Map 2

Uganda GRBP - Assisted Districts

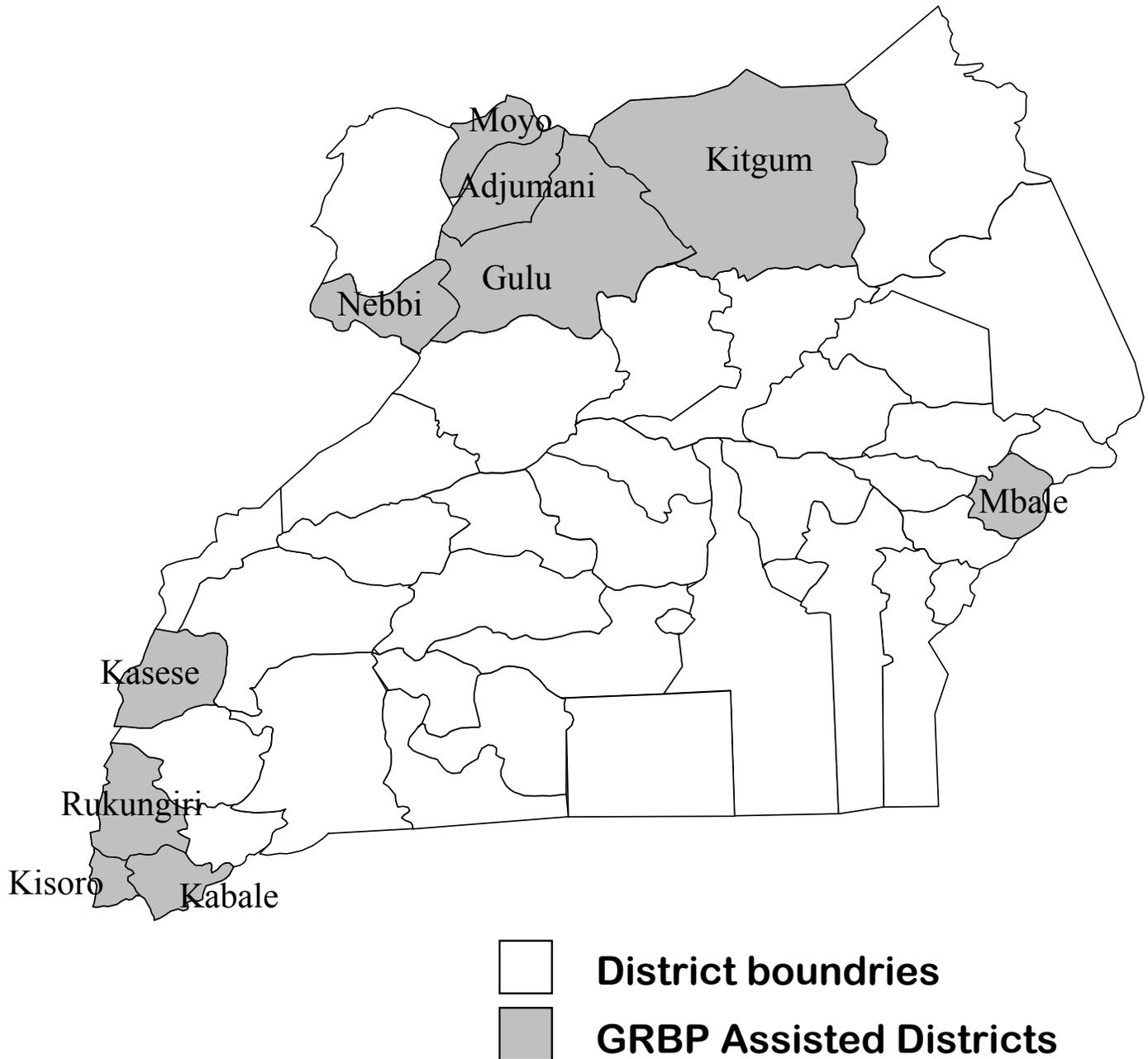
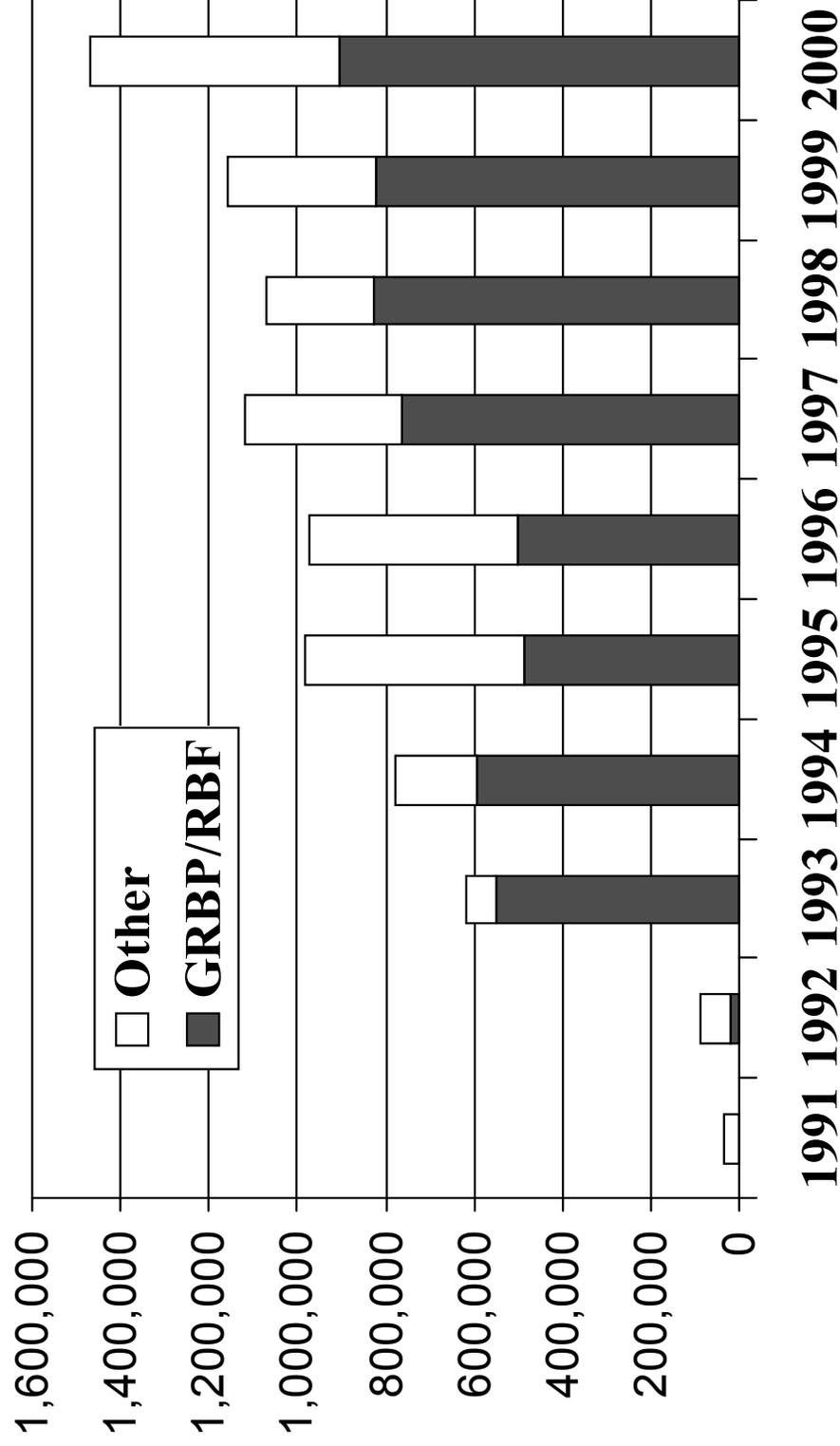


Figure 15

Uganda: GRBP-assisted Mectizan Treatments as Part of the Total Treatments Provided, 1991-2000



Treatments in 1992-1995 by RBF

Table 6: GRBP-Assisted Uganda Treatments, 2000 and 1999, by District

	2000	ATO(earp)	TX 2000	% ATO	ATO(arv)	TX 2000	% ATO
Adjumani		132700	125621	95%	119	119	100%
Apac		11542	11387	99%	9	9	100%
Gulu		136500	131906	97%	184	184	100%
Kabale		13400	13398	100%	27	27	100%
Kasese		74400	64877	87%	125	125	100%
Kisoro		16500	14555	88%	31	31	100%
Mbale		180000	165343	92%	446	446	100%
Moyo		126800	121216	96%	177	177	100%
Nebbi		209726	205490	98%	670	670	100%
Rukungiri		30000	30000	100%	102	102	100%
Total		931568	903429	97%	1890	1890	100%

	1999	ATO(earp)	TX 1999	% ATO	ATO(arv)	TX 1999	% ATO
Adjumani		120436	120069	100%	116	116	100%
Apac		6260	5918	95%	9	9	100%
Gulu		136379	136434	100%	209	209	100%
Kabale		12953	12052	93%	27	27	100%
Kasese		73648	59252	80%	124	124	100%
Kisoro		16960	14915	88%	31	31	100%
Moyo		170530	169167	99%	386	386	100%
Mbale		123812	101562	82%	169	169	100%
Nebbi		178592	171226	96%	637	637	100%
Rukungiri		28896	28872	100%	22	22	100%
Total		868466	819467	94%	1730	1730	100%

**Table 7: Cost per Treatment in GRBP Assisted Districts:
Uganda 2000 and 1999**

District	2000 Cost Per Person			1999 Cost per Person		
	APOC	Overall	% APOC	APOC	Overall	% APOC
Adjumani	0.07	0.09	73%	0.06	0.15	40%
Apac	0.42	0.60	69%	0.89	1.38	64%
Gulu	0.06	0.07	79%	0.03	0.07	43%
Kabale	0.65	0.79	81%	0.7	1.05	67%
Kasese	0.13	0.18	75%	0.1	0.14	71%
Kisoro	0.42	0.60	69%	0.54	0.7	77%
Moyo	0.08	0.13	64%	0.09	0.27	33%
Mbale	0.05	0.10	52%	0.05	0.07	71%
Nebbi	0.05	0.08	57%	0.07	0.11	64%
Rukungiri	0.24	0.38	64%	0.25	0.33	76%
Total	0.09	0.14	67%	0.09	0.16	56%

CAMEROON

Onchocerciasis is widespread in Cameroon, with some 5.1 million infected, and about 62% of its population of 15 million at risk of infection. About 60,000 people are estimated to suffer some degree of visual impairment, and perhaps 1 million persons have onchocercal skin disease. Mectizan treatment has been accepted as the principal strategy for onchocerciasis control. However, in the past, the Cameroon ministry of health (MOH) strategy for Mectizan distribution differed in two important ways from the African Program for Onchocerciasis Control (APOC) community directed distribution (CDTI) strategy: 1) Cameroonian health center personnel distributed the drug through an outreach program (rather than using villagers as community directed distributors), and 2) 100 central African francs (CFA) (about US \$ 0.20) was charged for each Mectizan treatment to cover distribution costs. The money was used to pay for supervision (per diem), the maintenance and fueling of motorcycles, and other costs, some unrelated to Mectizan distribution. In 1997, the MOH developed a comprehensive plan for a nationwide control effort aimed at obtaining APOC support to eliminate onchocerciasis as a disease of public health and socio-economic importance by the year 2015. Also that year Cameroon changed its distribution policy to embrace the APOC CDTI strategy. Since then Cameroon has been transitioning from the outreach strategy to one of community-based (community-directed) treatment. The cost recovery policy remains.

Although it has been postulated that the cost recovery system was contributing to low rates of treatment coverage in Cameroon, there has been no change in the MOH mandate for cost recovery in the Mectizan program, although it was decided that children under the age of 15 would pay only 10 CFA. Otherwise, each person treated is asked by the Ministry of Health to pay 100 CFA at the time the drug is administered. The planned distribution of funds obtained from the cost recovery system is as follows:

5%	Drug procurement for treating minor side effects
25%	Oncho fund to be saved for post APOC support
25%	Incentives for community distributors
15%	Distribution activities (including adverse reaction drugs)
15%	Operation expenses at the MOH
15%	Supervision

The River Blindness Foundation (RBF) began assisting the MOH in North Province (the most highly endemic area for blinding onchocerciasis in the country) in 1992. In August 1995, the Lions SightFirst launched a project, supervised by Lions District 403B and in partnership with the MOH and four NGOs (RBF, Helen Keller Worldwide, International Eye Foundation, and Sight Savers International), to distribute Mectizan in 3 other provinces (Centre, Adamaua, and West) over a 5-year period. RBF was responsible for assisting West Province. This project has had a major impact on the number of treatments provided in Cameroon, increasing annual treatments by more than 200% since 1996. The original Sight First Cameroon project ended in early 2001, and there are plans to request an extension (Editor's note: this extension was subsequently approved).

The Carter Center assumed RBF activities in Cameroon in 1996 with specific responsibilities for North and West Provinces. North obtained APOC support in 1999, whereas West Province was supported by LCIF until 2000 when APOC support was approved and the transition to CDTI began. North Province is the only GRBP project not assisted by Lions.

The Lions Clubs-GRBP relationship began in May 1996 in partnership with MOH to establish a Mectizan distribution program in West Province over a 5-year period. In 2000 this relationship was renewed through a new grant. In addition, West Province, now a project of APOC also operates under the CDTI strategy.

Treatment Activities: The total number of GRBP-assisted treatments in Cameroon for 2000 was 833,973, which reached 80% of the GRBP annual treatment objective (ATO) (Table 8). Of these, 214,254 treatments were achieved in North Province, while 619,719 in were achieved in West. Compared to 1999, GRBP-assisted treatment activities in Cameroon increased by 23%. Treatment activities took place in 2,315 at risk villages. The GRBP is believed to have provided 67% of all treatments in Cameroon in 2000 but reporting by other Mectizan programs there is lacking (Figure 16).

The APOC supported North Province enters its third year of APOC funding in 2001. Recent assessment activities have increased estimates of the 'earp' and 'arv'. Activities in 2000 increased therefore by 99% to 214,254 treatments from 107,778 (Figure 17). The North program increased its 2001 ATO to 235,864 an increase of 34% from 2000 (176,714). Similarly, the ATO for at-risk villages increased by 23% from 431 in 2000 to 528 in 2001.

The treatment activities in West Province increased by 9% to reach 619,719 (Figure 18). Expansion through the three phases of the original 1996 action plan was completed in September 1998, and now all targeted health districts are under Mectizan treatment. The West Province program has shown continuous improvement in meeting its ATO's (Figure 18). The 2001 ATO for West Province is 870,421, a 36% increase over 2000 (640,420).

The ultimate treatment goal for GRBP Cameroon is 1,439,437 treatments per year, meaning that the 2001 ATO (1,079,189) aims to reach 75% of that full coverage goal.

The Cameroon program faces challenges of implementing CDTI in urban areas (Figure 19). CDTI is more difficult to implement in these areas due to challenges such as the difficulty in assessing census numbers. As a result, the primary strategy used in the urban areas of West Province is health center outreach. Treatment coverage appears to be lower in districts with urban areas (shown with arrows) compared to rural districts possibly because CDTI is a strategy for rural, not urban communities. This needs further study.

Training: In the North in 2000, training of community-directed distributors (CDDs) was a major activity in line with the APOC CDTI strategy. A total of 739 CDDs were trained in 400 communities, compared with 182 trained in 1999. This 20% increase was an important achievement of the program, mandated by APOC.

Mectizan: In 2000 a total of 1,749,682 tablets were distributed in the West Province and 548,451 in the North. As of December 2000, the West Province had 245,000 Mectizan tablets on hand and the North had 40,500 Mectizan tablets. Orders need to be submitted soon to the MDP for 2001 tablet needs.

Following the outbreak of 19 cases of coma presumed due to *Loa loa* encephalopathy in Center Province (with four deaths) in 1999, the National Onchocerciasis Task Force (NOTF), MDP and TCC have worked toward the epidemiological refinement of areas co-endemic for onchocerciasis and loasis (See Annex 5). *Loa loa* does occur in West Province, and close monitoring for severe adverse effects is maintained. (*Loa loa* does not occur in North Province).

In late 2000, a visit to Cameroon by TCC members resulted in a recommendation for further assessment for *Loa loa* in West Province. According to TCC recommendations, REA should be conducted in all *Loa loa* at risk communities in West Province, and treatment withdrawn from hypoendemic communities. GRBP will conduct REA in *Loa loa* at risk districts in West Province, with Lions and APOC support.

Surveillance structures for monitoring adverse reactions in all GRBP assisted areas will be maintained and strengthened. The provincial health delegates and the provincial chiefs of community health have been fully briefed about *Loa loa*-related reactions. The referral and treatment program for patients with such reactions, if any were to occur, has been integrated into a primary health care system reinforced to handle such cases.

APOC: APOC and TCC carried out an external review in 2000 of the program in the North, which has been under pressure to complete training and reorientation activities to allow CDTI transition. In 1999, 40% of the communities trained CDDs to carry out the CDTI strategy of APOC. In 2000, 30% more communities made this transition, and it is expected that in 2001, the final 30% will be conducting Mectizan distribution using the CDTI strategy (Table 9). The external reviewers were satisfied with the progress. In 2000, GRBP Cameroon obtained APOC support for West Province for a similar transition process to CDTI to be funded and established (Table 9).

Sustainability Indices:

Community involvement: Community-based workers have been more involved with the outreach nurses in delivering treatment and therefore will be important resources during the transition to CDTI in both North and West Provinces. The role of local NGOs in Cameroon is a promising channel towards sustainability. NGOs such as MOJE could play a role in community mobilization/sensitization, in addition to drug distribution in the future. This area still needs operational research to determine the feasibility of such an undertaking.

Government involvement: The integration of the program into the National Primary Health Care system has been relatively successful, but little money has been released by the government in support of the program.

Cost per treatment: Cost per treatment in 2000 averaged US \$0.20 (US\$ 0.11 in the West and US\$ 0.29 in the North). However, this figure excludes cost recovery monies and the Ministry of Public Health contribution. Compared with 1999, costs decreased overall (from \$0.39 to \$0.20). They were stable in the West but decreased dramatically in the North (from \$0.44 to \$0.29). The reasons for this decrease are not clear.

Challenges & Constraints:

- The implementation of MEC/TCC recommendations for *Loa loa* in West Province.
- Mass treatment of urban communities.
- Ongoing restructuring of health areas by Ministry of Public Health and frequent appointment and reappointment of Ministry of Public Health personnel interferes with data collection processes, requires frequent advocacy visits, and leads to a lack of continuity of activities.
- Lack of standardization of and compliance to the National Cost Recovery System.
- Increased demand for incentives by community members, health personnel, and local authorities.
- Insecurity due to bandits in the North.

