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Awakening Africa's Sleeping Giant - Human Health Issues

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Awakening Africa's Sleeping Giant - Human Health Issues

- Introduction
- The Health Impact Assessment
- Classification of Health Hazards
- Heterogeneity of (health-related) Biodiversity within Guinea Savanna
- List of Health Hazards
- Planning for Health
- Case Study - Onchocerciasis

THE BURDEN OF DISEASE 2004 – DALYs lost per 100,000

	Burkina Faso	Nigeria	Mozambique	UK
All Causes	45,867	48,578	44,407	11,012
Infectious & Parasitic	15,706	17,976	20,148	187
Non-communicable	13,008	13,263	11,017	6,115
Neuro-psychiatric	2,673	3,004	2,434	3,461
Injuries	3,681	3,626	3,116	735

Data from WHO, 2010

“Development policies designed to improve the economic conditions and living standards of communities often have unintended effects on health”

“Action without consultation by different sectors was identified as the main factor engendering disregard and neglect of human health”

- Hunter et al. (1993) *Parasitic diseases in water resources development*. WHO, Geneva

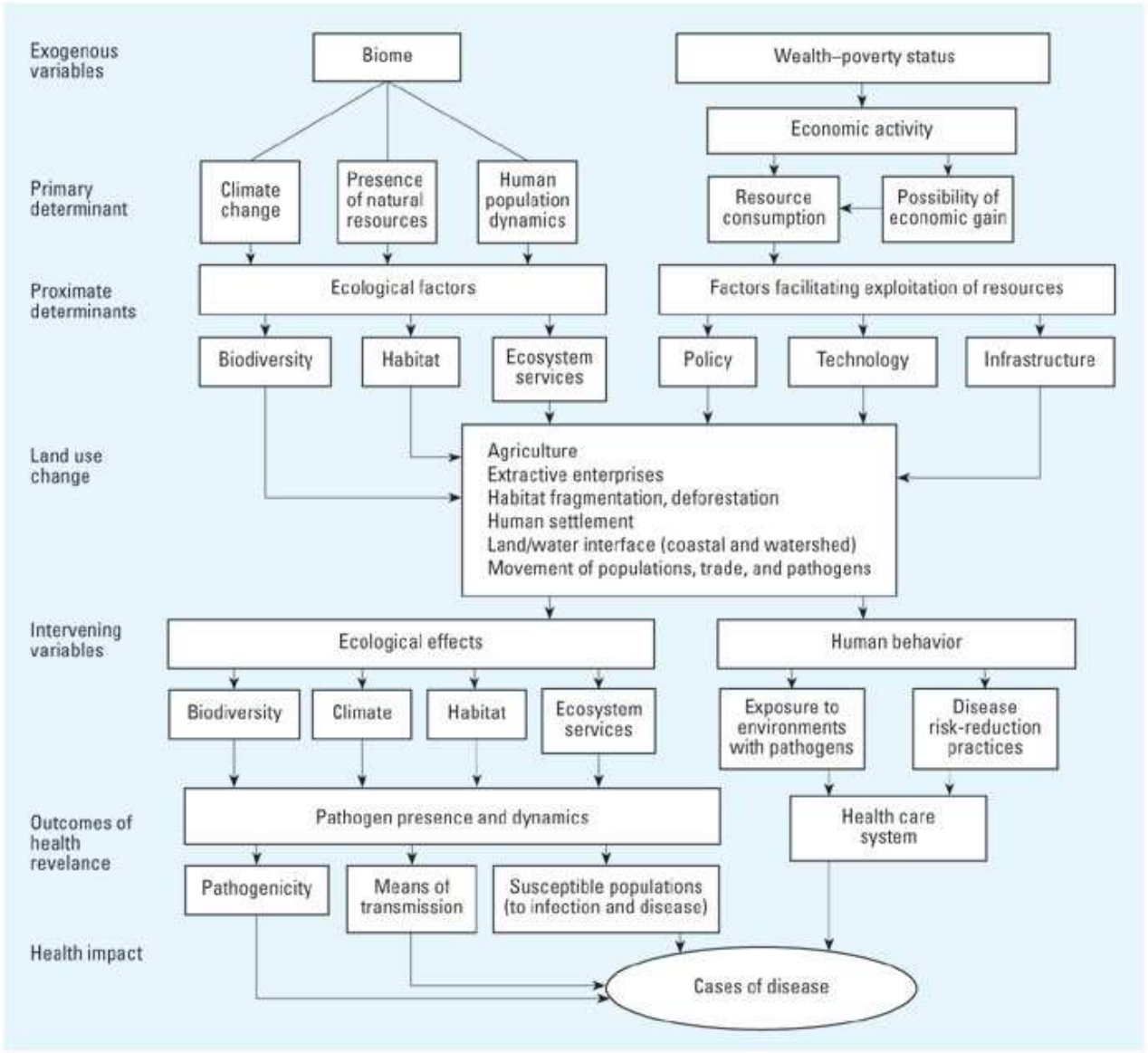
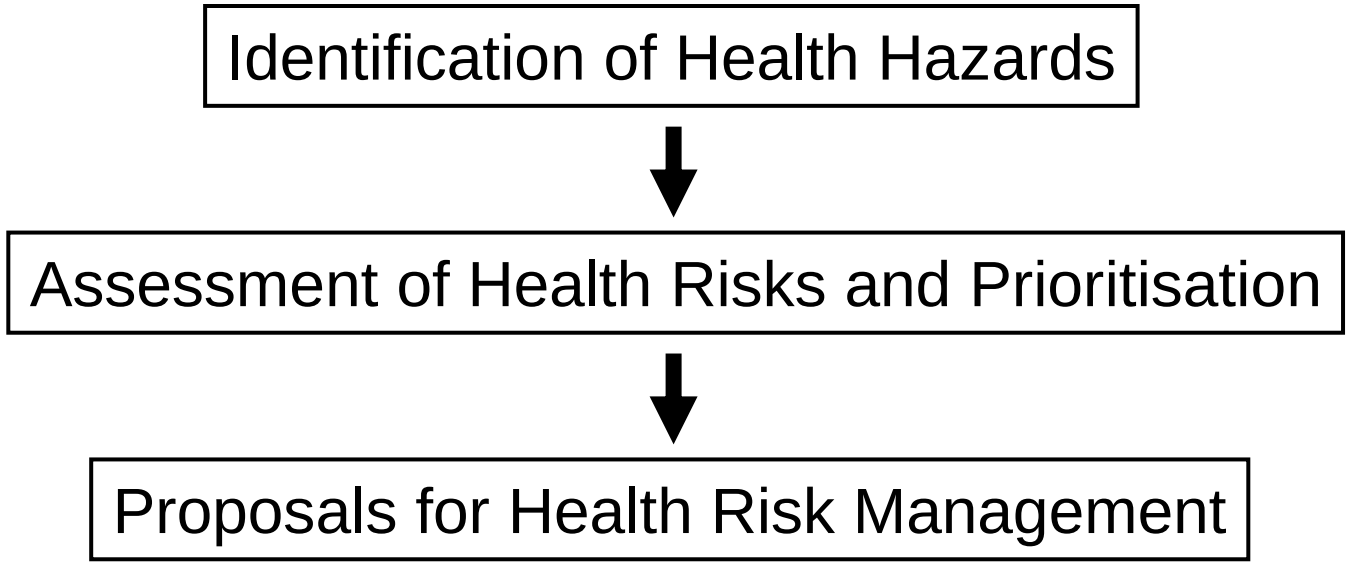


Figure 1. A systems model of land use change that affects public health. This model shows relationships between drivers of land use change and subsequent levels of environmental change and health consequences. Various levels of investigation and intervention are evident and range from specific risks factors and determinants of population vulnerability to larger institutional and economic activity.

From Patz et al., (2004) *Environmental Health Perspectives* 112, 1092-1098.

The Health Impact Assessment



The Health Impact Assessment

Classification of Hazards:

1. Communicable disease
2. Non-communicable disease
3. Malnutrition
4. Injury
5. State of mind (neuro-psychiatric)

The Health Impact Assessment

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The Health Impact Assessment

Will take into account:

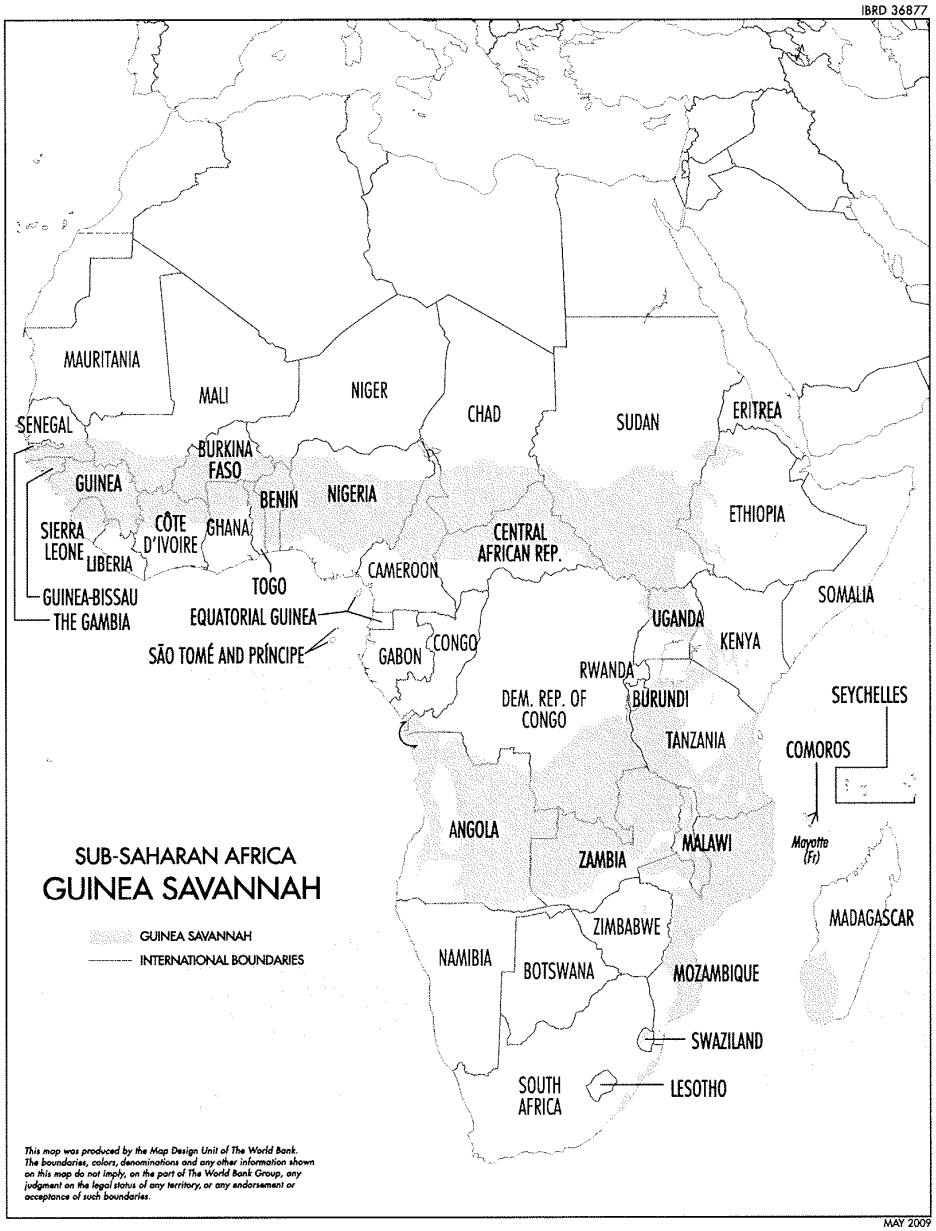
- the sorts of environmental and social changes which can be predicted

- the different phases of the project (construction and operational)

- the vulnerable groups (existing residents, construction workers, immigrants, gender issues, children, socio-economic group, etc)

- local and regional conditions

Figure 1.1 Extent of the Guinea Savannah Zone in Sub-Saharan Africa



From *Awakening Africa's Sleeping Giant*, World Bank 2009

FIGURE 2.4. Biomes and realms of Africa.

From: Burgess et al. (2004) *Terrestrial Ecoregions of Africa and Madagascar*

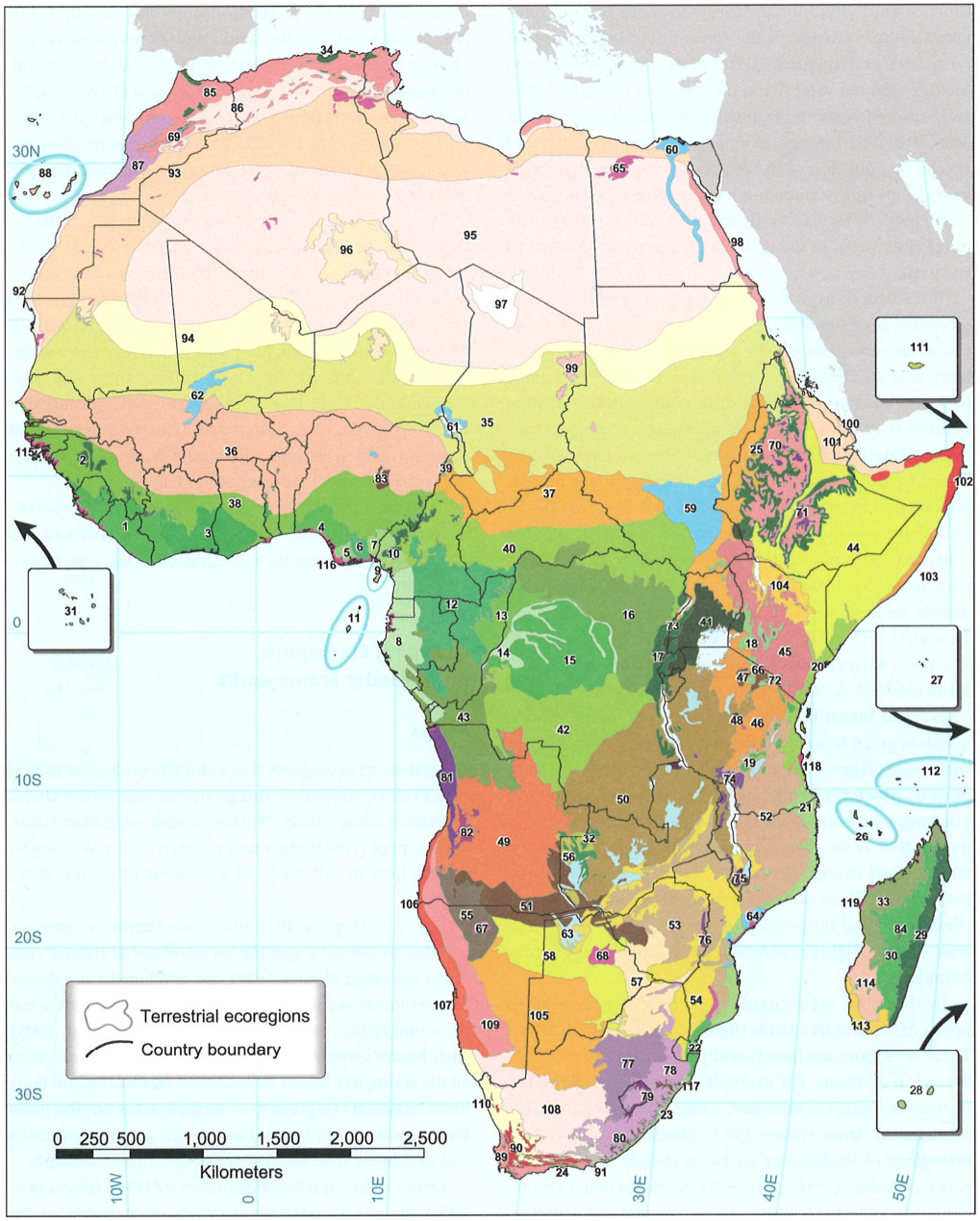


FIGURE 2.2. Terrestrial ecoregions of Africa.