RECOMMENDATIONS 2001 for GRBP CAMEROON

North Province (APOC):

- Refine population data and better establish UTG.
- Fully implement CDTI

West Province:

- Work to reach ATOs and the UTG.
- Establish administration needed for APOC and Lions Grants.
- Evaluate challenges of urban treatment.

Cost recovery:

- Do not manage cost recovery funds, but leave that to the Ministry of Public Health to administer.

Loa loa:

- Complete REA in at risk Loa loa areas in West Province.
- Implement TCC/MEC guidelines.

Health Education:

- Each health unit should be provided with a flip chart

Cameroon GRBP - Assisted Provinces

- GRBP, & APOC,
- ▨ GRBP, APOC, & LCIF

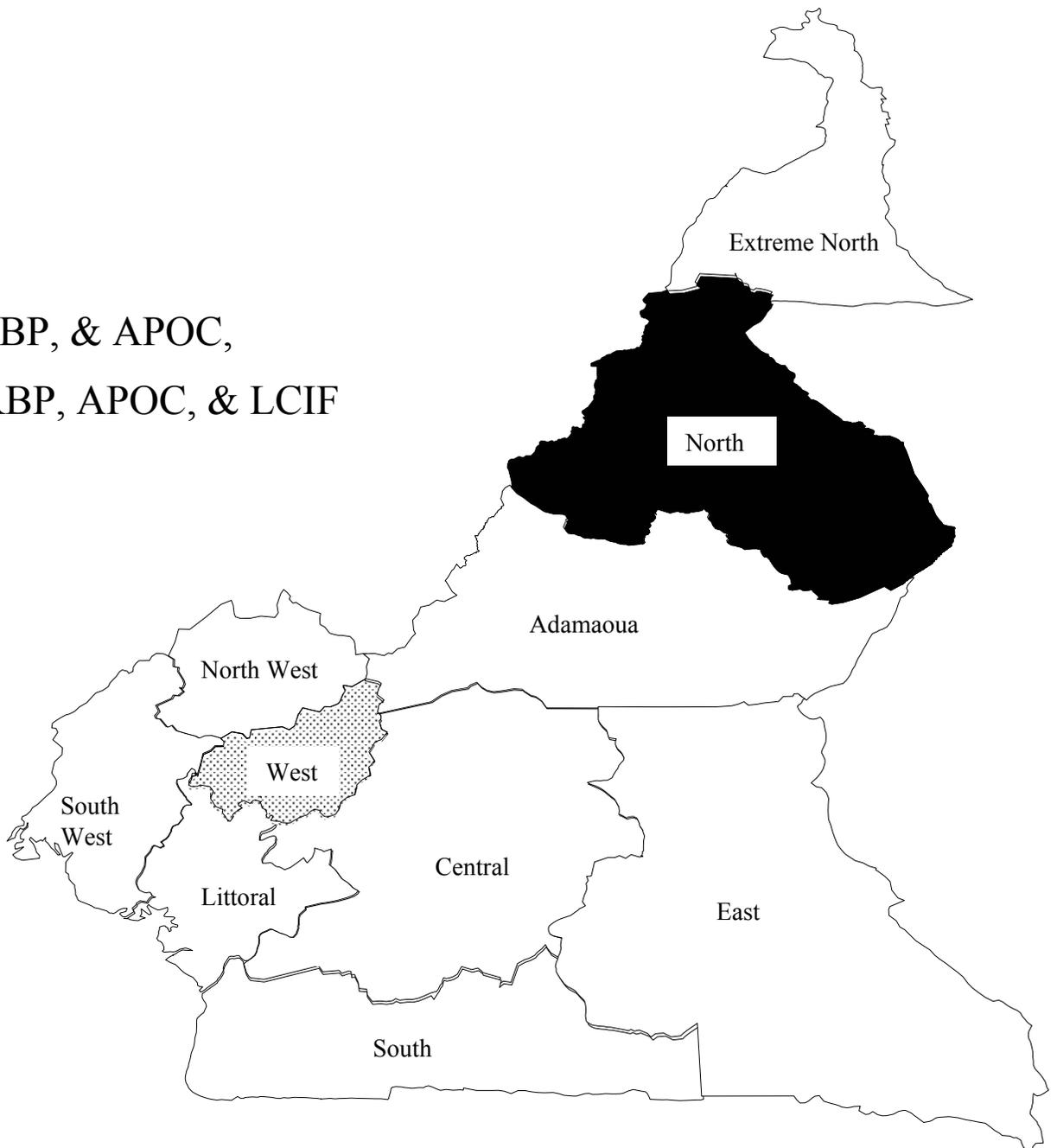
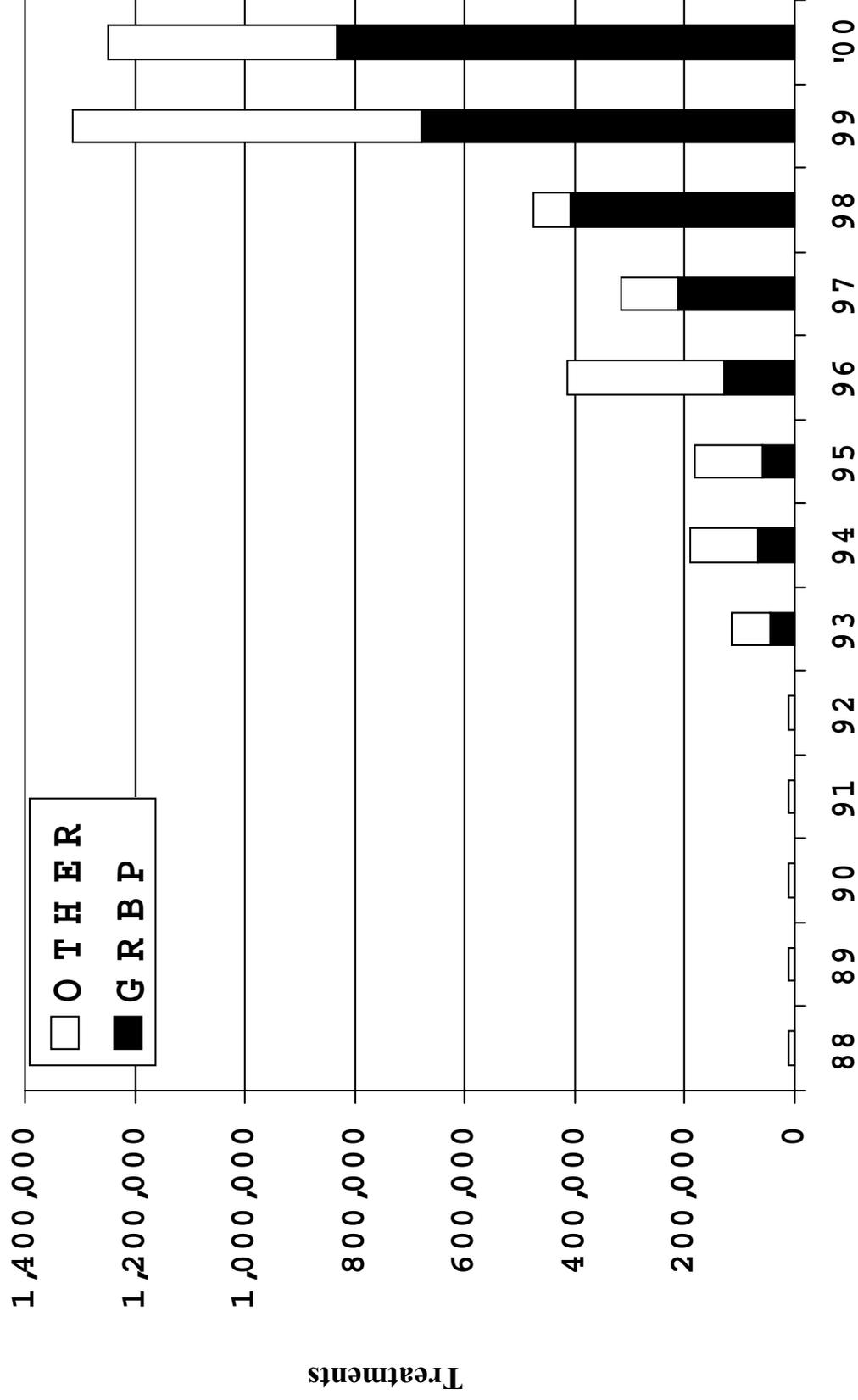


Figure 16

Cameroon: GRBP-assisted Mectizan Treatments as Part of Total Treatments Provided, 1988-2000



Treatments in 1993-1995 by RBF

Figure 17

Cameroon: GRBP-assisted Mectizan Treatments in North and West Provinces, 1993-2000

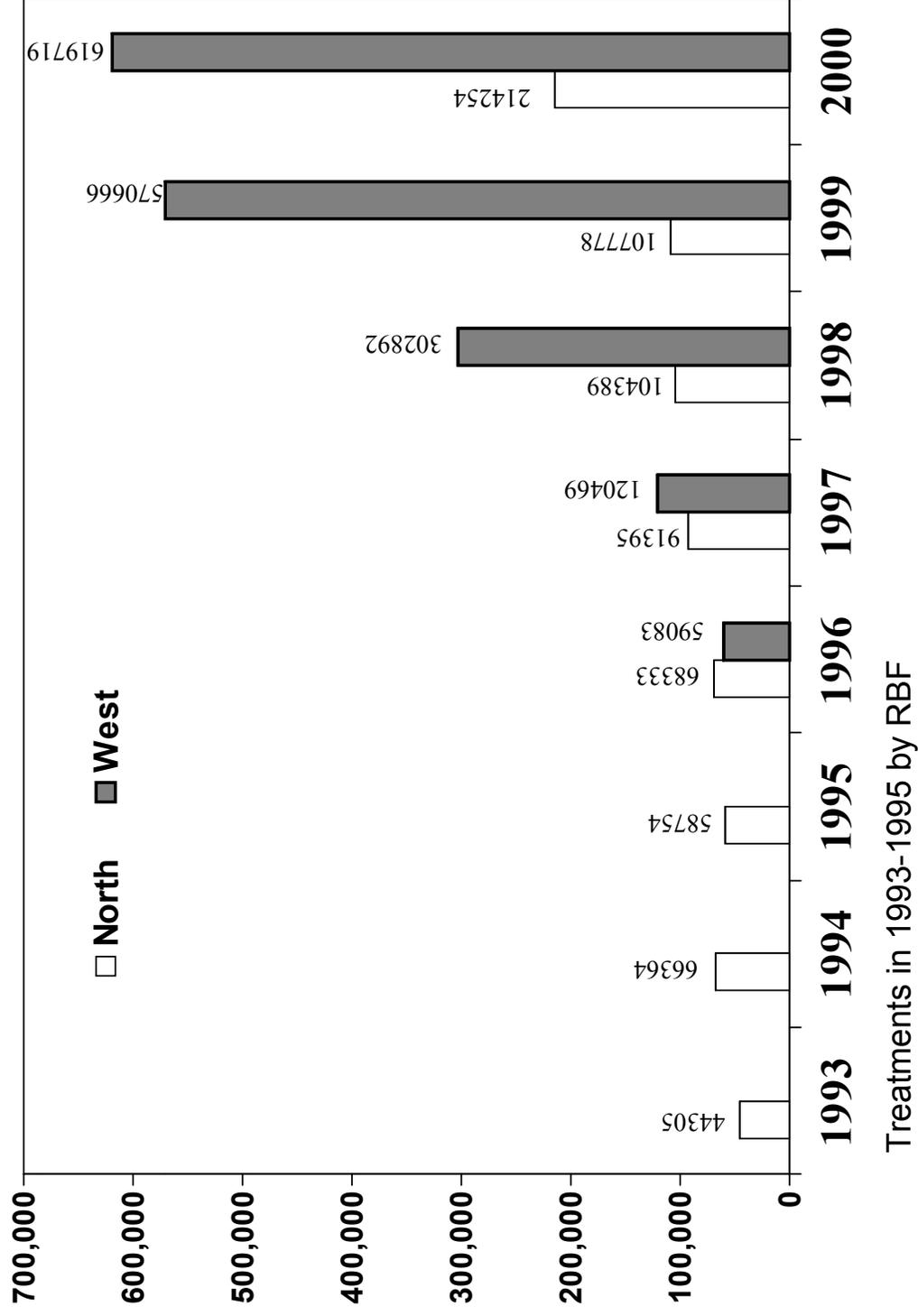


Figure 18

GRBP Treatment Objectives in West Province: Cameroon 1996 – 2000(% ATO Achieved)

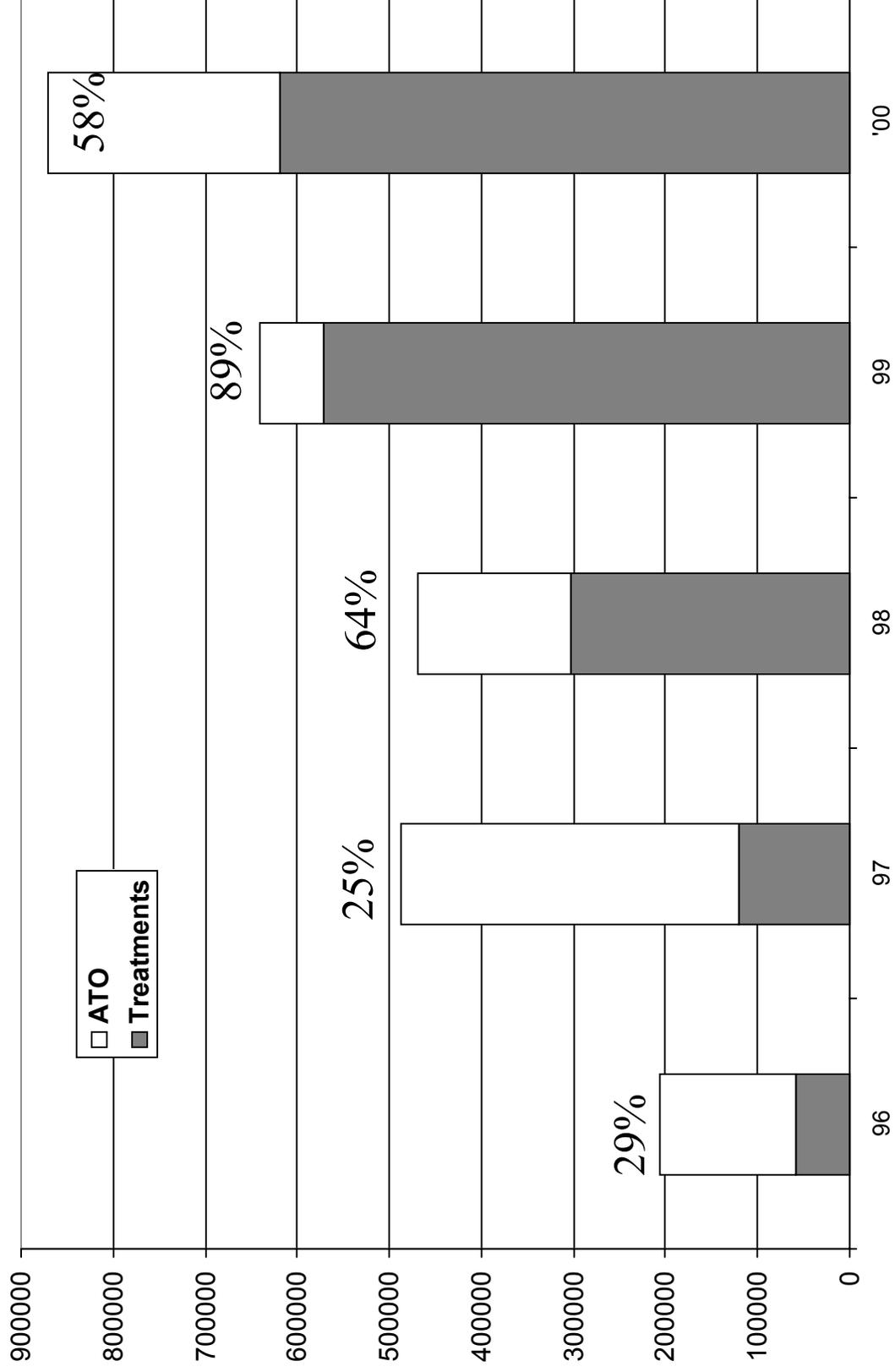
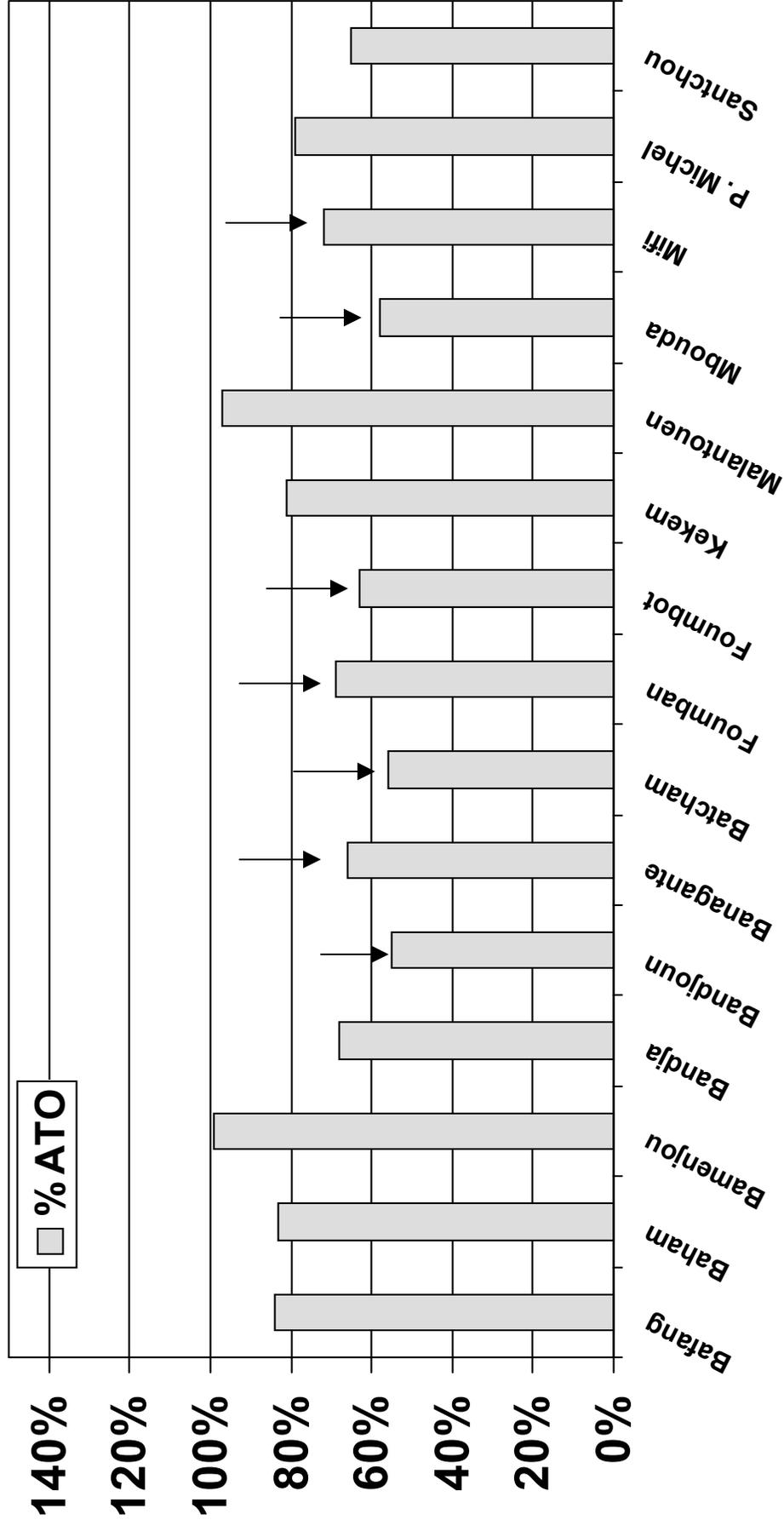