From: Burgess et al. (2004) *Terrestrial Ecoregions of Africa and Madagascar*

36:
West sudanian savanna

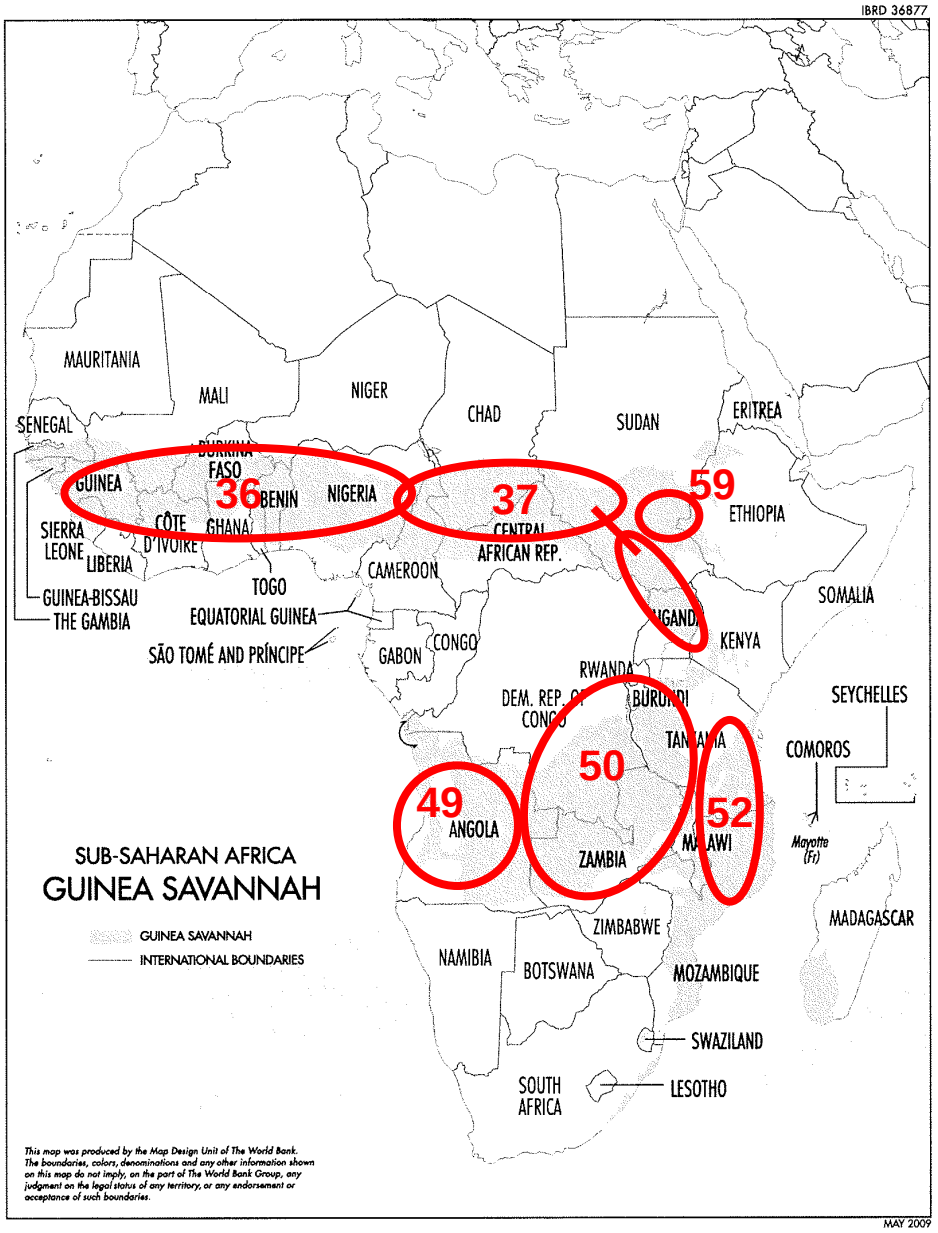
37:
East sudanian savanna

59:
Sudd flooded grasslands

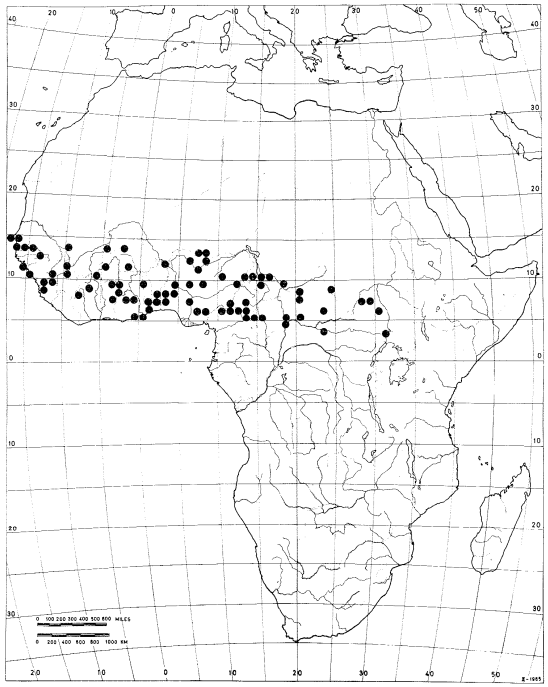
52:
Eastern miombo woodlands

50:
Central miombo woodlands

49:
Angolan miombo woodlands

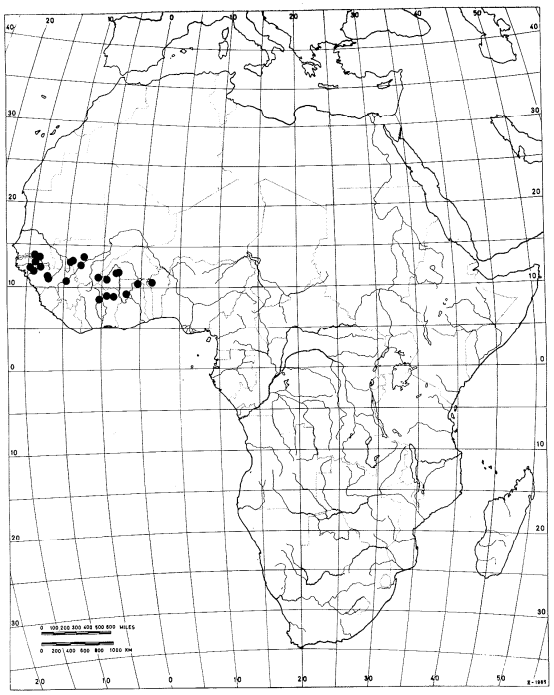


Distributiones plantarum africanarum, **27** (31-12-84)



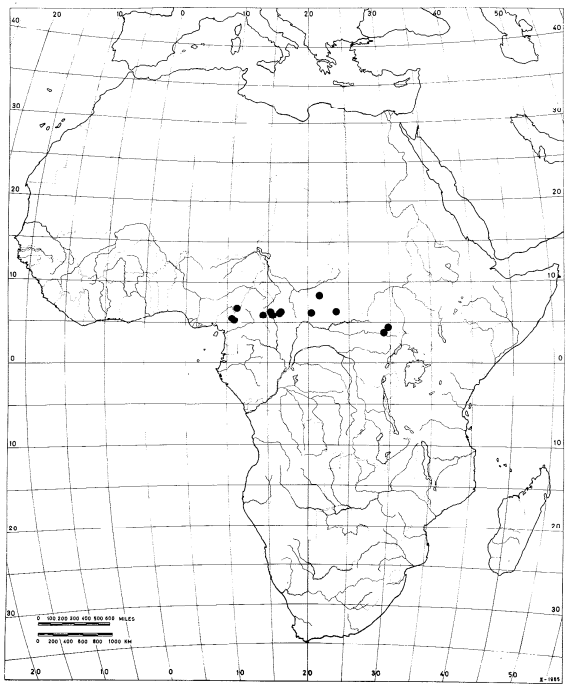
Mimosaceae

Distributiones plantarum africanarum, **13** (30-06-1978)



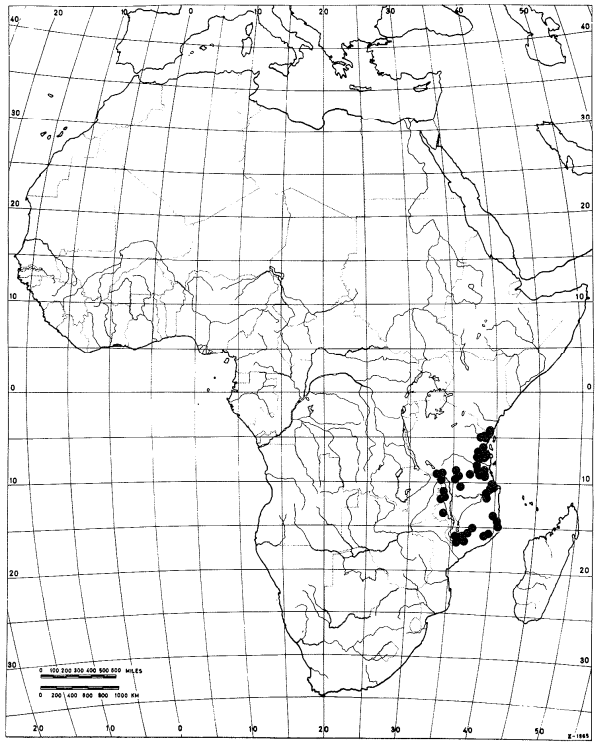
Rubiaceae

Distributiones plantarum africanarum, **32** (30-6-87)



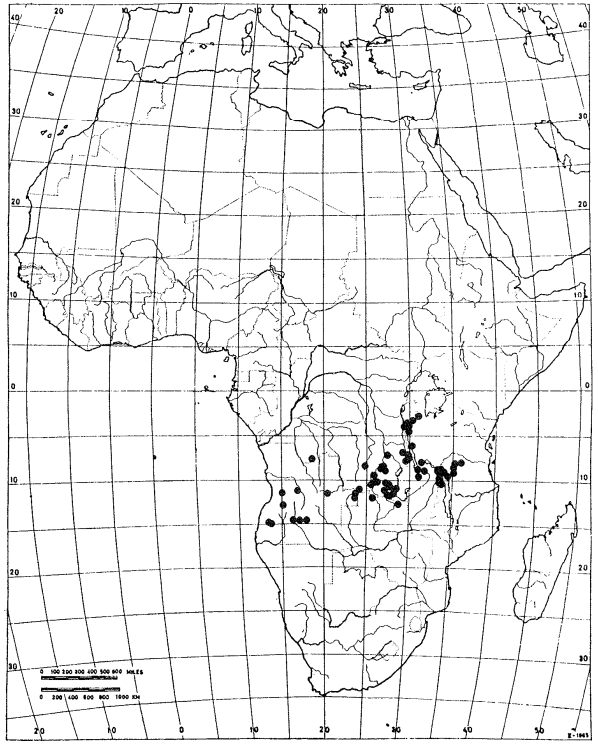
Compositae

Distributiones plantarum africanarum, **29** (31-12-86)



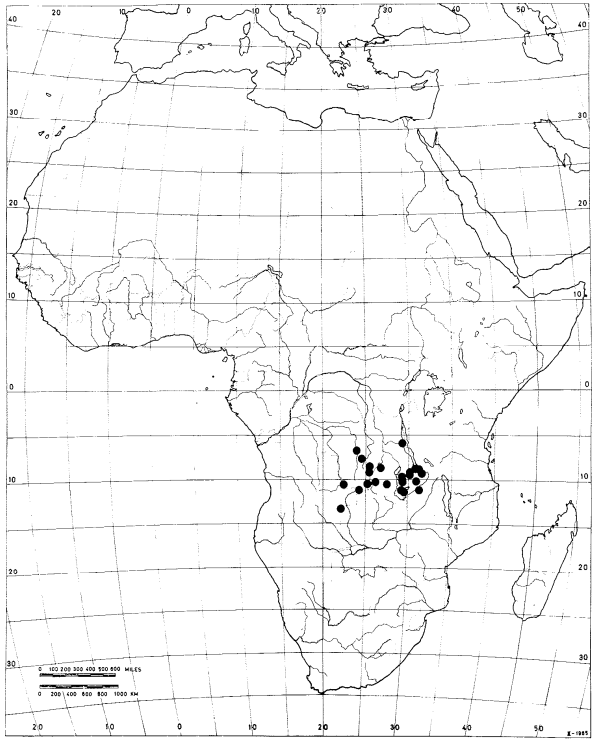
Apocynaceae

Distributiones plantarum africanarum, **21** (30-6-81)