Figure 19

Cameroon: GRBP-Assisted Treatments by District, 2000



Arrows indicate urban areas; * Dschang is not shown

Table 8

2000

Province/Tx Category	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL	% ATO	
North	ATO(earp)= 176,714 ATO(arv)= 431														
TX(earp)					71,398	52,852	77,808	12,196					214,254	121%	
TX(arv)					254	199	47						500	116%	
West	ATO(earp)= 870,421 ATO(arv)= 2,180														
TX(earp)					124,803	75,105	50,210	44,832	43,509	111,312		169,948	619,719	71%	
TX(arv)					475	372	298	225	170	130		145	1,815	83%	
TOTAL	ATO(earp)= 1,047,135 ATO(arv)= 2,611														
TX(earp)	0	0	0	0	196,201	127,957	128,018	57,028	43,509	111,312		169,948	833,973	80%	
TX(arv)	0	0	0	0	729	571	345	225	170	130	0	145	2,315	89%	

ATO: Annual Treatment Objective TX: Number Treated earp: Eligible At Risk Population arv: At Risk Villages (for mass treatment), ptv: Passive Treatment Villages

1999

Province Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	% ATO	
North	ATO(earp)= 176,714 ATO(arv)= 431														
TX(earp)					15,549	7,475	25,965	16,322	42,467				107,778	61%	
TX(arv)					0	0		237	148				385	89%	
West	ATO(earp)= 640,420 ATO(arv)= 2,180														
TX(earp)	72,902	28,849	20,325	20,015	41,002	24,892	39,104	69,382	62,204	116,336	38,729	36,926	570,666	89%	
TX(arv)	210	155	85	109	134	77	150	264	150	134	49	265	1,782	82%	
TOTAL	ATO(earp)= 817,134 ATO(arv)= 2,611														
TX(earp)	72,902	28,849	20,325	20,015	56,551	32,367	65,069	85,704	104,671	116,336	38,729	36,926	678,444	83%	
TX(arv)	210	155	85	109	134	77	150	501	298	134	49	265	2,167	83%	

ATO: Annual Treatment Objective TX: Number Treated earp: Eligible At Risk Population (for mass treatment) arv: At Risk Villages

**Table 9: CDTI Implementation in North (1999-2000)
West (2001) Provinces**

North Province:

Districts	# of endemic communities	# of CDTI communities 1998	# of CDTI communities 1999	# of CDTI communities 2000
Tchollire	116	8	32	82
Touboro	140	9	58	98
Rey Boubake	62	3	23	44
Poli	120	13	39	108
Lagdo	67	0	25	48
Touroua	23	0	5	20
Total	528	33	182	400
% of all communities		6%	34%	76%

West Province:

Districts	# of endemic communities	# of CDTI communities 2001
Bafang	100	100
Bangangte	205	205
Foumbot	201	201
Bandja	57	57
Kekem	78	78
Malantouen	191	191
Santchou	62	62
Mbouda	307	0
Foumban	221	0
Bandjoun	116	0
Dschang	347	0
Baham	71	0
Bamendjou	51	0
Penka Michel	191	0
Batcham	107	0
Mifi	198	0
TOTAL	2503	894
% of all communities		36%

SUDAN

There are an estimated two million persons at-risk of onchocerciasis in Sudan, and 10,000 cases of onchocerciasis-related blindness. Of the several endemic areas in the country, the southern (principally southwestern) focus is the most significant and is characterized by high prevalence of blinding onchocerciasis. Some of the highest rates of blindness due to onchocerciasis in the world occur in the southwestern focus of Sudan.

The decades-old civil war in Sudan continues and as a result, channels of communication between the Government of Sudan (GOS) and the non-government held areas in the south remain key to coordinate and accelerate the onchocerciasis program. Operation Lifeline Sudan (OLS), a consortium of Non-governmental Development Organization (NGDOs) and UNICEF, is the lead agency working in the contested southern part of the country. Within the structure of the OLS, Health Net International (HNI) is the NGDO that coordinates the distribution of Mectizan in OLS areas in a program known as the South Sudan Onchocerciasis Control Program (SSOCP). SSOCP is composed of NGDOs with onchocerciasis control activities in areas served by OLS. HNI works to standardize training and reporting formats for the 11 NGDOs engaged in treatment activities. A total of 22 NGDOs continue to either treat *en masse* or on an individual basis in southern Sudan (Table 10). All parties work closely with the Sudan Relief and Rehabilitation Association. In 1997, Sudan established a National Onchocerciasis Task Force (NOTF) that includes both the GOS and SSOCP. The NOTF receives support for Sudan's campaign against onchocerciasis from Lions Clubs International Foundation (LCIF) (through The Carter Center) and the African Program for Onchocerciasis Control (APOC). LCIF funds helped support the GOS and three NGDOs active in the SSOCP: Aktion Afrika Hilfe, International Medical Corps, and World Vision International.

Treatment Activities: Treatments in Sudan have been steadily increasing, despite the war, since President Carter negotiated a four month long "Guinea worm cease fire" in 1995, that also helped to launch Mectizan treatments in conflict areas (Figure 20). In 2000, GRBP assisted in treating a total of 451,573 persons with Mectizan treatments in Sudan, a 38% increase compared to the 1999 total of 326,779 (Figure 20). Of GRBP-assisted treatments, 88% (398,908) were administered by GOS (with support from LCIF, GRBP and APOC). This represented 92% of the ATO of 489,232. There were three new treatment areas in GOS: Abu Hamad; Al Baraka, a displaced camp; and two additional villages, Terekeka and Toreit. In OLS areas, a total of 52,665 people were treated through the SSOCP (with support from HNI, APOC, LCIF and GRBP) as shown in Table 11. This represented 66% of the ATO of GRBP assisted NGDOs in Operation Lifeline Sudan (80,000), but a decline of 25% over treatments by these NGOs in 1999 (65,685) due to the continued civil conflict. Another 107,864 treatments were assisted by other NGDOs operating within the SSOCP; thus the total treatments provided by SSOCP in rebel held areas in Sudan in 2000 was 160,529 (71% of the south Sudan ATO), and for all Sudan 559,437 (88% of the ATO) (Table 11). The distribution of treatments by area is shown in Figure 21. The 2001 ATO for Sudan is 458,744 for GOS areas and for GRBP-assisted NGDOs in SSOCP 166,889. Thus, the

2001 ATO for GRBP in Sudan is 625,633. The estimated ultimate treatment goal (UTG) for GRBP Sudan affiliated programs is 743,230, meaning that the 2001 ATO (625,633) aims to reach 84% of that full coverage goal. Due to the difficulties of obtaining accurate figures in the face of war, revisions of the ATO and UTG are expected.

Training/Retraining: In 2000, in GOS areas, training occurred for a total of 1568 community-directed distributors (CDDs) and 80 health workers. This level of training increased by 60% compared to 1999 (980 CDDs and health workers trained).

A major concern was expressed by HNI about the need for better technical support for the SSOCP.

Mectizan: Mectizan tablets were distributed during the year 2000 from two shipments. One in October 1999 of 1,200,000 tablets and the other in September 2000, of 1,227,000 tablets. The total shipped to the field was 1,235,000 tablets. Wastage of Mectizan was minimal in GOS areas. The 3mg tablets were well accepted and, to avoid wastage, Mectizan was transferred from one zone to another as needed. In the SSOCP, however, there was more wastage due to insecurity and fuel shortages that delayed delivery of opened bottles for redistribution.

Sustainability indices:

Community involvement: In general, communities are well organized and are committed to the distribution of Mectizan using CDTI. Many communities are selecting their CDDs, and some community leaders are promoting ownership of the program and contributions to CDDs for their efforts. More women have been participating in workshops and as CDDs. There is, however, still need to increase the involvement of communities in CDTI.

Government involvement: Generally, the onchocerciasis control program is viewed as an example of a successful health delivery system. Onchocerciasis control supervisors are knowledgeable and work well with the community health department. CDTI fits well into the Sudanese health policy that now stresses maximizing community ownership and participation.

The integration of the onchocerciasis control program into the primary health care system has progressively strengthened that PHC system, despite the war. Due to a shortage of health staff, onchocerciasis coordinators are often coordinators of other programs, and many of the CDDs are also volunteers for Guinea worm eradication and other diseases. Such integration has strengthened the onchocerciasis program.

Cost per Treatment: The cost per treatment in 2000 was considerably above that recommended by APOC, and calculated at US \$ 0.71.

Constraints:

- The ongoing civil conflict.
- Treatment activities required in areas devoid of any health infrastructure, or in areas where the Primary Health Care system is non operational.
- Loss of trainers and trainees. Attrition of CDDs and rapid turnover of NGDO staff makes training and advocacy a constant task.
- Difficult transportation. To facilitate Mectizan coverage in remote areas, frequent travel to the affected zones by government officials and supervisors is necessary. Often agencies and programs do not have vehicles on site, and therefore must share available resources with other programs. Vehicles are often lost to the warring parties.

In Memory:

- The Sudan program mourns the loss of Eliza Amaya, a CDD. He was killed while delivering treatment to residents in Toriet, Equatoria State (southern Sudan). The program also mourns the death of Anthony Agostino, who was killed in the Wau area of Sudan.

RECOMMENDATIONS 2001 for SUDAN

Activities in conflict areas:

- Flexibility and creativity must be employed whenever possible when applying WHO/APOC guidelines and Mectizan delivery strategies under the conditions that currently exist in Sudan.
- There is a need for a political settlement of the conflict.

APOC:

- APOC should provide more technical assistance to the Sudan program, especially in the south.

Treatments:

- Refine the eligible at risk, total population, ATO's, and UTGs.
- Improve monthly reporting of data by GRBP-assisted programs in Sudan, perhaps through clear reporting guidelines, schedules, and a Memorandum of Understanding with participating NGOs.

Sustainability:

- Monitor the impact of the demands on CDDs by other programs and higher health priorities.

Map 4

Onchocerciasis in Sudan

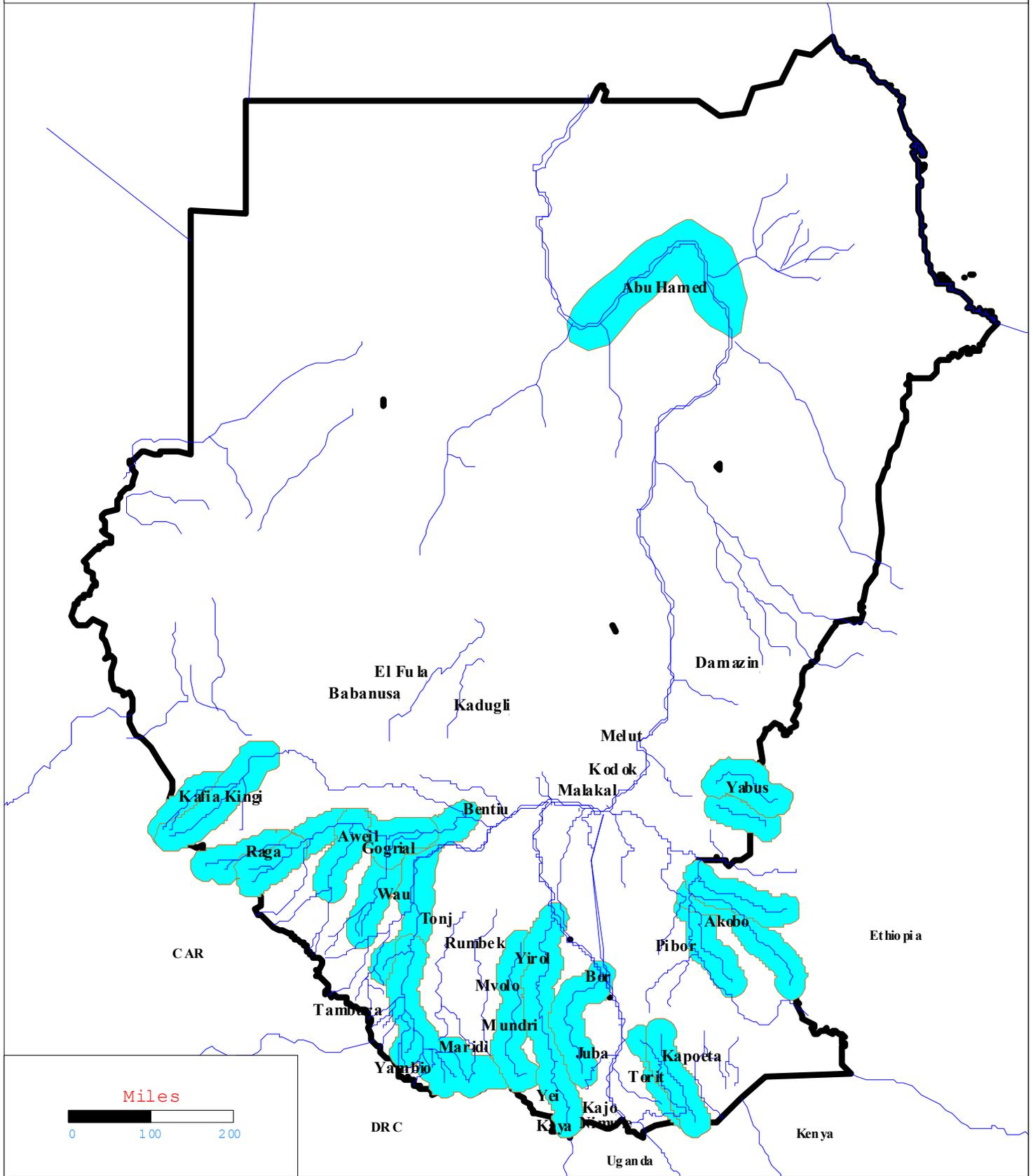
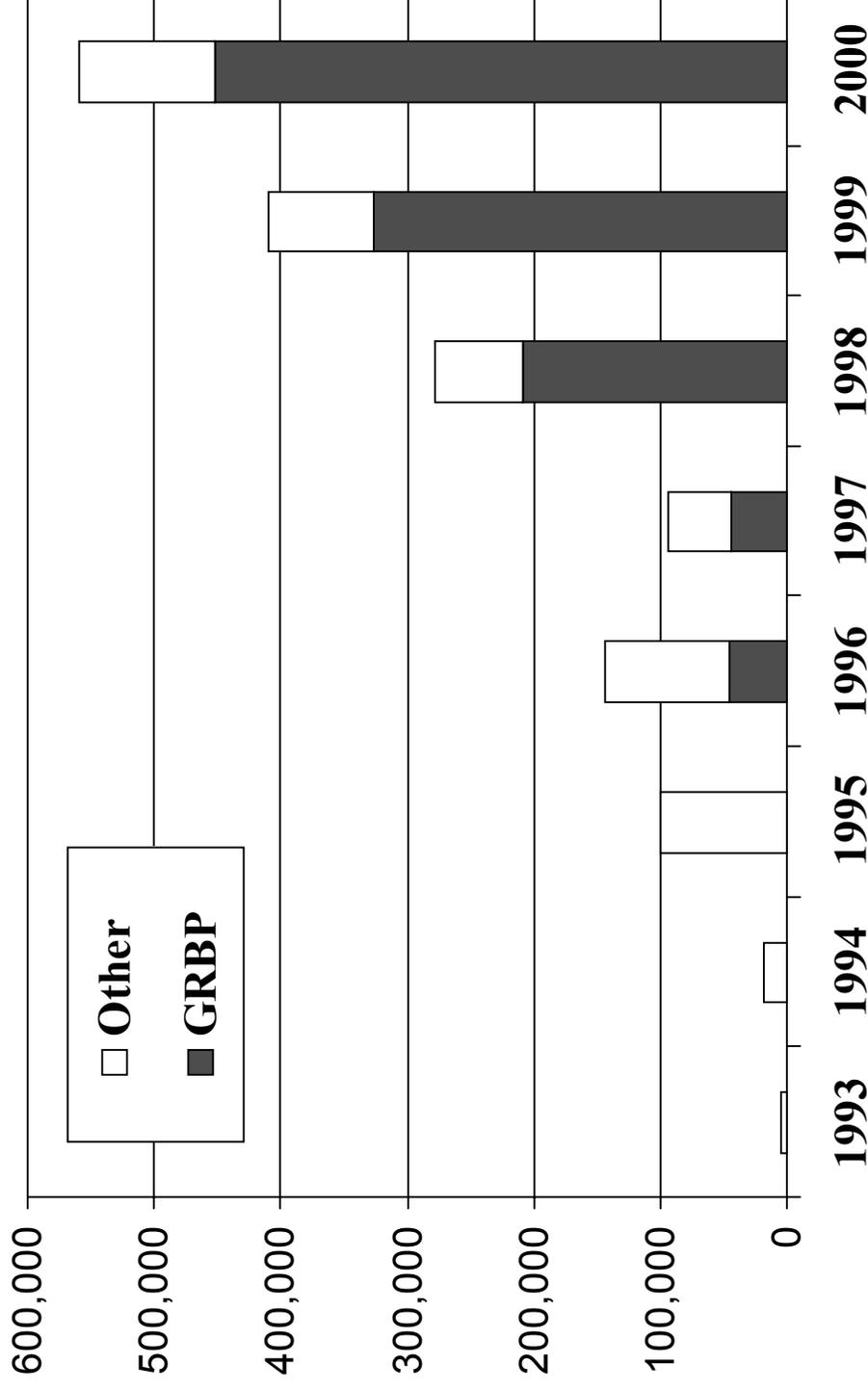