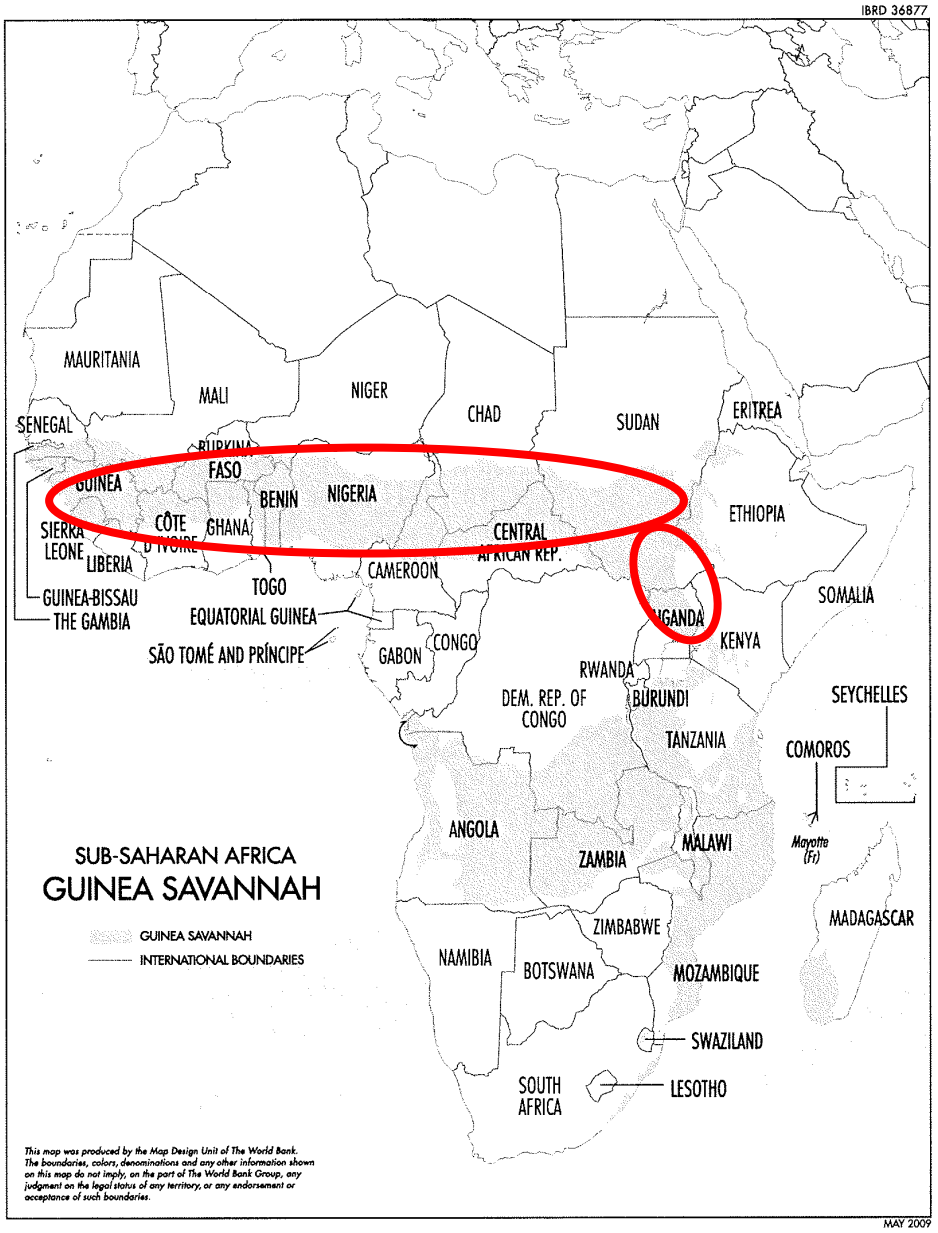
Rubiaceae

Distributiones plantarum africanarum, **26** (30-6-84)

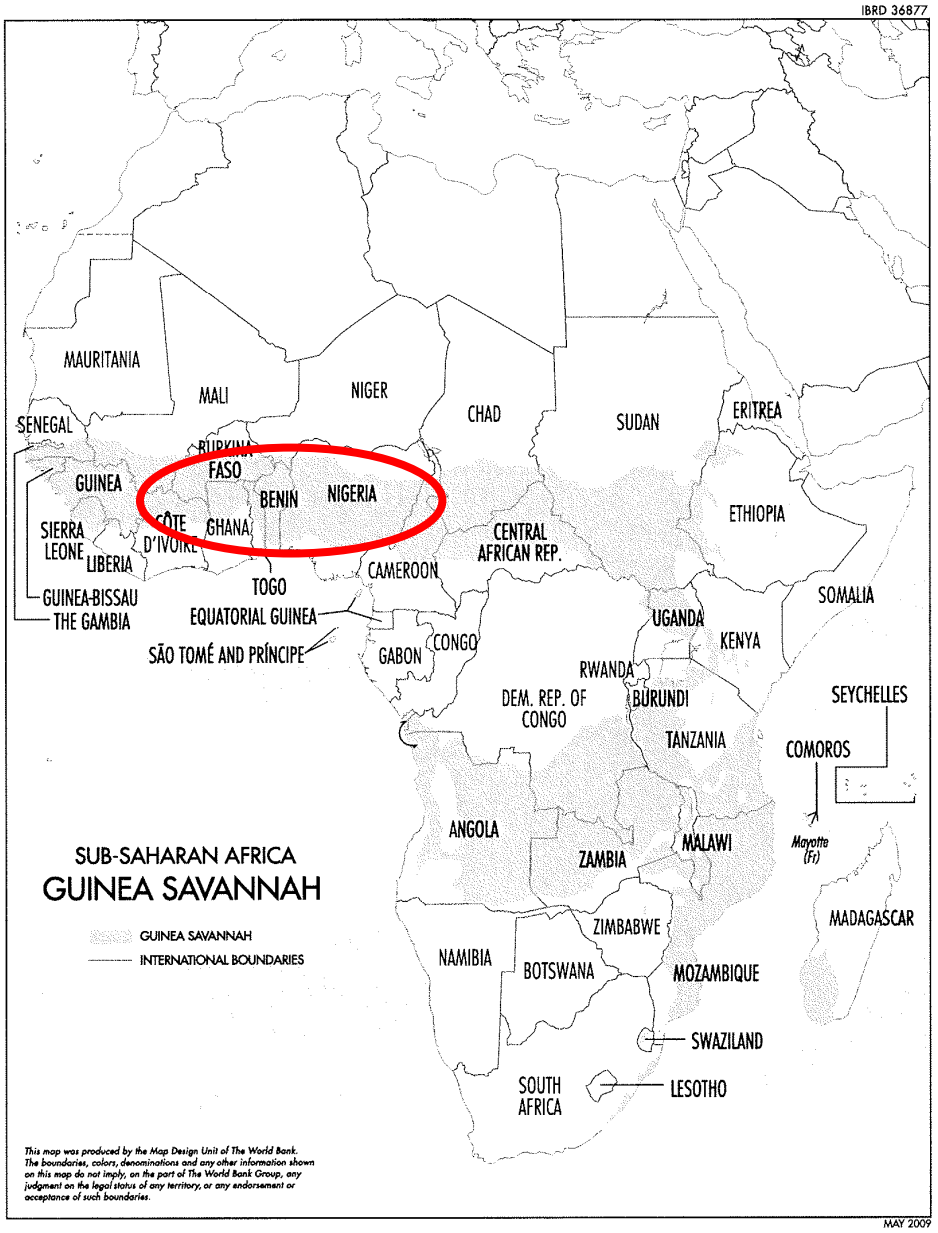


Apocynaceae

Cutaneous Leishmaniasis transmitted by *Phlebotamus duboscqi*



Flea-borne (Murine) Typhus (*Rickettsia mooseri*) transmitted by *Xenopsylla cheopis.*

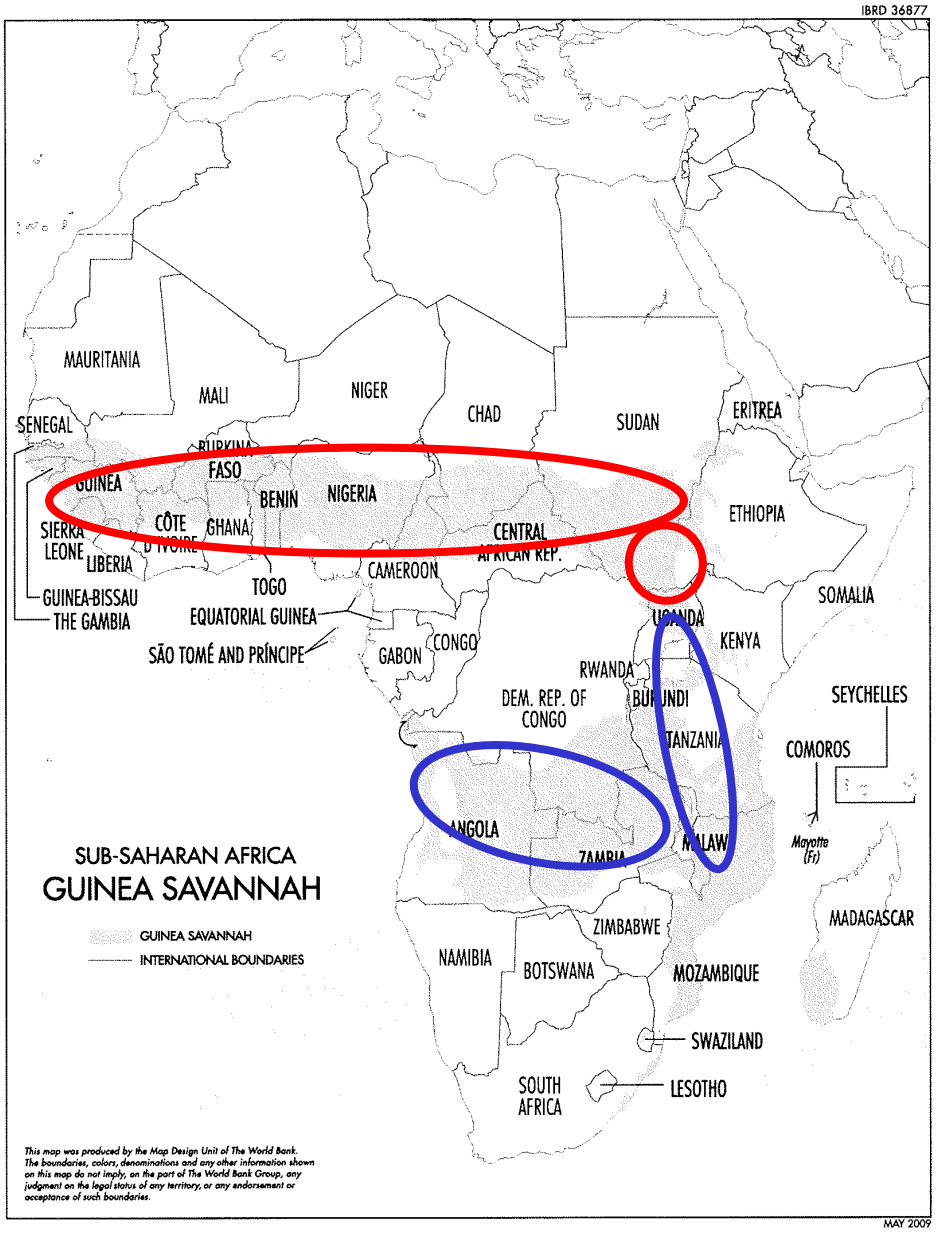


Tick-borne Relapsing Fever (*Borelia sp) mooseri*) transmitted by *Ornithodoros* spp.

Onchocerciasis in Savanna

River blindness (blinding onchocerciasis) transmitted by species of the *Simulium damnosum* subcomplex.

Focal non-blinding onchocerciasis transmitted by other vector subcomplexes, causing skin disease.



Infectious and Parasitic Disease Risks

Malaria
TB
HIV-AIDS
Lymphatic Filariasis (Elephantiasis)
Schistosomiasis (Bilharzia)
Diarrhoeal disease
Meningitis
Trypanosomiasis (Sleeping sickness)
Onchocerciasis (River blindness)
Cholera
Dracunculiasis (Guinea Worm)
Leprosy
Soil-transmitted helminths

Acute Respiratory Disease
Buruli Ulcer
Polio
Measles
Dengue
Trachoma
Tick-borne Relapsing Fever
Yellow Fever
Zoonoses (eg liver flook, bovine TB, hydatid, rabies, brucellosis, anthrax, etc)
Emergent Diseases
etc….

Table 1. Agents and infectious diseases with suspected or known links to landscape change.[a]

Vector-borne and/or zoonotic	Soil	Water	Human	Other
Malaria	Melioidosis	Schistosomiasis	Asthma	Hemorrhagic fevers
Dengue	Anthrax	Cholera	Tuberculosis	Foot and mouth
Lyme disease	Hookworm	Shigellosis	Influenza	Rice blast
Yellow fever	Coccidioidomycosis	Rotavirus		Triachoma
Rift Valley fever		Salmonellosis		
Japanese encephalitis		Leptospirosis		
Onchocerciasis		Cryptosporidiosis		
Trypanosomiasis				
Plague				
Filariasis				
Meningitis				
Rabies				
Leishmaniasis				
Kyasanur Forest fever				
Hantavirus				
Nipah virus				

[a]Those with the strongest evidence for a link with land use.

From Patz et al., (2004) *Environmental Health Perspectives* 112, 1092-1098.

Planning for Health

Planning for health (rather than responding to health needs as they arise) is important because:

Solutions to many health risks can be engineered into projects especially water-related issues such as,
Domestic water against trachoma
Human and animal waste against diarrhoeal disease
Irrigation against schistosomiasis

Some health risks will only become evident after a period of time (eg schistosomiasis), but others can cause immediate morbidity (eg malaria).

Planned solutions to health risks can involve, for example, engineering solutions and health infrastructure solutions, and can be cost neutral (eg siting of dwellings).

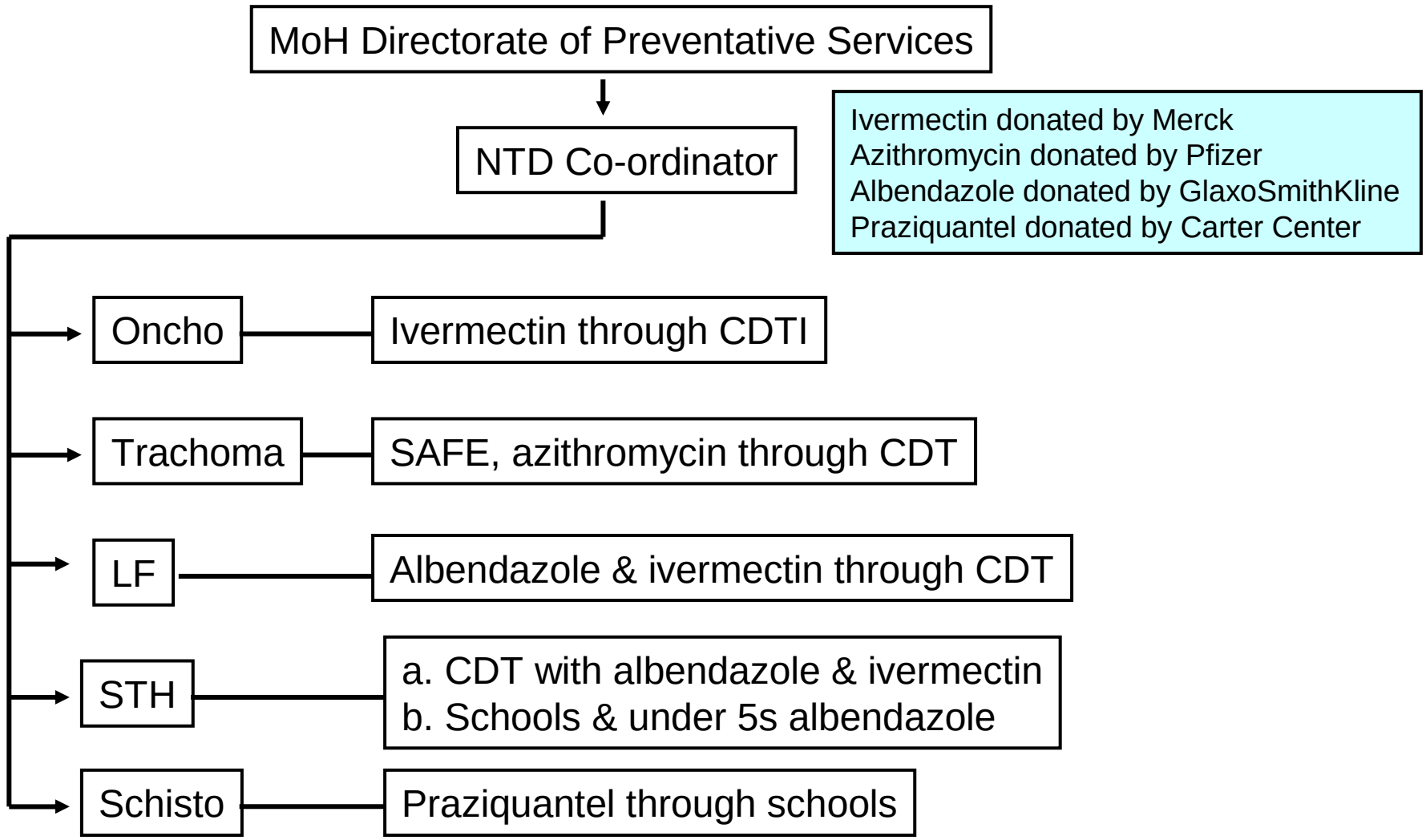
Public Health Intiatives Against Some Major Parasitic Disease Hazards

HAT	PAAT promotes curative drug treatment through the health system. Drugs provided free by sanofi-aventis (pentamidine, melarsoprol and eflornithine) and Bayer AG (suramin).
Yellow Fever	WHO recommends routine childhood vaccination and mass vaccination campaigns to prevent outbreaks, through the health system
Guinea Worm	Almost extinct. Carter Centre eradication programme. Only Ghana, Mali, Sudan & Ethiopia still endemic.
Malaria	WHO recommends: a. Access to affordable treatment within 24 hours b. Bednets c. Chemoprophylaxis for pregnant women
NTDs	Onchocerciasis, Lymphatic Filariasis, Soil-transmitted helminths, Bilharzia and Trachoma. Integrated chemotherapy through the health system via CDT(I).