Figure 20

Sudan: GRBP-Assisted Mectizan Treatments as Part of the Total Treatments Provided, 1993-2000



Since 1997, GRBP activities in Sudan have been supported by Lions Clubs International Foundation

Figure 21

GRBP-Assisted Mectizan Treatments in Sudan, by Area, 2000

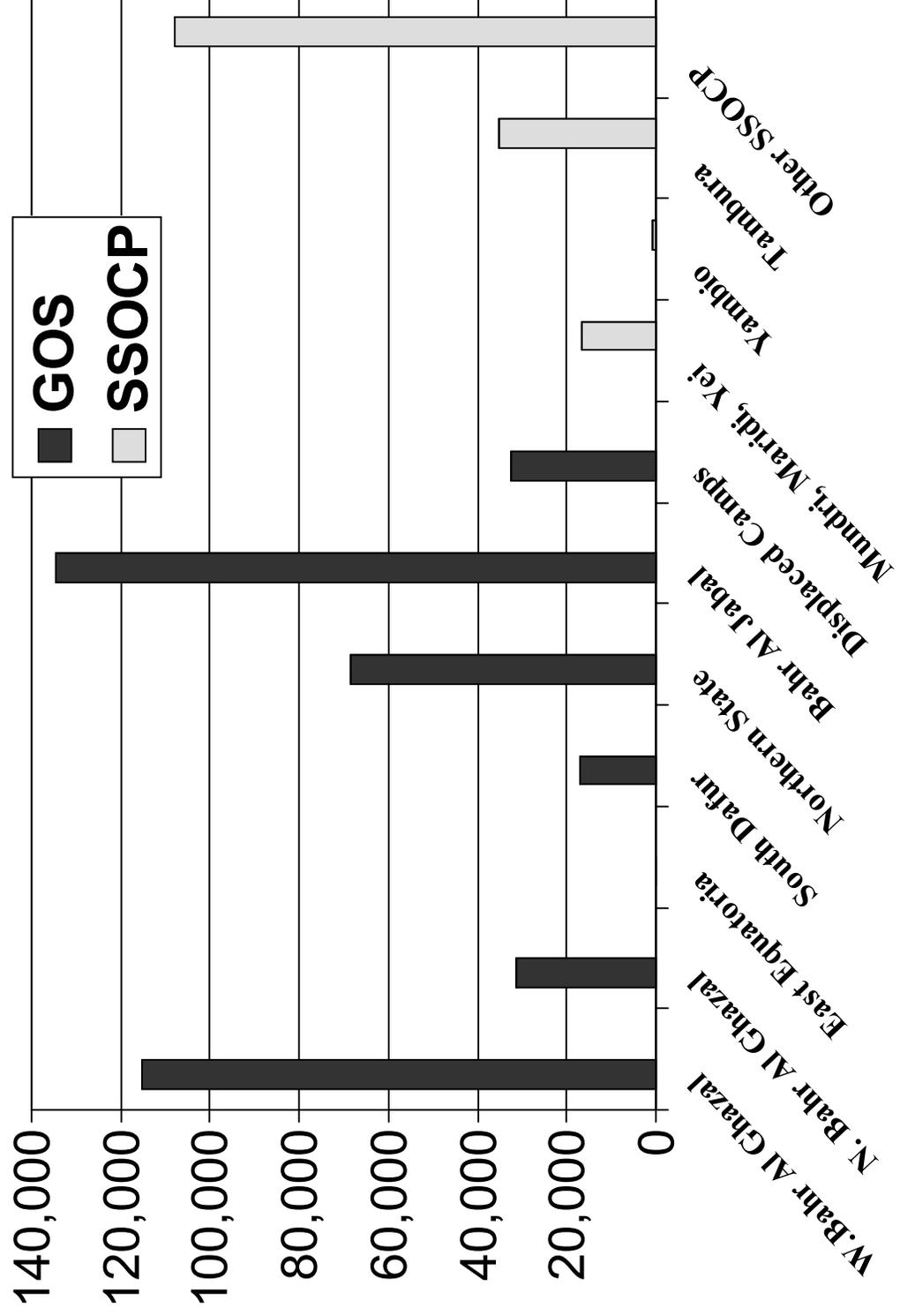


Table 10

**List of implementing NGO partners
In the Southern Sudan OV Control Program:**

1. ACROSS
2. Aktion Afrike Hilfe
3. American Refugee Committee
4. Comitato Collaborazione Medica
5. Diakonie Emergency Aid
6. Diocese of Rumbek
7. Diocese of Torit
8. German Emergency Doctors
9. International Committee for the Red Cross
10. International Medical Corps
11. International Rescue Committee
12. MEDAIR
13. Medecins Sans Frontiers-Belgium
14. Medecins Sans Frontiers-Holland
15. Medecins Sans Frontiers-Swiss
16. Norwegian People's Aid
17. Norwegian Church Aid
18. OXFAM-UK
19. Samaritan's Purse
20. Sudan Relief and Rehabilitation Association *
21. Sudanese Health Association (SUHA) *
22. Zud Ost Asia (ZOA)- Refugee Care

* Sudanese NGO's

Table 11: 2000 Mectizan Treatments in Sudan

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	% of ATO	% Total
	ATO=	409232		ATO GRBP	409232			arv	306						
GOS															
West Bahr Al Ghazal															
Raja	7829	6810	4748	1782	1976	5473					1,861	2,946	30,479		5%
Wau		4596	77014	152									84,708		15%
Other													-		0%
North Bahr Al Ghazal															
Gogrial															
Aweil						31318							31,318		6%
East Equatoria State															0%
South Darfur State															
Radom					13788					3111			16,899		3%
Northern State															
Abu Hamad															0%
Abu Hamad Sheeri/AI Kab		27843											27,843		
Abu Hamad Locality				26607				2201					28,808		
Abu Hamad Sherak										11935			11,935		
Bahr Al Jebel															
Juba	12641	10518	3261	9299	3211	911	5774	29289	14489	31320	9,347	4,545	134,605		24%
Displaced camps (El Obeid & Khartoum)															
Gabel Awlia															
Al Baraka		1369	4309		14449								20,127		
Mayo															
Alhag Yousif															
Nyala															
Asalaam Camp											2,936		2,936		
Wad Albasheir										9250			9,250		
GOS TOTAL	20470	51136	89332	37840	33424	6384	37092	31490	14489	55616	14,144	7,491	398,908		97%
SOUTH SUDAN															
	ATO=	225000		ATO GRBP	80000										
State: Western Equatoria															
OLS (AAH Mandi, Mundri, and Yei)								0	0	0	0	16,583	16,583		
OLS (WVI Yambio)								0	0	0	0	738	738		
OLS (IMC Tambura)	207	252	900	356									35,344		
OLS (LCIF Supported)	207	252	900	356	0	0	0	0	0	0	0	50,950	52,665		71%
All OLS													160,529		
TOTAL SUDAN															
	ATO=	634232		ATO GRBP	489232										
TOTAL SUDAN													559,437		
TOTAL LCIF SUPPORTED (Callahan/Hilyer)	20,677	51,388	90,232	38,196	33,424	6,384	37,092	31,490	14,489	55,616	14,144	58,441	451,573	92.3%	71%

ETHIOPIA

Ethiopia is the most populous country in the Horn of Africa, with over 60 million people and an area of 435,000 square miles. Onchocerciasis was first reported in southwestern Ethiopia in 1939 by Italian investigators. The northwestern part of the country was reported to be endemic in studies done in the 1970's. Currently it is estimated that 7.3 million persons are at risk of onchocerciasis, and 1.4 million are infected. The levels of endemicity in communities were defined by nodule prevalence rates obtained from the Rapid Epidemiological Mapping of Onchocerciasis (REMO) exercise conducted in 1997. The results indicated that out of 43 zones in 6 regions surveyed, 11 zones were hyper-endemic and 13 meso-endemic. REMO has not yet been completed throughout the country (Table 12)

The National Onchocerciasis Task Force (NOTF) has been tentatively established and will function through the Ministry of Health's (MOH) Malaria and Other Vector Borne Disease Control Unit (MOVDCU). A National Plan of Action for onchocerciasis control activities in Ethiopia was drafted at a workshop in Nazareth on September 14, 1999 with assistance by many partners, including The Carter Center. The plan proposed phasing the delivery of Mectizan tablets and health education into onchocerciasis endemic areas identified in the 1997 REMO exercise. Table 12 shows the schedule for CDTI project development by Phase in Ethiopia, according to the National Plan. In December 1999, the MOH invited The Carter Center to be its partner in an application to the African Program for Onchocerciasis Control (APOC) for support of treatment activities in Kaffa Sheka zone of the Southern Nations Nationalities and Peoples' Region (Map 6).² The proposal, which was approved in 2000, targeted 50% of the eligible at risk population in the zone (239,436) for 2001, with expansion to the Ultimate Treatment Goal (478,872) by year 2003.³ Programmatic activities began in 2000, including mobilization and training of distributors to carry out treatment activities using the CDTI strategy.

A strong relationship with the local Lions Club International has been established. The Lions have played an active role in attending and sponsoring meetings including the official launching of onchocerciasis control activities on December 5, 2000 in Addis Ababa. In attendance were: Dr. Lamisso Hayesso: Vice Minister of Health, Dr. Ebrahim Samba: Regional WHO Director, Dr. Tebebe Y/Berhan: Vice Governor, Lions Clubs District 411, Mr. Alemayehu Seifu: Department Head, DPC, MoH, Dr. Mitchel Jancloes: WHO Representative for Ethiopia, and others.

Treatments: Treatment and health education activities are expected to begin in early 2001, with a 2001 ATO earp of 239,436 and ATO arv of 390.

² Following the application to APOC, Kaffa Sheka zone was divided into two separate zones, Kaffa and Sheka zones.

³ earp may increase after the completion of REMO survey.

Training: An APOC sponsored workshop from October 29 - November 7, 2000 trained members of the NOTF and regional, zonal and woreda (district) health personnel in CDTI strategy. Overall, at the regional level, 39 health officials participated in CDTI training and 22 officials from the zones. Fifty-six health workers (CDD trainers) participated from the three CDTI woredas and currently training of CDDs is underway. Materials provided included: training manuals, onchocerciasis information brochures, treatment registries, individual treatment cards, CDD bags, reporting pads, measuring sticks and posters for health education activities. In addition, 100 copies of the CDTI manual have been translated and printed in Amharic.

Assessments: Following the split of Kaffa Sheka zone, Kaffa zone has a total of 10 woredas and Sheka zone has a total of 3 woredas. CDTI activities are being planned in five of the woredas (2 in Kaffa and 3 in Sheka) in a total of 390 arv's.

Mectizan: An application for Mectizan was submitted to the MDP in 2000. Based on the treatments projected for the first year, a request was made for 628,536 3-mg tablets. A total of 1,258 bottles of Mectizan were received from MDP in November of 2000 and delivered to Kaffa and Sheka zones.

Challenges to the Onchocerciasis Program:

- The restructuring of zones and woredas.
- Shortage of updated mapping data.
- Few collaborating NGOs.
- Competing health programs demand the time of MOH personnel.
- Remoteness of some of the CDTI areas, and transportation difficulties.
- No regular meeting of the NOTF.

RECOMMENDATIONS 2001 for GRBP ETHIOPIA

Assessments:

- Encourage the completion of REMO assessments in Kaffa Sheka zone, and begin similar exercises in other suspected endemic regions of Ethiopia.
- Establish UTG after REMO exercises.

Treatments:

- Assist with the launching of treatments and health education in 2001.

Training:

- Additional translated CDTI manuals should be printed as soon as possible.

NOTF:

- Encourage more frequent NOTF meetings.

Ethiopia GRBP Assisted Zones

Map 5

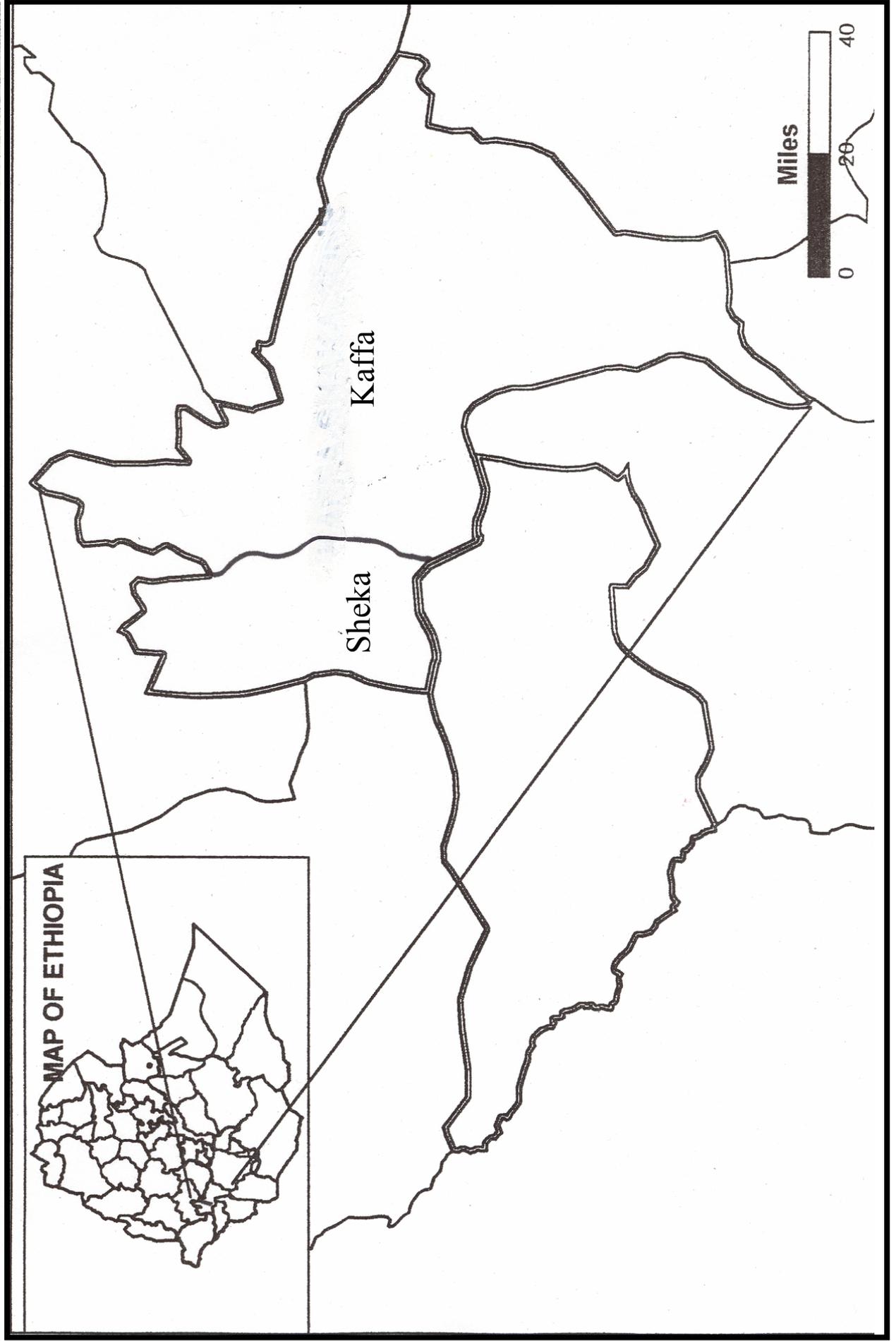


Table 12: Schedule of CDTI Projects Development by Phase in Ethiopia

PHASE	CDTI PROJECT	Latest Date of Submission to APOC	1st year Implementation	NGO Patner	Remark
I	Keffa-Sheka	31-Dec-99	2000	Global 2000	REMO to be refined
	Bench-Maji	31-Jul-01	2001	Global 2000	REMO to be refined
	North Omo	31-Dec-01	2002	Global 2000	REMO to be refined
	Metema - Quara	31-Jul-01	2001	Global 2000	REMO to be refined
II	East Wollega	31-Dec-01	2002	To be identified	REMO to be conducted
	West Wollega	31-Dec-01	2002	To be identified	REMO to be conducted
	Jimma-Metu	31-Dec-01	2002	To be identified	REMO to be refined
	Pawi	31-Dec-01	2002	To be identified	REMO to be refined
	Assossa	31-Dec-01	2002	To be identified	REMO to be conducted
	Gambella	31-Jul-02	2002	To be identified	REMO to be refined
III	Humera	31-Jul-02	2002	To be identified	REMO to be conducted

ONCHOCERCIASIS ELIMINATION PROGRAM FOR THE AMERICAS (OEPA)

The Onchocerciasis Elimination Program for the Americas (OEPA) is a regional coalition working to eliminate both morbidity and transmission of onchocerciasis in the Americas through sustained, semi-annual (i.e., every six months) distribution of Mectizan. The OEPA initiative began shortly after passage in 1991 of Resolution XIV of the 35th Pan American Health Organization (PAHO) Assembly, which called for the elimination of onchocerciasis as a public health problem in the Americas by the year 2007. The OEPA coalition includes ministries of health of the six countries (Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela), The Carter Center, PAHO, InterAmerican Development Bank, Mectizan Donation Program (MDP) and the Centers for Disease Control and Prevention (CDC). GRBP coordinates much of the technical and financial assistance to the initiative.

Treatments: As with other GRBP assisted programs, coverage has been reported in OEPA as a percentage of the Ultimate Treatment Goal (UTG) which is defined as the total number of persons eligible for treatment in the American region (429,920 persons). In the first treatment round of year 2000, 367,619 persons were treated, representing a UTG coverage of 86% and 90% of the 2000 ATO (408,164). This reflects a 34% increase over the number treated during the first round of 1999 (compared to a 1% increase between 1998 and 1999) (Figure 22). During the second treatment round in 2000, 256,385 people were treated, making the total ivermectin treatments for the region 624,004. The improvement in 2000 treatment figures was due to the dramatic growth in the programs of Guatemala and Venezuela (see below). Table 13 indicates treatments by country for 1999 and 2000, and is graphically illustrated in Figure 23.