Example Environmental and Engineering Intiatives Against Some Major Parasitic Disease Hazards

HAT	Often decreases with environmental changes brought about by development projects, but proximity of natural breeding sites outside project area can lead to increase.
Yellow Fever	None considered cost-effective in rural areas
Guinea Worm	Water filters, temephos treatment of water supplies, deep wells and bore holes. Community volunteers through MoH.
Malaria	Intermittant irrigation (rather than continuous flooding) can increase rice yields and control mosquito breeding. Site housing away from mosquito breeding sites. Use livestock as zooprophylaxis.
NTDs	Engineering of water supply and waste disposal. Siting of human activities (such as dwellings).

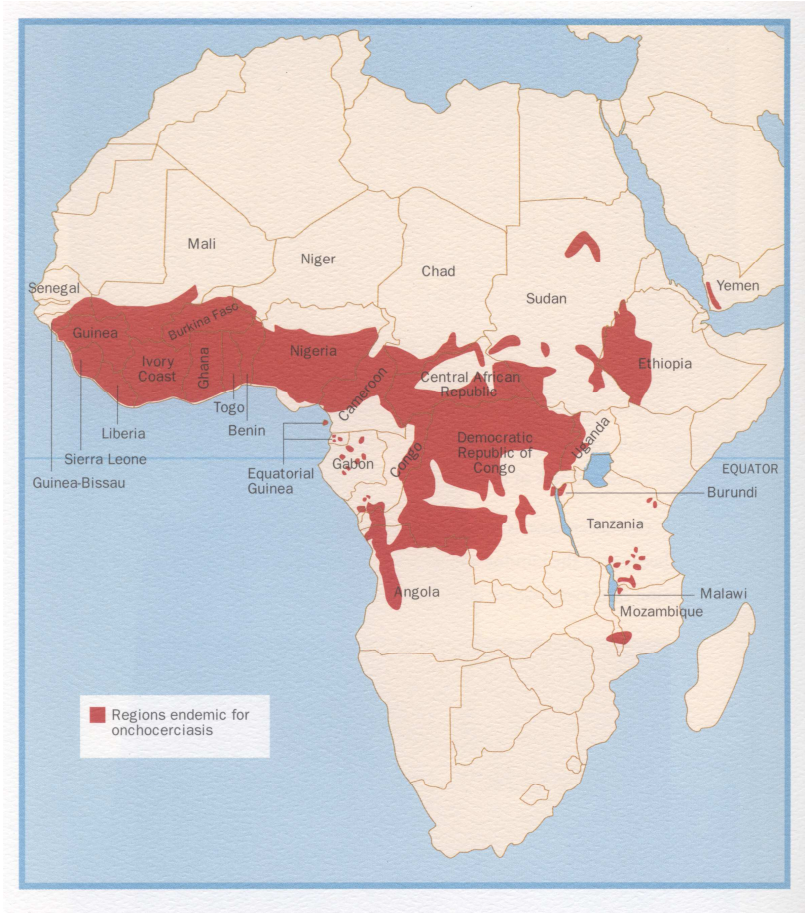
Tanzania – An example MoH integrated* NTD programme



*Integrated delivery systems where diseases overlap

CASE STUDY:

ONCHOCERCIASIS (=River Blindness)