In 2000, OEPA adopted a new reporting index, the 'UTG (2),' as the primary single indicator for measuring progress. The UTG(2) is defined as the number of individuals in the region who require ivermectin treatment (the Ultimate Treatment Goal) multiplied by two (since each individual should be treated twice during a calendar year). OEPA has recommended use of the UTG(2) to better monitor the success of programs in providing two treatments per year to all at risk eligible individuals. Use of the new UTG (2) denominator of 859,840 (twice the UTG of 429,920), shows the overall 2000 UTG (2) treatment coverage for the Region was 73%, with only Colombia and Mexico achieving over 85% of the UTG(2) (Figure 24). A country-by-country review of treatment achievements follows:

- During the first half of 2000, Brazil provided 5,103 persons with ivermectin treatment, 75% of the UTG (6,794) and ATO (6,781). This was an 86% increase from 1999 treatments. During the second half of 2000, 2,556 persons (38% of the UTG) received treatment. A total of 7,659 ivermectin treatments were given in 2000. This represents 50% coverage of the Brazilian UTG (2) of 13,588. These treatments were provided in migratory Yanomami communities in the remote jungle areas of the northern states of Roraima and Amazonas. The distribution strategy in Brazil utilizes health care centers situated in accessible base camps (polos bases) that are staffed by ministry of health and by non-governmental development organization (NGDO) personnel. Treatments took place in 15 of the 19 endemic polo bases, including 4 of

the 5 high-risk polo bases (e.g., those with an infection prevalence of * 60%). A key need for the Brazilian program is to reach > 85% of its UTG (2) by 2002.

- Colombia has a single known endemic community (Naicioná, in the municipality of López de Micay, Department of Cauca). For the year 2000, the endemic area registered 1,101 persons eligible for treatment (ATO and UTG), and during the first semester 1,070 persons (97% of the UTG) were treated. This already high coverage rose to 100% (1,101 treated) of the UTG for the latter half of the year. The UTG (2) coverage for the year 2000 was 99% (2,171 treatments of its 2,202 UTG (2)). This was achieved despite civil unrest in and around the small Colombian focus that prevented the epidemiological impact evaluations scheduled for 2000. In-depth epidemiological evaluations to determine if transmission has been suppressed in Colombia have been re-scheduled to take place during 2001.
- Ecuador treated 16,490 persons in the first half of the year 2000, 85% of the country's 19,321 eligible population (UTG) and 89% of the 2000 ATO (18,629). However, only an additional 2,770 treatments (14% of the UTG) were provided during the second half of the year, giving an overall UTG (2) coverage of only 50% (19,260 of 38,642 required treatments). Of the 119 endemic communities, 106 (89%) received treatment, including all 42 high-risk communities. The Ecuadorian Program pledged to provide two treatment rounds in all endemic communities in 2001, and the MOH committed US\$40,000 per year to the program.
- Guatemala treated 127,978 persons during the first six months of 2000, or 80% of the UTG (160,000) and 92% of the ATO (138,949). This was a 66% increase over 1999, when 76,985 (48%) persons were treated. During the second half of the year, 108,350 persons received treatment. Considering both rounds, a total of 236,328 doses of ivermectin were administered in 2000, representing 74% of its 320,000 UTG (2). Of the 552 endemic communities at the beginning of the year 2000, 501 (91%) received treatment, including 38 (84%) of 45 high-risk communities. Key needs for the Guatemalan program in 2001 will be to strengthen community-based ivermectin delivery (through the use of community volunteers) and attain >85% of its UTG (2).
- In the first six months of the year in Mexico, 157,291 persons were treated, or 99% of the UTG and ATO (158,824), a 3% increase over 1999. The second half of the year saw 132,899 persons treated (84% of the UTG). Mexico administered a total of 290,190 treatments and achieved a coverage of 91% of its UTG (2) of 317,648. Of the 689 endemic communities in Mexico, all received treatment, including 100% of the 39 high-risk communities. The Mexican Program in 2000 was host to preparatory exercises towards the certification of elimination of onchocerciasis in the foci of Oaxaca and northern Chiapas, where the status of efforts to suppress transmission was examined (results pending). A key need for the Mexican program in 2001 will be to strengthen community-based ivermectin delivery (through the use of community volunteers) in Chiapas State, where political unrest hampers activities.

- Venezuela provided treatment to a total of 59,687 persons (71% of its UTG and ATO of 83,880) during the first half of 2000 in the two endemic foci in the north of the country, and in the smaller southern Amazon focus. This represents an increase of 156% over all treatments provided in 1999. However, only 8,676 treatments (15% of the UTG) were administered during the second half of the year, resulting in a total of 68,363 treatments for 2000 the lowest UTG (2) coverage (41% of 167,760) in the Region (Figure 24). Of the 618 confirmed endemic communities in the country, all 80 high-risk communities were treated, along with 373 (69%) of the remaining 538 endemic communities. Additional funding is needed to strengthen the program in Venezuela in 2001 to reach > 85% UTG (2) coverage.

Certification meeting: A group of onchocerciasis experts was convened in September 2000 under the auspices of WHO Geneva to review and revise proposed guidelines (drafted by OEPA and ratified by IACO'99) for the certification of elimination of onchocerciasis. OEPA and Carter Center staff participated in the meeting.

The meeting provided a time diagram showing various phases (intervals) and key decision points (points of transition) between phases in the certification process for onchocerciasis transmission elimination (Figure 25). The first point of transition is named 'suppression of transmission.' This is the point where no new parasites are entering the system, and the program enters into the phase characterized by the countdown to death by old age of the adult worm population (15 years). After this happens, Mectizan interventions would be withdrawn, and the precertification period would begin. If no transmission is resumed after withdrawal of the intervention for a period of three years, the country can be certified as having eliminated onchocerciasis. The country would then move into the post-endemic phase.

IACO 2000: The tenth annual conference (IACO'2000) was held in Guayaquil, Ecuador on 6-9 November 2000. In addition to representatives of the national programs, the meeting was attended by representatives of WHO/PAHO, non-governmental organizations (The Carter Center, the Lions Clubs, the Mectizan Donation Program, and Christoffel-Blindenmission), the Centers for Disease Control and Prevention, the Onchocerciasis Control Program of West Africa, and other interested parties. The theme of IACO'2000 was 'New Challenges for the Regional Initiative,' and the topics addressed included the need for new and alternative diagnostic techniques for monitoring incidence of disease in human populations, the logistics needed to apply PCR in the field to measure infection rates in Simulium black flies, the need to better monitor impact of the program on ocular morbidity, and the critical role of good data collection, timely data analysis and information exchange. Member countries accepted these challenges, and reaffirmed their commitment to delivering two treatment rounds per year, eliminating new ocular morbidity from onchocerciasis by the year 2002, and suppressing transmission by the year 2005.

Key recommendations of the meeting were that 1) all programs should heighten their efforts to provide two treatments per year (with at least 85% coverage of eligible populations in each round in all 1963 known endemic communities in the Region), and 2) programs should promptly report the treatment data (by treatment round and by

community) to OEPA headquarters in Guatemala City. To monitor progress toward these goals, IACO'2000 adopted a new reporting index, the 'UTG (2),' as the primary single indicator for measuring progress.

RECOMMENDATIONS 2001 for OEPA:

Treatments:

- All programs should provide two treatments per year (with at least 85% coverage of eligible populations in each round in all 1,963 known endemic communities in the Region) in 2001 with the possible exception of southern Venezuela
- All programs should promptly report the treatment data (by treatment round and by community) to OEPA headquarters using the new reporting index, the 'UTG (2),' as the primary single annual indicator for measuring progress.

Countries:

- Country summaries should be prepared by OEPA staff that include one to two recommendations for key action in three areas: political, financial, and technical
- Brazil needs to reach > 85% of its UTG (2) by 2002
- Colombia needs to reschedule the in-depth epidemiological evaluations to determine if transmission has been suppressed for 2001.
- Ecuador needs to provide two treatment rounds in all endemic communities in 2001, and the MOH observed to see if it releases the committed US\$40,000 per year to the program.
- Guatemala should strengthen community-based ivermectin delivery (through the use of community volunteers) and attain >85% of its UTG (2).
- Mexico needs to strengthen community-based ivermectin delivery in Chiapas State, where political unrest hampers activities.
- Venezuela desperately needs additional funding to strengthen the program in 2001 to grow to reach > 85% UTG (2) coverage.

Funding:

- New funding is crucial for OEPA as The InterAmerican Development Bank grant expires in 2002 (after a second year of a no cost extension), OEPA needs to secure resources to provide maximum support to the Venezuelan, Guatemalan, and Brazilian programs, which still have not reached their UTG (2). However, core support for OEPA will be sustained past 2002 under the expanded Lions/Carter Center partnership.

Transmission:

- Document the 'suppression' of transmission in certain areas of the Americas using the new ICT test for onchocerciasis antibody
- Continue to apply polymerase chain reaction techniques to measure infection rates in all major American blackfly vectors in countries (by University of Alabama Birmingham).
- Model transmission dynamics in all major American blackfly vectors
- Seek ways to escalate the attack on onchocerciasis using other interventions in combination with Mectizan and health education.

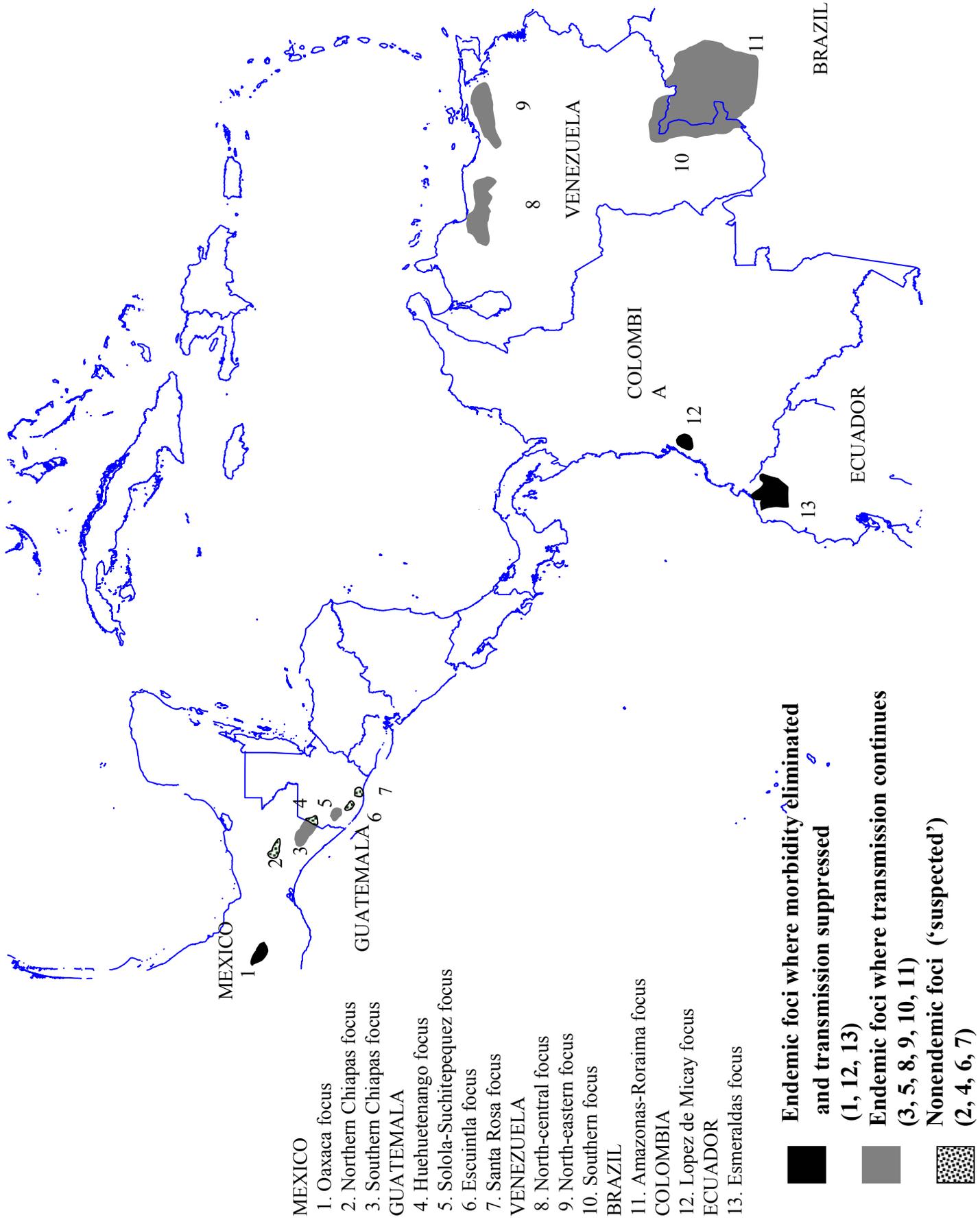
Mectizan:

- Assist the MDP whenever possible with issues related to importation of Mectizan into the Americas.

Certification:

- Continue to promote the adoption of certification criteria.
- Develop and carry out 'preparatory exercises towards certification of elimination' in Mexico, Colombia, and Ecuador.
- Continue to support OEPA representation at the World Health Assembly.
- Increase political support with the assistance of President Carter
- Push WHO to release the certification report from September 2000

Stratification of onchocerciasis foci in the Americas



- Endemic foci where morbidity eliminated and transmission suppressed (1, 12, 13)**
- Endemic foci where transmission continues (3, 5, 8, 9, 10, 11)**
- Nonendemic foci ('suspected') (2, 4, 6, 7)**

Figure 22

Persons Treated With Mectizan in the Americas, 1988-2000, 2001 ATO & UTG

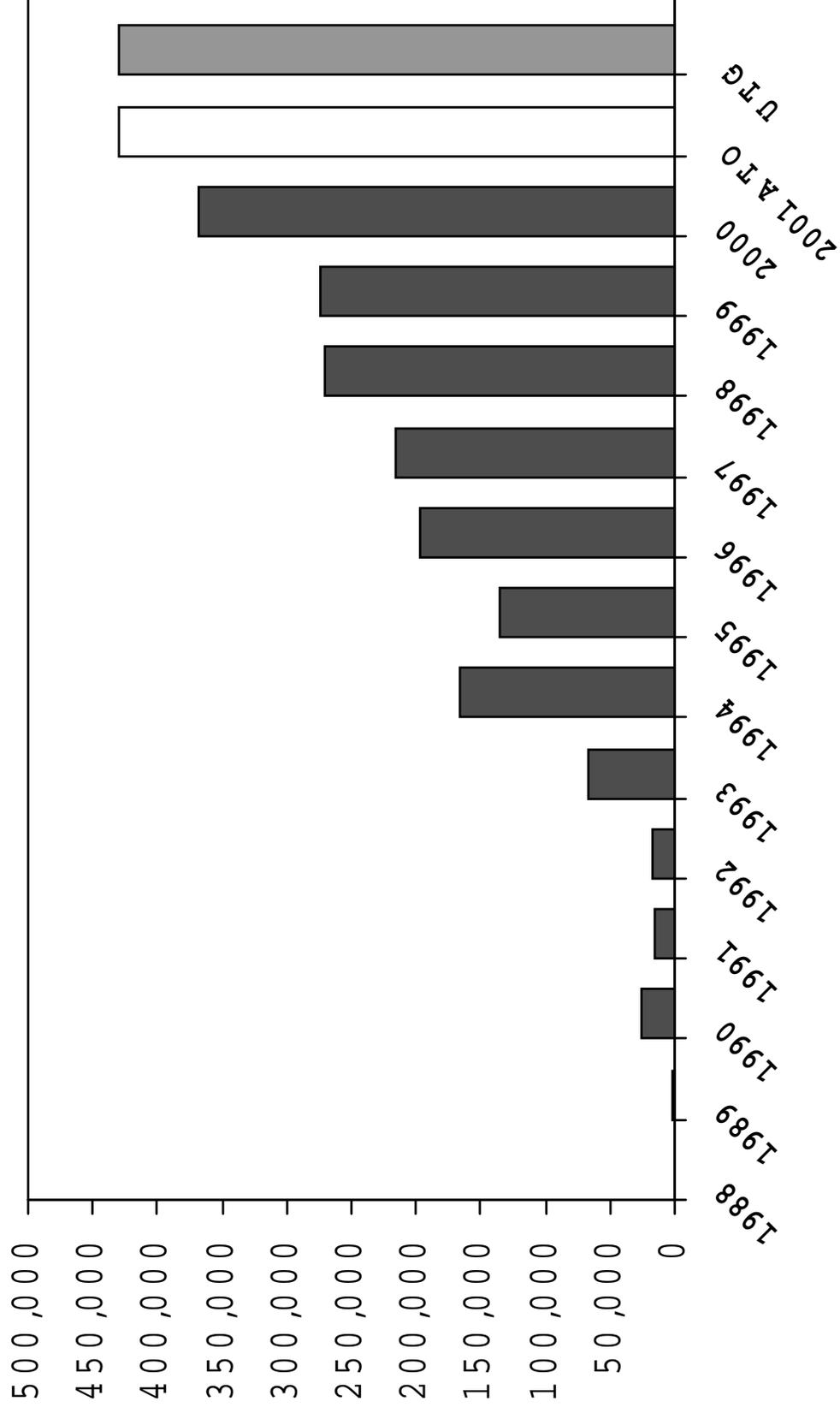


Figure 23

1996 - 2000: Persons treated in the Americas, by Country, with the 2000 ATO and the UTG

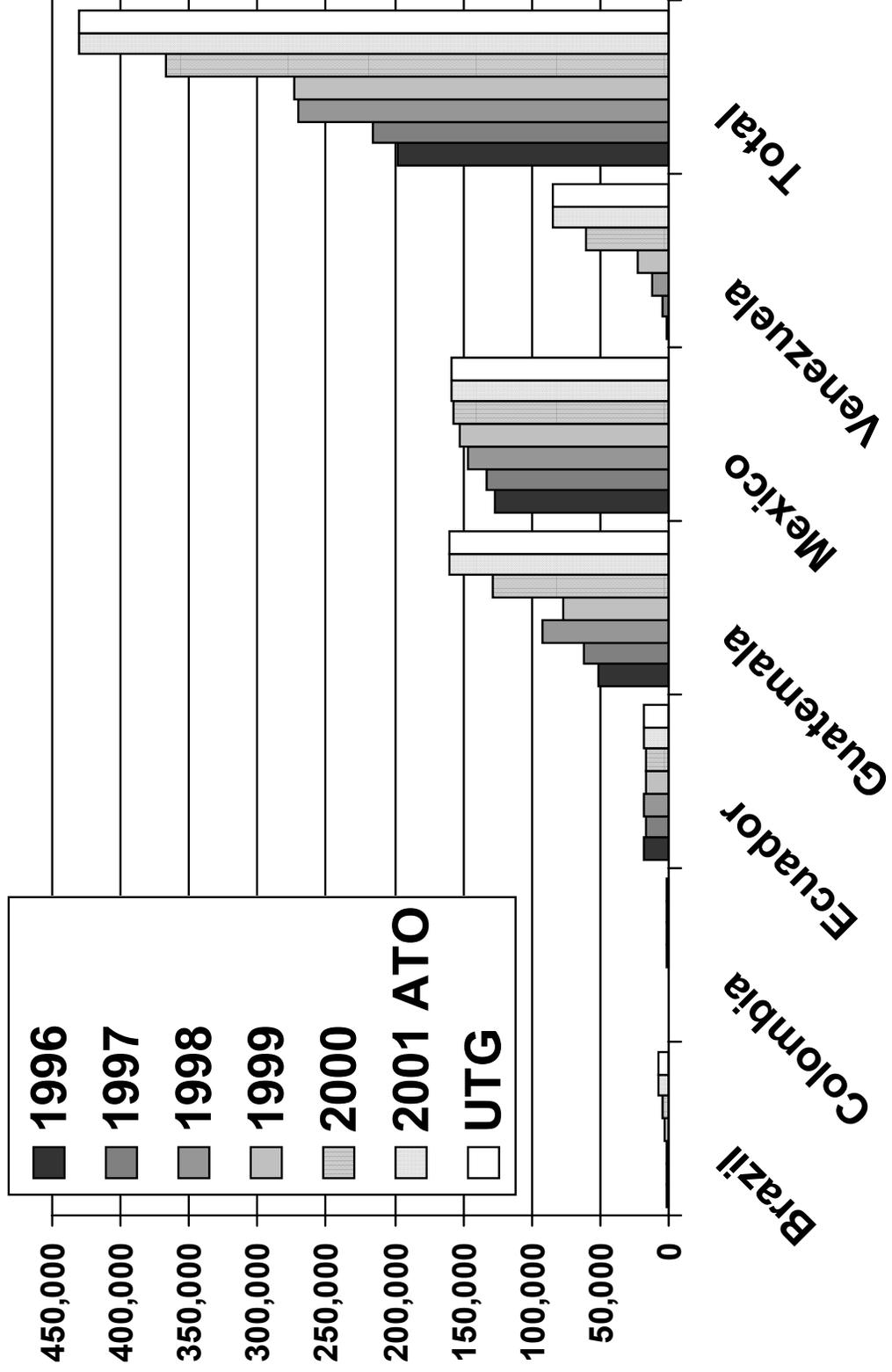


Figure 24

Mectizan Treatment in the Americas: Percent of UTG (2) Reached in 2000

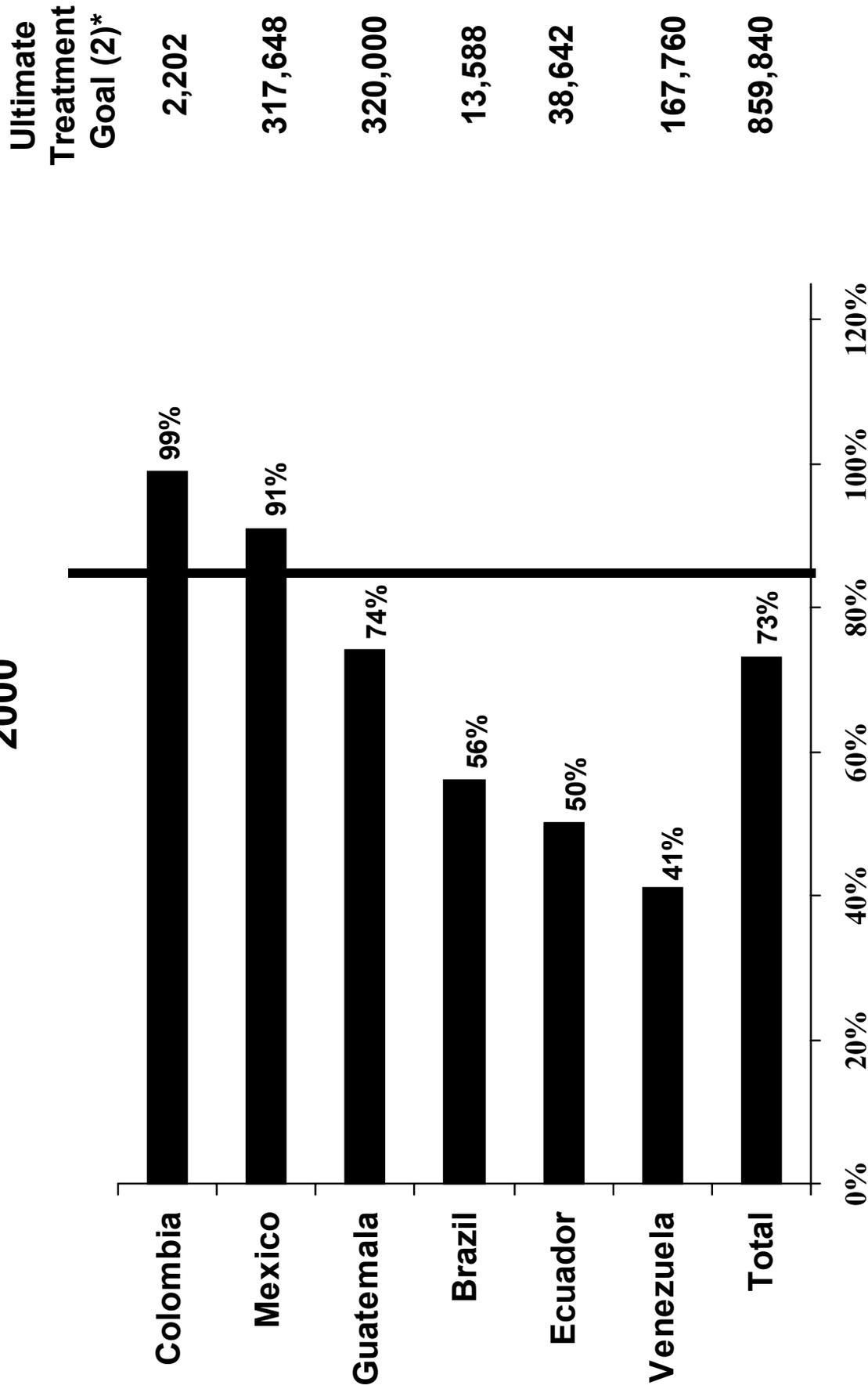
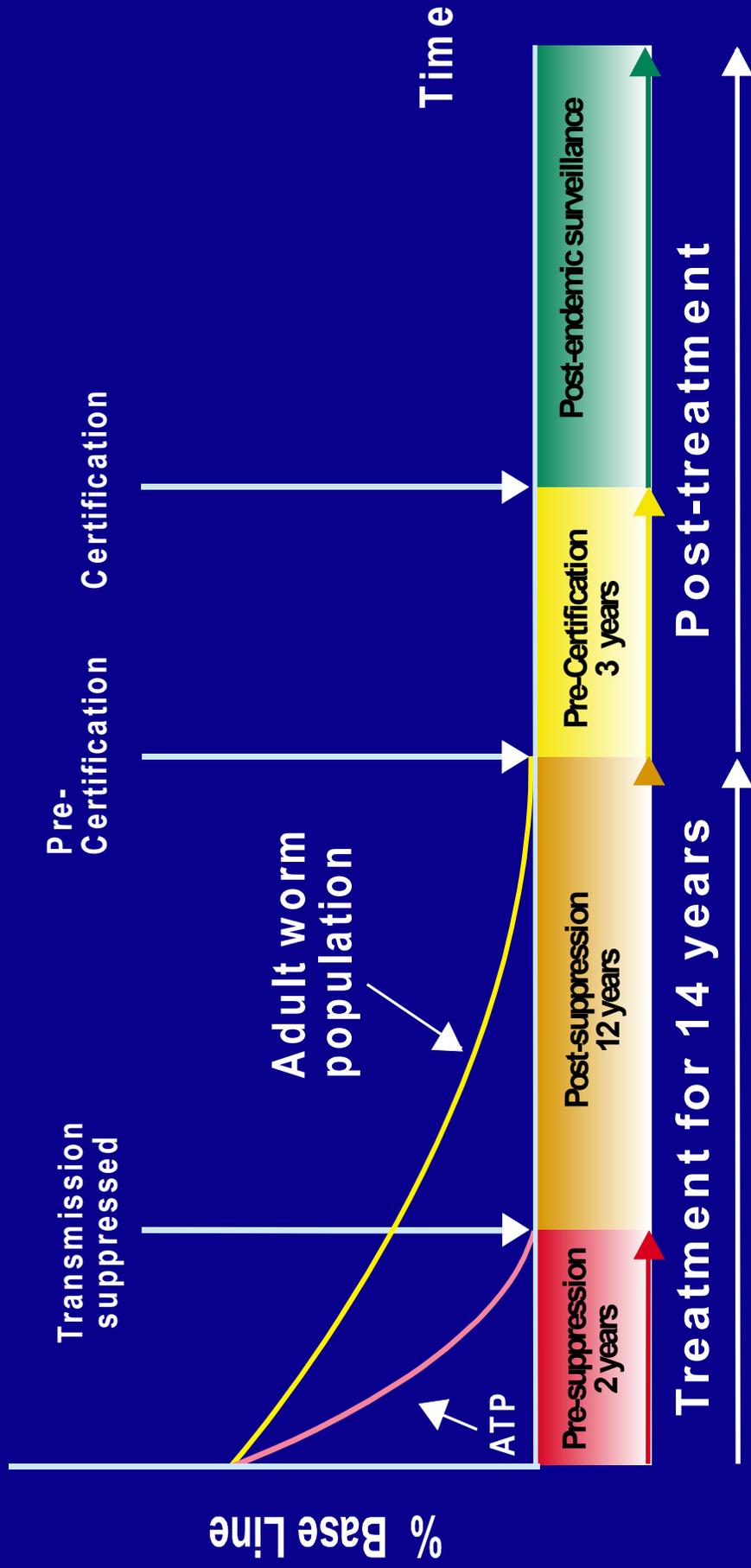


Figure 25

Process of Certifying the Elimination of Onchocerciasis



* ATP: Annual Transmission Potential

Table 13: Treatments in The Americas, 2000 and 1999, by country

OEPA 2000											
OEPA	TX(earp)		Tx (earp)		TX(arv)		TX (arv)		TX(hrv)		(hrv)
	ATO(earp)	Cum 2000	% ATO	% ATO	ATO(arv)	Cum 2000	% ATO	% ATO	ATO(hrv)	Cum	
Brazil	6781	5103	75%	19	15	79%	5	4	80%		
Colombia	1101	1070	97%	1	1	100%	0	0	0%		
Ecuador	18629	16490	89%	119	106	89%	42	42	100%		
Guatemala	138949	127978	92%	552	501	91%	40	38	95%		
Mexico	158824	157291	99%	689	689	100%	39	39	100%		
Venezuela	83880	59687	71%	618	453	73%	80	39	49%		
Total	408164	367619	90%	1998	1765	88%	206	162	79%		

OEPA 1999											
OEPA	TX(earp)		TX(earp)		TX(arv)		TX (arv)		TX(hrv)		TX(hrv)
	ATO(earp)	Cum 1999	% ATO	% ATO	ATO(arv)	Cum 1999	% ATO	% ATO	ATO(hrv)	Cum 1999	
Brazil	1784	2746	154%	7	7	100%	3	3	100%		
Colombia	1016	930	92%	1	1	100%	0	0	0%		
Ecuador	19321	17281	89%	119	111	93%	42	42	100%		
Guatemala	131586	76985	59%	497	331	67%	45	45	100%		
Mexico	176805	152624	86%	953	953	100%	46	46	100%		
Venezuela	15000	23309	155%	200	245	123%	68	62	91%		
Total	345512	273875	79%	1777	1648	93%	204	198	97%		

ANNEXES

ANNEX 1: LIST OF PARTICIPANTS

GRBP Headquarters

Dr. Rachel Barwick
Dr. Donald Hopkins
Ms. Misrak Makonnen
Ms. Wanjira Mathai
Mr. Stanley Miano
Ms. Megan Reif
Dr. Frank Richards (Chair)
Mr. Rick Robinson
Ms. Shandal Sullivan
Mr. Craig Withers
Dr. James Zingeser

Country Representatives

Ms. Kelly Callahan- Sudan
Dr. Albert Eyamba - Cameroon
Mr. Teshome Gebre - Ethiopia
Ms. Irene Mueller - HNI, SSOCP
Mr. Elvin Hilyer - Sudan
Dr. Mamoun Homeida- NOTF Sudan
Mr. Moses Katarwa - Uganda
Dr. Emmanuel Miri - Nigeria
Dr. Mauricio Sauerbrey - OEPA

Mectizan Donation Program

Dr. Mary Alleman

Other participants

Dr. Beatrice Bezmalinovic - Harvard School of Public Health
Dr. David Blaney - Student Assistant
Dr. Steve Blount- CDC
Dr. Dan Colley - CDC
Mr. Ross Cox- CDC
Dr. Ed Cupp - University of Alabama, Birmingham
Dr. Allan Fenwick - Harvard School of Public Health
Dr. Danny Haddad- Helen Keller Worldwide
Ms. Minnie Iwamoto- GlaxoSmithKline
Dr. Tovi Lehmann - CDC
Ms. Audrey Lenhart - Student Assistant
Mr. Peter Lynch- Lions Clubs International Foundation

Dr. Charles MacKenzie - Michigan State University
Dr. Deborah McFarland - Emory University
Dr. Tom Unnasch - University of Alabama, Birmingham

Annex 2:

AGENDA

**Fifth Annual Program Review Meeting
Global 2000 River Blindness Program
The Carter Center, Cyprus Room
February 26-28, 2001**

Monday, February 26

9:00 - 9:15	Welcome, introductions and remarks	Dr. Donald Hopkins
9:15 - 9:30	The 'State' of the (GRBP) Union	Dr. Frank Richards

OEPA

9:30 - 10:30	Onchocerciasis Elimination Program for the Americas (OEPA) (Part 1)	Dr. Mauricio Sauerbrey
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10:30 - 11:00	<u>Coffee Break</u>	
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11:00 - 12:00	OEPA (Part 2)	Dr. Mauricio Sauerbrey
12:00 - 1:00	OEPA: Discussion/recommendations	Dr. Frank Richards

1:00 - 2:00	<u>Lunch in Copenhill Café</u>	
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Nigeria

2:00 - 4:00	Nigeria Presentation	Dr. Emmanuel Miri
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4:00 - 4:30	<u>Coffee Break</u>	
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4:30 - 5:30	Nigeria: Discussion/Recommendations	Dr. Frank Richards
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5:30 - 6:00 Richards	Lymphatic Filariasis (LF) Update (Part 1)	Ms. M Iwamoto/Dr.
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Tuesday, February 27

9:00 - 10:00	LF Update (Part 2, Nigeria)	Dr. Miri/Dr. Richards
10:00 - 11:00	Uganda (Part I)	Mr. Moses Katarwa

11:00 - 11:30	<u>Coffee Break (Group Photo)</u>	
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11:30 - 12:30	Uganda (Part II)	Mr. Moses Katarwa
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12:30 - 1:30	<u>Lunch at Copenhill Café</u>	
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1:30 - 2:30 Uganda: Discussions/Recommendations Dr. Frank Richards

Sudan

2:30 - 4:00 Sudan presentation (Part 1, GOS) Dr. Mamoun Homeida

4:00 - 4:30 Coffee Break

4:30 - 6:00 Sudan presentation (Part 2, SSOCP) Ms. Irene Goepp

Wednesday, February 28

9:00-10:00 Sudan: Discussion/Recommendations Dr. Frank Richards

Cameroon

10:00 - 11:00 Cameroon presentation (Part 1) Dr. Albert Eyamba

11:00 - 11:30 Coffee Break

11:30 - 12:30 Cameroon presentation (Part 2) Dr. Albert Eyamba

12:30 - 1:30 Lunch in Copenhill Café

1:30 - 2:30 Cameroon: Discussion/recommendations Dr. Frank Richards

Ethiopia

2:30-3:30 Ethiopia presentation Mr. Teshome Gebre

3:30-4:30 Ethiopia: Discussion/recommendations Dr. Frank Richards

4:30-5:00 Coffee Break

Other Items:

5:00-5:30 Mectizan^R Issues MDP/GRBP staff

5:30-6:00 Lions Clubs Update Mr. Peter Lynch

6:00-6:30 General conclusions/reflections Dr. Frank Richards

6:30 Closure of fifth session Dr. Donald R Hopkins

ANNEX 3: GRBP REPORTING PROCESSES

At Risk Villages (arv's) An epidemiological mapping exercise is prerequisite to identify at risk villages (arv's) for mass Mectizan treatment programs. The assessment techniques used in the mapping exercise in Africa varies from those used in the Americas. Although detailed discussion of the mapping processes is beyond the scope of this document, a summary of the two approaches follows: In much of Africa, a staged village sampling scheme called Rapid Epidemiological Mapping of Onchocerciasis (REMO) is recommended by WHO to define endemic 'zones' that should capture most or all villages having onchocercal nodule rates $\geq 20\%$ for mass treatment. The mapping strategy is based on studies that show that most if not all morbidity from onchocerciasis occurs in villages with nodule prevalences of $> 20\%$. In the first stage of REMO, survey villages are selected from areas which are environmentally likely to support black fly breeding and therefore transmission of *O. volvulus*. In the second stage, the survey villages are visited and a convenience sample of 30-50 adults are examined (by palpation) for onchocercal nodules. The mean nodule prevalence for each village sample, along with the latitude and longitude coordinates for that village, are entered into a geographic information system that then is used to define endemic zones surrounding the sample villages having nodule prevalences of $\geq 20\%$. Villages falling within the treatment 'zone' are considered 'at risk' and offered mass Mectizan treatment. In contrast, in the Americas the goal is to eliminate both morbidity and transmission from *O. volvulus*, and as a result all villages where transmission can occur are considered 'at risk' and offered mass Mectizan treatment activities twice a year (i.e., every six months). It is recommended that every village in known or suspected endemic areas have a rapid epidemiological assessment of 50 adults (who would have both nodule examinations and superficial skin biopsies to identify *O. volvulus* microfilariae in skin). Villages where one or more persons are positive (sample prevalence $>3.3\%$) are considered 'at risk,' and recommended for the mass treatment campaign. Thus, the cutoff prevalence for treatment varies between Africa and the Americas.

Data Reporting: GRBP program offices are asked to submit reports monthly to Atlanta headquarters. These reports include 1) numbers of villages and persons treated during the previous month (reporting of treatments are updated quarterly for Sudan and the Americas), 2) the status of the Mectizan tablet supply, 3) training and health education activities, 4) epidemiologic assessment, research, and program monitoring activities, and 5) administrative issues. The treatment data that are reported originate from records prepared during mass treatment activities carried out by village distributors and/or national ministry of health personnel. The accuracy of these reports are routinely confirmed with random spot checks performed primarily by ministry of health personnel, supplemented by GRBP/OEPA staff site visits, and, in Cameroon and Nigeria, by Lions Clubs members. Summary reports of numbers of villages and persons treated are compiled at the district level and forwarded (whenever possible through ministry of health surveillance and reporting channels) to the headquarters of the national onchocerciasis programs and the national GRBP offices in Jos (Nigeria), Kampala (Uganda), Yaounde (Cameroon), Khartoum (Sudan), and Nairobi (for rebel-held areas of south Sudan). In the Americas, the ministries of health in the six

countries report treatments quarterly to the OEPA office in Guatemala City, which then provides a combined regional report to PAHO and GRBP.

The data from monthly reports are summarized, and supplemented with additional information, at annual GRBP Program Reviews held the first quarter of each year at The Carter Center in Atlanta. These Reviews (which are modeled after those developed for national Guinea Worm Eradication Programs) convene all GRBP program directors to discuss problems, formalize final treatment figures for the previous year, and establish new treatment objectives for the coming year (see below). Data on Mectizan treatments provided by other programs operating in other parts of the countries GRBP assists, when available, are also discussed.

GRBP Treatment Indices: Treatment indices are reported as the numbers of persons or villages (communities) treated (Tx) by state or province for the month. The cumulative treatment figures are compared to annual treatment objectives (ATO's). GRBP uses two ATO's, both of which are established during the Program Review based on projections of program capacity. Communities targeted for active mass distribution are to receive community wide Mectizan treatment for all eligible to take the medicine. The ATO for mass drug administration in arv's [ATO(arv)], is the total number of at risk villages in which a program projects it will provide mass treatment during the year. The ATO for eligible at risk population [ATO(earp)] is the number of persons who can receive Mectizan who are known or thought to be living in arv's. The eligible at risk population (earp) are all persons living in arv's who can receive Mectizan (e.g., who are over five years of age and in good health, and excluding pregnant women). The ATO(earp) is expected to be the same figure used in the annual request for tablets submitted to the Mectizan Donation Program. Program directors are urged to define their ATO's using the latest epidemiological mapping information and village census data from the most recent treatment rounds. Given the complex emergency in Sudan (characterized by war, famine, and displacement), only a rough estimate of the ATO(earp) can be made, and reporting of an ATO(arv) has not yet been established.

Full Geographic Coverage and the Ultimate Treatment Goal: Full geographic coverage is reached when the program is able to extend mass treatment services to all arv's in the assisted area. The ultimate treatment goal (UTG) is defined as the sum of the eligible populations living in all arv's in the assisted-area. That is, the UTG is that number of persons estimated to ultimately require Mectizan treatment once a program has the capacity to provide full geographic coverage. At the point when the program can demonstrate that it has treated the UTG, it is said to have reached full coverage; in other words full coverage is defined by the point $TX(earp)=ATO(earp)=UTG$. GRBP program progress is judged by the ability to meet ATO objectives, and to increase those objectives over a reasonable time period to reach full geographic coverage and the ultimate treatment goal.

INDICES OF SUSTAINABILITY

GRBP programs are asked to report annually on three sets of indices for sustainability, including: Community involvement (absolute and expressed as a percentage of total communities treated), National and Local Government involvement (absolute and expressed as a percentage of total communities treated), and Costs (absolute and expressed as cost per treatment). There has been difficulty among GRBP programs in complying with reporting of sustainability indices. The guidelines for the reporting follow:

Community involvement: The number and percent of treated villages in which the community is involved in the design and implementation of the treatment program and in the selection of their community-based distributor (CBD). If data are available on monetary or in kind community support for CBDs, formation of village health committees, and community support for CBDs to collect Mectizan from a central point, these should also be reported.

Government involvement: The number and percent of treated villages in which the CBD is a part of, or is supervised by, the primary health care system. Does the local and central government have a line item for onchocerciasis control in its budget? If so, how much of this budget has been released to the program?

Cost: This category includes total costs and cost per treatment.

Actual costs of treatment: This calculation includes all costs, including: a) country GRBP HQ costs, overhead and salaries, b) delivery of Mectizan from the port of entry to community, including collecting the drug from a central point by CBD c) training, d) MOH/PHC supervision and monitoring of the program, and e) remuneration/incentives paid to CBDs by the community, which could include cost recovery mechanisms.

Cost provided by national government: The government provided cost per treatment.

APOC allowable costs: The amount that APOC provides per capita treatment, and the percentage APOC is paying of actual costs.

ANNEX 4: *LOA LOA* and MECTIZAN

Recommendations for the treatment of onchocerciasis with Mectizan in areas co-endemic for onchocerciasis and Loiasis

[Adapted from a communique from the Mectizan Expert Committee, May 2000]

Infection with *Loa loa* can cause central nervous system (CNS) dysfunction both spontaneously and following treatment. In 1999, four deaths in which serious CNS events followed treatment with Mectizan were reported in *Loa*-endemic regions of Cameroon. In past years, similar cases may have occurred in Gabon, the Central African Republic, and the Democratic Republic of Congo, but not in Nigeria or Sudan. It is not known why the deaths have occurred almost exclusively in Cameroon and not in other *Loa*-endemic countries.

The precise distribution of *Loa loa* in Africa is not known; however, it is known to be endemic in humid forest areas of the following countries: Angola, Benin, Cameroon, the Central African Republic, Congo, the Democratic Republic of Congo, Equatorial Guinea, Gabon, Nigeria, and Sudan. Map 8 is based on environmental data (vegetation and remote sensing for humidity/vegetation) and can be used as an indicator of presumptive *Loa*-endemic areas. Unfortunately, complete data are not yet available for Sudan, Nigeria, or Benin; the map will be updated when the data become available. GRBP assisted areas have been crudely sketched into the map.

The Mectizan Expert Committee recommends that for onchocerciasis control programs operating in areas known to be endemic, or potentially endemic as indicated by the map, for *Loa loa* one of the following strategies be followed:

A. Program areas where the following apply:

- **Two or more rounds of annual treatment with Mectizan with at least 60% treatment coverage in each community have been carried out.**
- **No cases of serious CNS dysfunction following treatment with Mectizan have occurred.**
 - a. Continue community-based mass treatment, or the Community Directed Treatment with Ivermectin (CDTI) strategy if an African Program for Onchocerciasis Control-supported program, and maintain careful surveillance for serious adverse reactions.
 - b. Enhance community awareness and education with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan.

- c. Enhance awareness and training of community distributors and all health personnel involved in the program with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan.

B In all other program areas where one or more of the following apply:

- **No previous treatment with Mectizan.**
- **Fewer than two rounds of annual treatment with Mectizan have been carried out.**
- **Two or more rounds of annual treatment with Mectizan have been carried out but with coverage of less than 60% in each community.**
- **Cases of serious CNS dysfunction following treatment with Mectizan have occurred.**
 - a. Prior to mass treatment with Mectizan, a Rapid Epidemiological Assessment (REA) should be done in each community to document the endemicity of onchocerciasis as hyper-, meso-, or hypo-endemic. If a community is hypo-endemic (nodule prevalence under 20%), mass treatment should not be done.
 - b. If the community has hyper- or meso-endemic onchocerciasis, treatment with Mectizan should be carried out over a fixed period of time with a defined period of careful observation by community distributors for days 2-8 after treatment and surveillance by medical personnel for days 3-5 after treatment (where day 1 is the day of treatment).
 - c. Enhance community awareness and education with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan.
 - d. Enhance awareness and training of community distributors and all health personnel involved in the program with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan. The objective of this effort should be early identification of serious CNS dysfunction and prompt referral of patients to a district hospital or designated center where staff is appropriately trained and supplied for case management. Family members should be encouraged to accompany the patient and provide care.

C. Programs that give individual treatments with Mectizan to people with proven onchocerciasis

- **Clinic-based treatments:**

- a. After confirming infection with *Onchocerca volvulus*, but prior to treating with Mectizan, possible co-infection with *Loa loa* should be assessed. In the absence of hematologic diagnostic methods, patients should be asked questions to determine if *Loa loa* is probably present in their community of residence or employment.
- b. Prior to treating with Mectizan, the possibility of adverse reactions after treating *Loa*-infected people should be discussed with the patient.
- c. If the patient is at risk of serious adverse CNS dysfunction following treatment with Mectizan, he/she should be monitored by medical personnel as described above in section A, item 2b.

These recommendations are intended to minimize complications following treatment with Mectizan, in known and suspected *Loa*-endemic areas, should they arise. The risk of complications will be further reduced when the distribution of *Loa loa* is delineated and a practical means for determining the intensity of infection is available.

The ultimate decision on how to proceed with community-based mass treatment of onchocerciasis with Mectizan, in a given country, should be made by the National Onchocerciasis Task Force (NOTF) and the Ministry of Health, which has final authority and responsibility for all decisions. Moreover, the decision on how to proceed with the treatment of individuals with onchocerciasis in clinic-based settings is the responsibility of the individual physician.

ANNEX 5 : THE GRBP NIGERIA LYMPHATIC FILARIASIS (LF) ELIMINATION AND URINARY SCHISTOSOMIASIS CONTROL INITIATIVE

Background:

With financial support from GlaxoSmithKline (GSK), The Carter Center is working with the ministry of health in Nigeria to establish lymphatic filariasis (LF) elimination and urinary schistosomiasis (referred to in this document as simply SH) control program in Plateau and Nasarawa States (Map 7). For LF, the concept is to develop a pilot project in two states based on health education and annual combination therapy with the oral drugs albendazole and Mectizan. For SH the strategy is similar; health education and mass annual treatments with the oral drug praziquantel. The praziquantel used in the schistosomiasis program was obtained in part through donations of 50,000 tablets each from Bayer, Medochemie and Shin Poong, while SB donates albendazole, through WHO. The plan is to work with the federal, state, and local ministries of health to: 1) ascertain the distribution of these diseases in Plateau and Nasarawa States, 2) implement interventions against LF and SH in Plateau and Nasarawa States, and 3) document the impact of mass treatment on LF, onchocerciasis, and (if possible) SH. The states' GRBP-assisted onchocerciasis control programs (which are partially funded by the African Program for Onchocerciasis Control--APOC) are both the starting point and model for the LF and SH programs. Dr. Abel Eigege directs the GRBP assistance activities. Dr. M.Y. Jinadu, the National Program Coordinator for the LF and SH Programs in Nigeria, is actively involved in the GRBP assisted program.

In 1999, village assessment activities for lymphatic filariasis and SH in the pilot LGAs of Akwanga and Pankshin were completed. LF as determined by ICT testing in samples of 30 adult males was found in 90% of 149 villages with a mean prevalence of 22.4% (range 0-67%). SH as determined by dipstick reagent testing for blood was found in 91% of 176 villages with a mean prevalence in school age children of 24.4% (range 0-87%).

Progress in 2000:

In 2000 the program expanded health education and praziquantel treatments for SH, and in 2000 launched health education and albendazole/Mectizan treatments for LF. Since SH activities commenced in October 1999, 52,480 persons have been provided health education and praziquantel treatment since the launching of that intervention (Figure 26). Treatment for onchocerciasis and LF began with the addition of albendazole to the Mectizan already being delivered in communities endemic for onchocerciasis found to be also endemic for LF in 1999 assessment activities.

In April, GRBP assisted the Ministry of Health in Plateau State to complete a 'roll out monitoring program' of single dose combined Mectizan and albendazole oral treatments as the first step in establishing the large scale treatment program. The goal of the monitoring exercise was to actively monitor the first 2,000 Nigerians being treated with the combination for severe adverse reactions related to the co-administration of Mectizan and Albendazole prior to treating on a larger scale. The study was mandated as part of WHO guidelines for establishing a lymphatic filariasis elimination program,

and sponsored by The Federal and Plateau State Ministries of Health, and The Carter Center. A total of 2,252 persons were treated with combined albendazole/Mectizan therapy under the special active monitoring protocol. No severe reactions were recorded: 5.6% of participants reported adverse reactions, 86% of which were mild, and the remainder moderate. After a review of the report by the Federal Ministry of Health and WHO, approval was given to proceed to the mass treatment program in the pilot LGAs of Pankshin and Akwanga. The program entered full activities in July and 159,555 persons were treated as of December 2000 (Figure 26). Entomology work was advanced in collaboration with Dr. Tovi Lehmann, a Centers for Disease Control and Prevention (CDC) mosquito entomologist, working with Ms Audrey Lenhard, an Emory MPH student. Another MPH student, Dr. David Blaney, worked with Dr. Frank Richards (technical director of the program, based in Atlanta), on two studies 1) an analysis of rapid assessment data (Geographic information overlay study of onchocerciasis, LF and SH) and 2) use of male urogenital disease from LF ('hydrocele) for rapid assessment activities. Abstracts from these students' work are attached.

Expansion of the program beyond the Pilot LGAs:

In 2000 the program applied new rapid assessment methods for LF produced by WHO. These guidelines allowed much less ICT sampling than used in the pilot LGAs. A WHO approved rapid assessment and mapping protocol was used (including a sample drawn with WHO/TDR direction) to complete assessment activities throughout all of Plateau and Nasarawa States. Testing of 50-100 individuals in the WHO sample was used to classify the remaining 28 LGAs of the two states. Results (Map 8) indicated that combined treatment with Mectizan and albendazole will be needed in all villages of the remaining 28 LGAs of the two states. Plans are being made to extend interventions for LF to the 8 other onchocerciasis endemic LGAs in 2001 (Phase 2), then extend to half of the 20 non-onchocerciasis endemic LGAs in 2002 (Phase 3), then to the remainder of Plateau and Nasarawa States' 30 LGAs in 2003 (Phase 4) (Map 7). To stop LF transmission it is assumed that the program will need to establish the treatment program in all rural (and perhaps all urban) communities, reaching >85% of the eligible population. We estimate that about 3.6 million persons in the two states must be treated with combined Mectizan/albendazole if transmission of lymphatic filariasis is to be interrupted. The Carter Center was successful in 2000 in obtaining a four year grant from the Bill and Melinda Gates Foundation that will allow such expansion to take place.

Expansion of the SH program will be even more challenging, since the only assessment method available appears to be the tedious and costly process of village by village assessments of school-aged children, using diagnostic testing materials (urine dipstick). Treatment options are also relatively expensive, as praziquantel is not yet being widely donated for this purpose as are Mectizan and albendazole. It is currently estimated that SH treatment will also be required in all 30 LGAs of the two States, with perhaps 2 million persons requiring praziquantel treatment and education to control urinary schistosomiasis. The cost of drug alone for this projection would be US\$526,000 per year (2.6 PZQ tablets/person @ US\$0.10 per tablet).

Abstracts reporting research activities in 2000

Rapid assessment for LF in preparation for combined ivermectin and albendazole therapy in central Nigeria: a comparison of ICT and hydrocele rates

Eigege A, Blaney DD, Amadiogwu S, Miri ES, Umaru J, Jinadu MY, Mathai W, MacKenzie C, and Richards FO.

Lymphatic filariasis (LF) affects an estimated 128 million people worldwide; Nigeria bears the greatest burden in Africa with an estimated 22 million people infected. It is estimated that disability due to hydrocele alone may result in over US \$800 million in economic losses per year in Africa. Hydrocele is also the most common visible manifestation of LF, and as such, its potential for use as a screening tool for LF is high. The immunochromatographic card test (ICT) for *Wuchereria bancrofti* filarial circulating antigen is recommended by WHO for use in rapid mapping surveys due to the fact that sensitivity and specificity of the test are high and testing does not have to take place at night. However, the test is also expensive, costing over US\$1.00 per test. Our study compared the two assessment methods, hydrocele examination and ICT, to classify villages for mass treatment with ivermectin and albendazole. The study was carried out in 144 villages located in two states in central Nigeria. Thirty males, 16 years and older, were examined in each village for hydrocele and tested by ICT method. We found a positive correlation of $r = 0.43$ between the communities identified as being endemic for filariasis by ICT and by prevalence of hydrocele ($p < 0.0001$). All communities with hydrocele rates of 17% or greater were classified as positive for endemic filariasis by ICT, demonstrating that hydrocele examination can be used to classify villages for mass treatment (i.e., all communities with hydrocele rates $\geq 17\%$ were eligible for mass treatment). As expected, no correlation was seen on an individual level between ICT positivity and clinical presence of hydrocele. Screening at the community level by hydrocele examination may offer an economically acceptable and broadly applicable alternative to ICT for determining endemicity of filariasis in areas being considered for elimination programs.

Preliminary entomological assessment of the impact of combined ivermectin and albendazole therapy on the transmission of lymphatic filariasis in central Nigeria

Eigege A, Lenhart A, Donnelly M, Richards F, Miri E, Onyeka J, Sambo Y, Kal A, Pam D, Dakul A, Kumbak D, Damboyi J, Umaru J, Jinadu M, Mathai W, and Lehmann T.

Lymphatic filariasis (LF) is a leading cause of chronic disability, affecting an estimated 120 million people in 80 countries. Africa bears approximately 30% of the global burden of LF, with Nigeria bearing the greatest burden in sub-Saharan Africa. Recently, the World Health Assembly called for the "global elimination of lymphatic filariasis as a public health problem." The strategy for doing so involves interruption of transmission of the parasite through mass chemotherapy. In rural Nigeria, LF is transmitted by a set of remarkably efficient vectors consisting of [*Anopheles gambiae*], [*A. arabiensis*], and [*A. funestus*]. The infection rate in the vector is a useful index to describe changes in transmission intensity over time. Such measurement is also a very sensitive way of monitoring the impact of mass treatment with microfilaricidal drugs on the transmission of LF. Using mosquito dissection, bloodmeal ELISAs, and PCR assays, a picture of the vector species composition, feeding patterns, and infection rates of several sentinel villages has emerged. Our preliminary results show: (1) exceedingly high pretreatment rates of transmission in certain villages, (2) heterogeneity in response to treatment between sentinel villages, and (3) incomplete interruption of transmission following the first annual chemotherapy in three of the four villages. A comprehensive evaluation of these trends in relation to coverage, seasonal transmission dynamics, and other key factors will be presented.

LYMPHATIC FILARIASIS AND SCHISTOSOMIASIS RECOMMENDATIONS 2001

Lymphatic Filariasis:

- Retreat all at risk LF villages in the Phase one LGAs (Akwanga and Pankshin). Expand treatments to the the remaining 10 onchocerciasis endemic LGAs currently under Mectizan treatment.
- Continue mosquito collections, and measure impact of treatments on LF infection rates in the vector. Test the mosquitoes at CDC using molecular techniques, and in particular advance pooling techniques where many mosquitoes can be tested at once for parasite DNA.
- Obtain baseline information using ICT on LF antigen prevalence in children
- Complete the GSK grant (now in final year) and establish mechanism needed to transition to the Gates funding (in particular begin to strengthen monitoring, assessment and evaluation infrastructure in Jos).

Urinary Schistosomiasis:

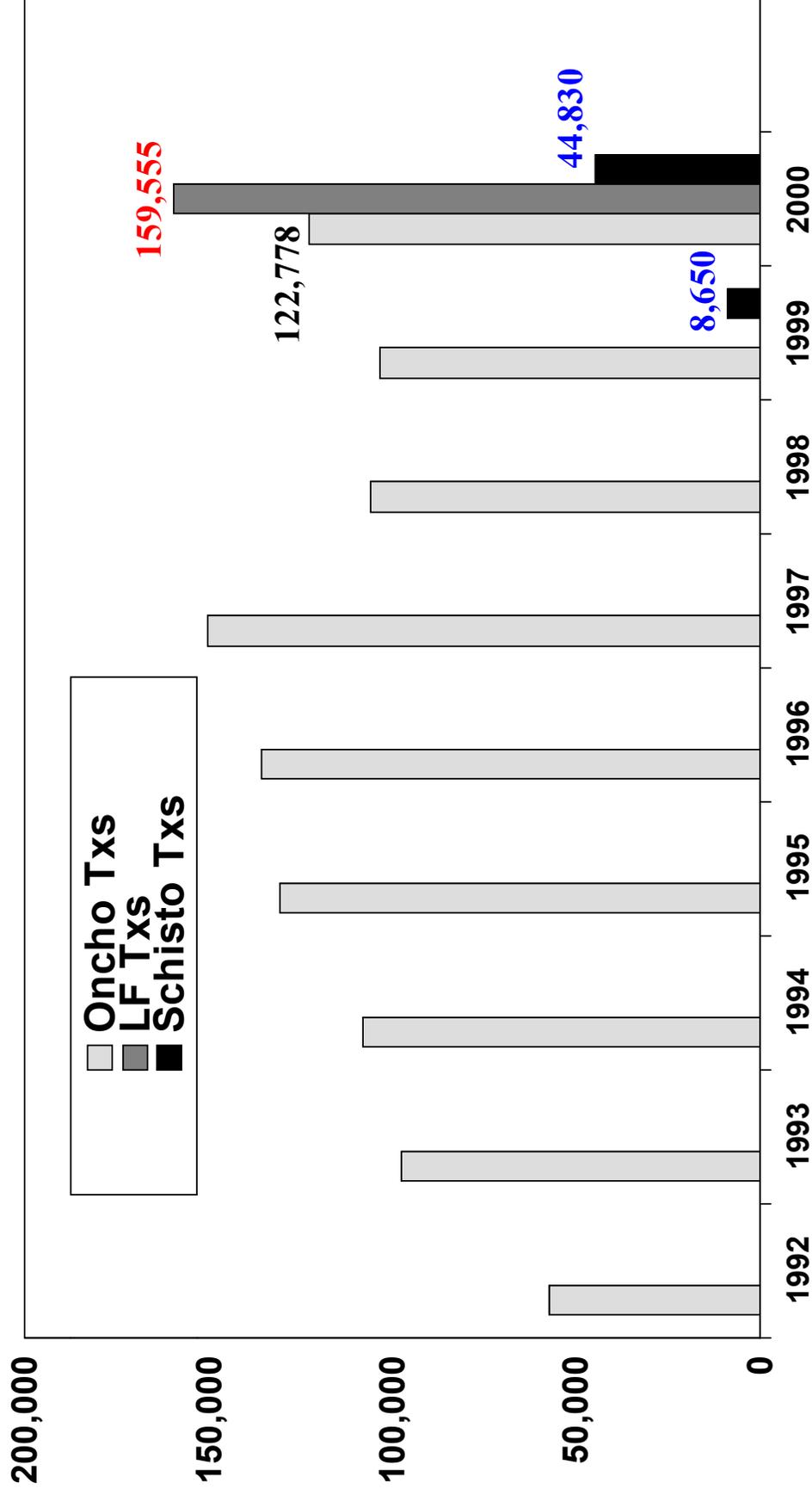
- Retreat all at risk SH villages in the Phase one LGAs (Akwanga and Pankshin), and expand assessment, health education and treatment activities to two more LGAs in 2000.
- Work with partners to find better methods for rapid assessment for SH that do not require sampling every village.
- Seek funding for the SH program

Analysis and Publications:

- Improve data management/handling in Jos
- Follow up KAP studies are needed
- Prepare the most important studies for publication (general report on integration of treatment for LF and SH with onchocerciasis, ICT/hydrocele).

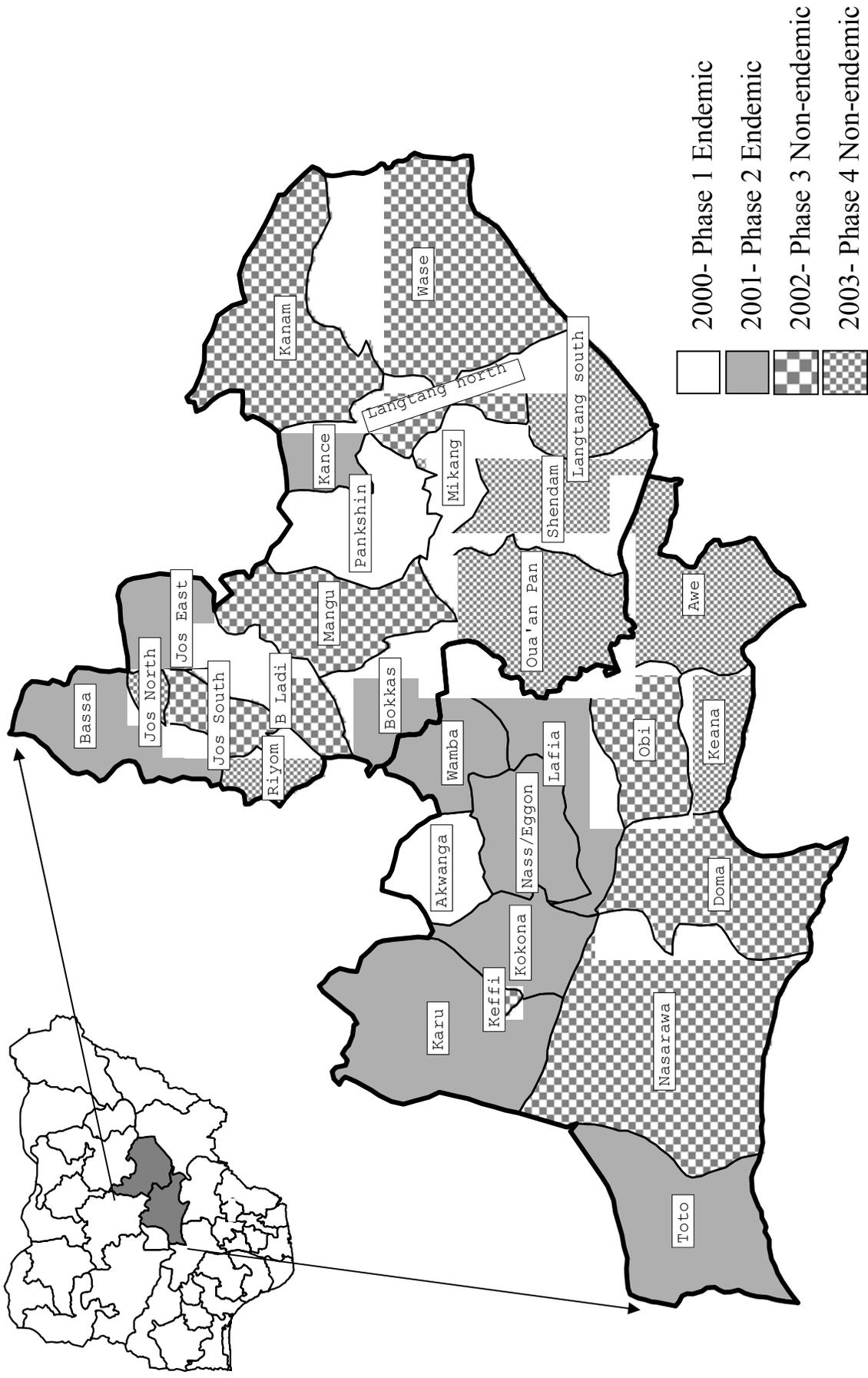
Figure 26:

Onchocerciasis, Schistosomiasis, and Lymphatic Filariasis Treatments: Akwanga and Pankshin LGAs; by Year

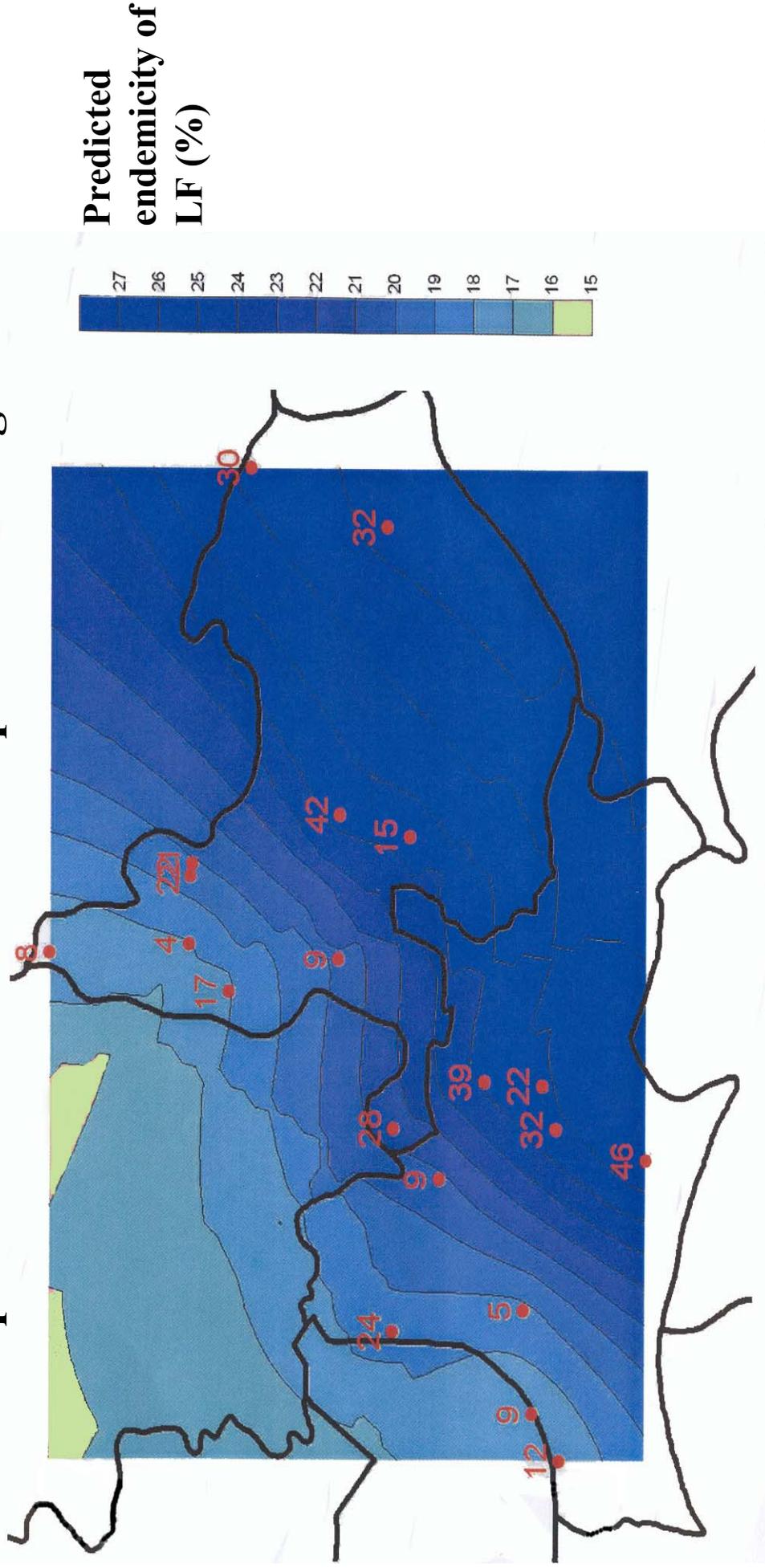


Lymphatic Filariasis Activities in Plateau / Nasarawa States

Phased Treatment Plan



Map 8: Rapid Assessment of Lymphatic Filariasis in Plateau and Nasarawa States, Nigeria: RAGFIL model endemicity predictions based on a sample of 19 Villages*



Analysis provided by Dr. J Remme, WHO/TDR

*figures on map indicate village sample LF serum antigen prevalence (see text)

.Annex 6: GRBP Publications

Anonymous. Annual Onchocerciasis Report from the InterAmerican Conference on Onchocerciasis in Oaxaca, Mexico. *Weekly Epidemiological Record* 72:215-218, 1997.

Anonymous. Dracunculiasis and Onchocerciasis: Sudan. *Weekly Epidemiological Record* 72:297-301, 1997.

Anonymous. Intervention research on onchocerciasis and lymphatic filariasis. *Weekly Epidemiological Record* 75:246-8, 2000.

Anonymous. Onchocerciasis, Nigeria. *Weekly Epidemiological Record* 71:213-5, 1996.

Anonymous. Onchocerciasis, progress towards elimination in the Americas. *Weekly Epidemiological Record* 71:277-80, 1996.

Anonymous. Report from the eighth InterAmerican conference on onchocerciasis in Caracas, Venezuela. *Weekly Epidemiological Record* 74:377-9, 1999.

Anonymous. Report from the seventh InterAmerican conference on onchocerciasis in Cali, Colombia. *Weekly Epidemiological Record* 74:9-16, 1999.

Anonymous. Report from the tenth InterAmerican conference on onchocerciasis, Guayaquil, Ecuador. *Weekly Epidemiological Record* 76:205-212, 2001.

Anonymous. River blindness (onchocerciasis): Progress in ivermectin distribution, Nigeria. *Weekly Epidemiological Record* 72:221-228, 1997.

Blanks J, Richards F, Beltran F, Collins R, Alvarez E, Zea Flores G, Bauler B, Cedillos R, Heisler M, Brandling-Bennett D, Baldwin W, Bayona M, Klein R, and Jacox M. The Onchocerciasis Elimination Program of the Americas: A history of partnership. *Pan American Journal of Public Health* 3:367-74, 1998.

Homeida MA, Goepp I, Magdi A, Hilyer E, MacKenzie CD. Medical achievements under civil war conditions. *Lancet* 354:601, 1999.

Hopkins D, Richards F. Visionary campaign: Eliminating river blindness. *Encyclopedia Britannica Medical and Health Annual*: 9-23, 1997.

Katarbarwa MN. Modern health services versus traditional engozi system in Uganda. *Lancet* 354(9175): 343, 1999.

Katarbarwa MN, Habomugisha P, Richards, FO. Community views on health programmes in Uganda. *Lancet* 355:2167-2168, 2000.

Katarbarwa MN, Mutabazi D. The selection and validation of indicators for monitoring progress towards self-sustainment in community-directed, ivermectin-treatment

programmes for onchocerciasis control in Uganda. *Annals of Tropical Medicine & Parasitology* 92(8): 859-868, 1998.

Katarbarwa MN, Mutabazi D. Community-directed, ivermectin-treatment programmes for onchocerciasis control in Uganda: the selection and validation of indicators for monitoring sustainability at the district level. *Annals of Tropical Medicine & Parasitology* 93(6) 653-658, 1999.

Katarbarwa MN, Mutabazi D, Richards FO. Monetary incentives and community-directed health programmes in some less-developed countries. *Lancet* 354: 1909, 1999.

Katarbarwa MN, Mutabazi D, Richards FO. The community-directed, ivermectin-treatment programme for onchocerciasis control in Uganda – an evaluative study (1993-1997). *Annals of Tropical Medicine & Parasitology* 93: 727-735, 1999.

Katarbarwa MN, Mutabazi D, Richards FO. Controlling onchocerciasis by community-directed, ivermectin-treatment programmes in Uganda: Why do some communities succeed and others fail? *Annals of Tropical Medicine & Parasitology* 94(4): 343-352, 2000.

Katarbarwa MN, Mutabazi D, Richards FO. Ivermectin distribution for onchocerciasis in Africa. *Lancet* 353: 757, 1999.

Katarbarwa MN, Onapa AW, Nakileza B. Rapid epidemiological mapping of onchocerciasis in areas of Uganda where *Simulium neavei* sl is the vector. *East Africa Medical Journal* 76(8), 1999.

Katarbarwa MN, Richards FO, Ndyomugenyi R. In rural Ugandan communities, the traditional kinship/clan system is vital to the success and sustainment of the African Programme for Onchocerciasis Control. *Annals of Tropical Medicine & Parasitology* 94(5): 485-495, 2000.

Miri ES. Problems and perspectives of managing an onchocerciasis control programme. *Annals Trop Med Parasitol* 92: S121-8, 1998.

Mutabazi D, Duke BOL. Onchocerciasis control in Uganda: How can self-sustaining community-based treatment with ivermectin be achieved? *Annals Trop Med Parasitol* 92:195-203, 1998.

Richards FO, Hopkins DR, Cupp E. Onchocerciasis control strategies (Reply to commentary: “Varying programmatic goals and approaches to river blindness”) [letter]. *Lancet* 256: 1523-4, 2000.

Richards FO, Carter K, Cupp E, Sauerbrey M, Klein R. Monitoring for the emergence of new foci of onchocerciasis (river blindness) in the Americas [letter]. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 94:108-9, 2000.

Richards F, Gonzales-Peralta C, Jallah E, Miri E. Community-based distributors in the delivery of ivermectin: Onchocerciasis control at the village level in Plateau State, Nigeria. *Acta Tropica* 61:137-44, 1996.

Richards F, Miri E, Meredith S, Guderian R, Sauerbrey M, Remme H, Packard R, Ndiaye JM. Onchocerciasis. In Global Disease Elimination and Eradication as Public Health Strategies. *Bull WHO* 76(2): 147-9, 1998.

Richards FO, Hopkins DR, Cupp E. Commentary: Varying programmatic goals and approaches to river blindness. *Lancet* 255:1663-4, 2000.

Richards FO, Miri ES, Katarawa M, Eyamba A, Sauerbrey M, Zea-Flores Guillermo, Korve K, Mathai W, Homeida MA, Mueller I, Hilyer E, Hopkins DR. The Carter Center's assistance to river blindness control programs: Establishing treatment objectives and goals for monitoring ivermectin delivery systems on two continents. *American Journal of Tropical Medicine and Hygiene* 65(2): 108-14, 2001.