WHO data up to 2000

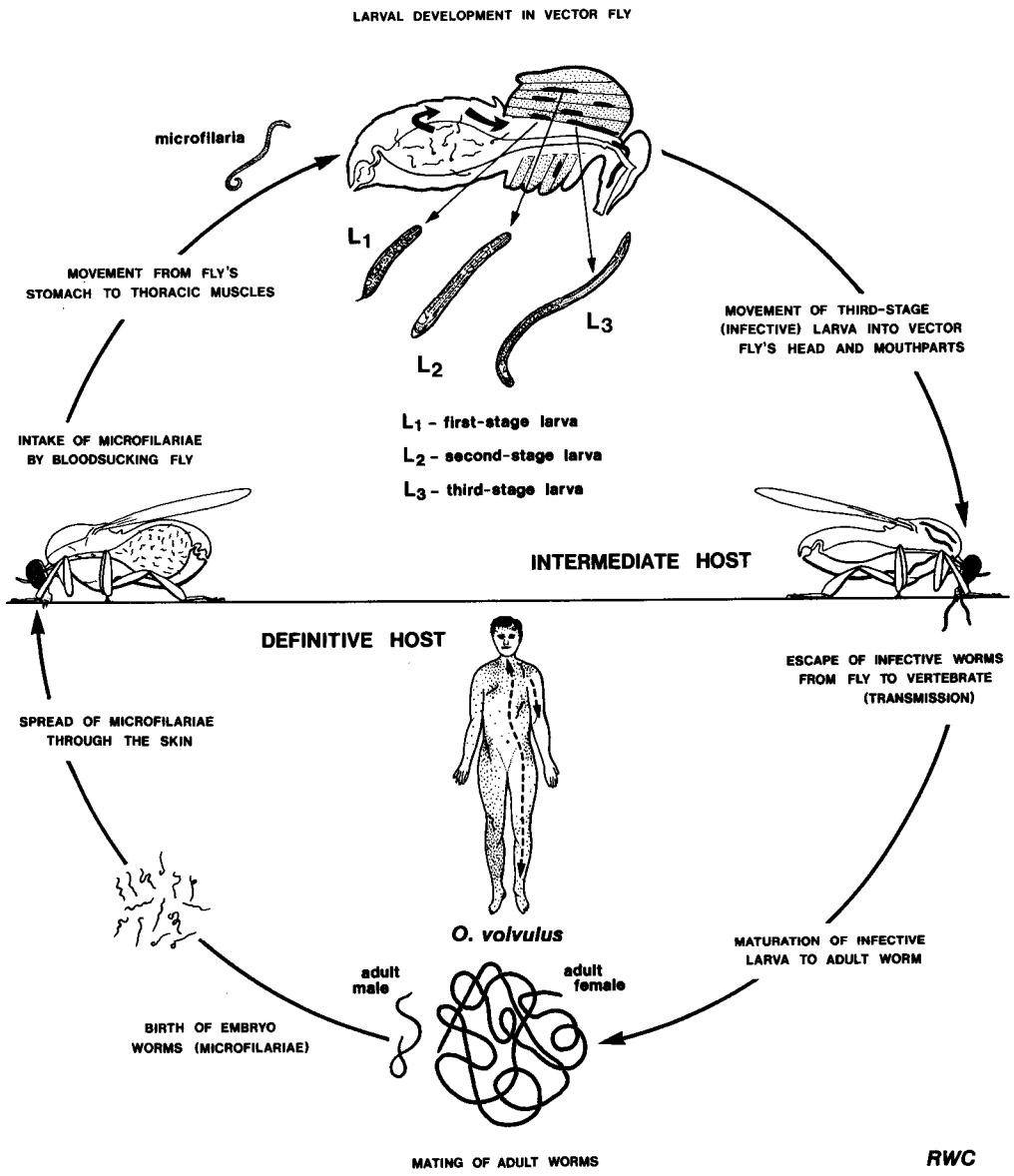
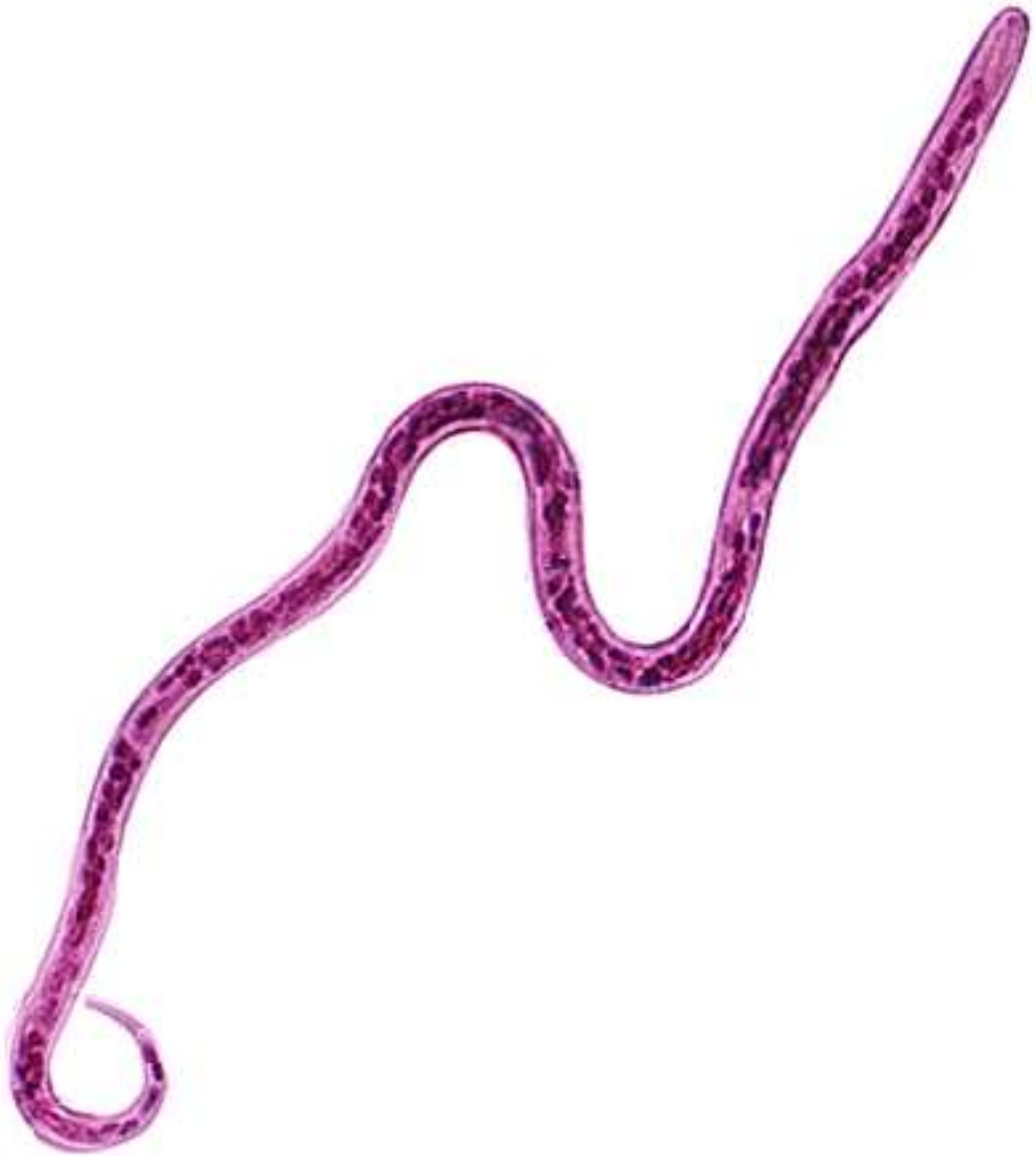
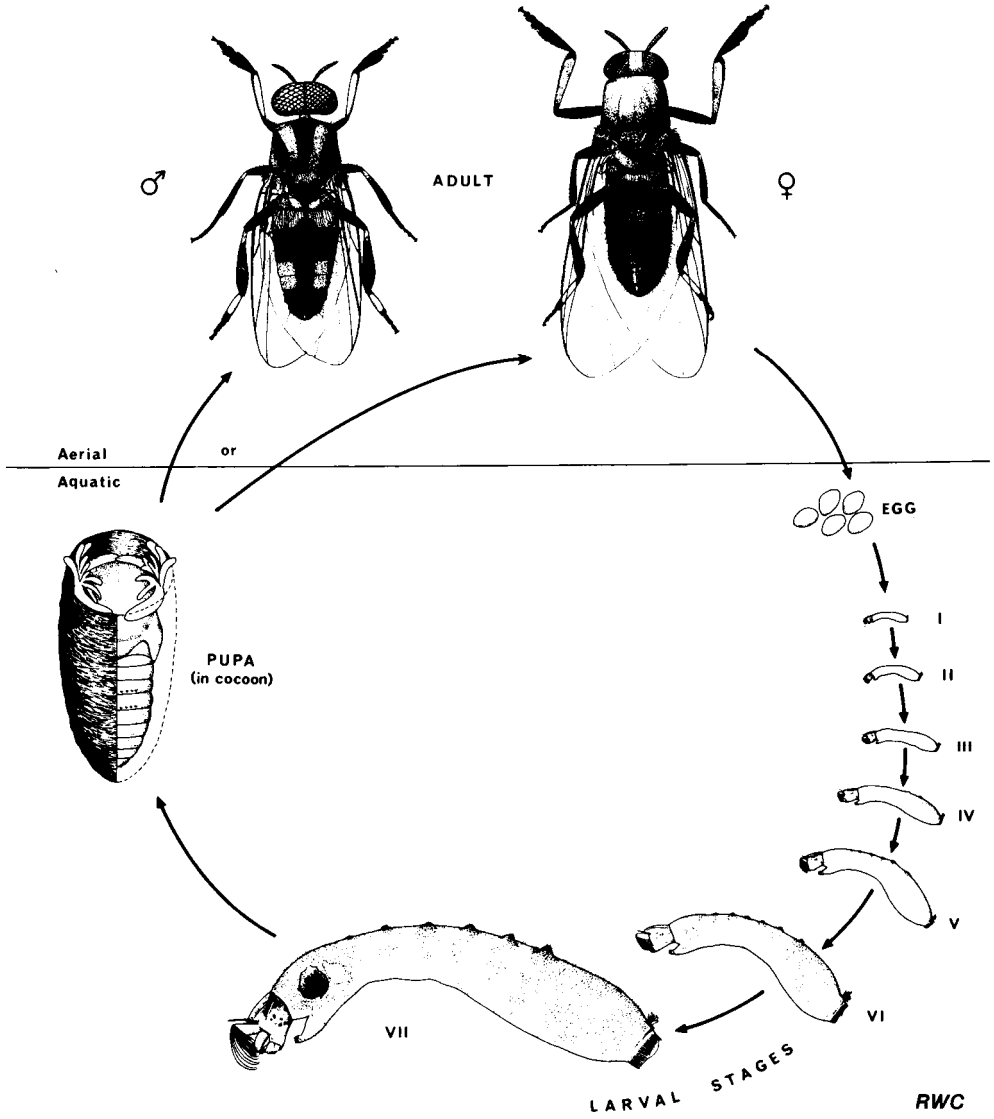
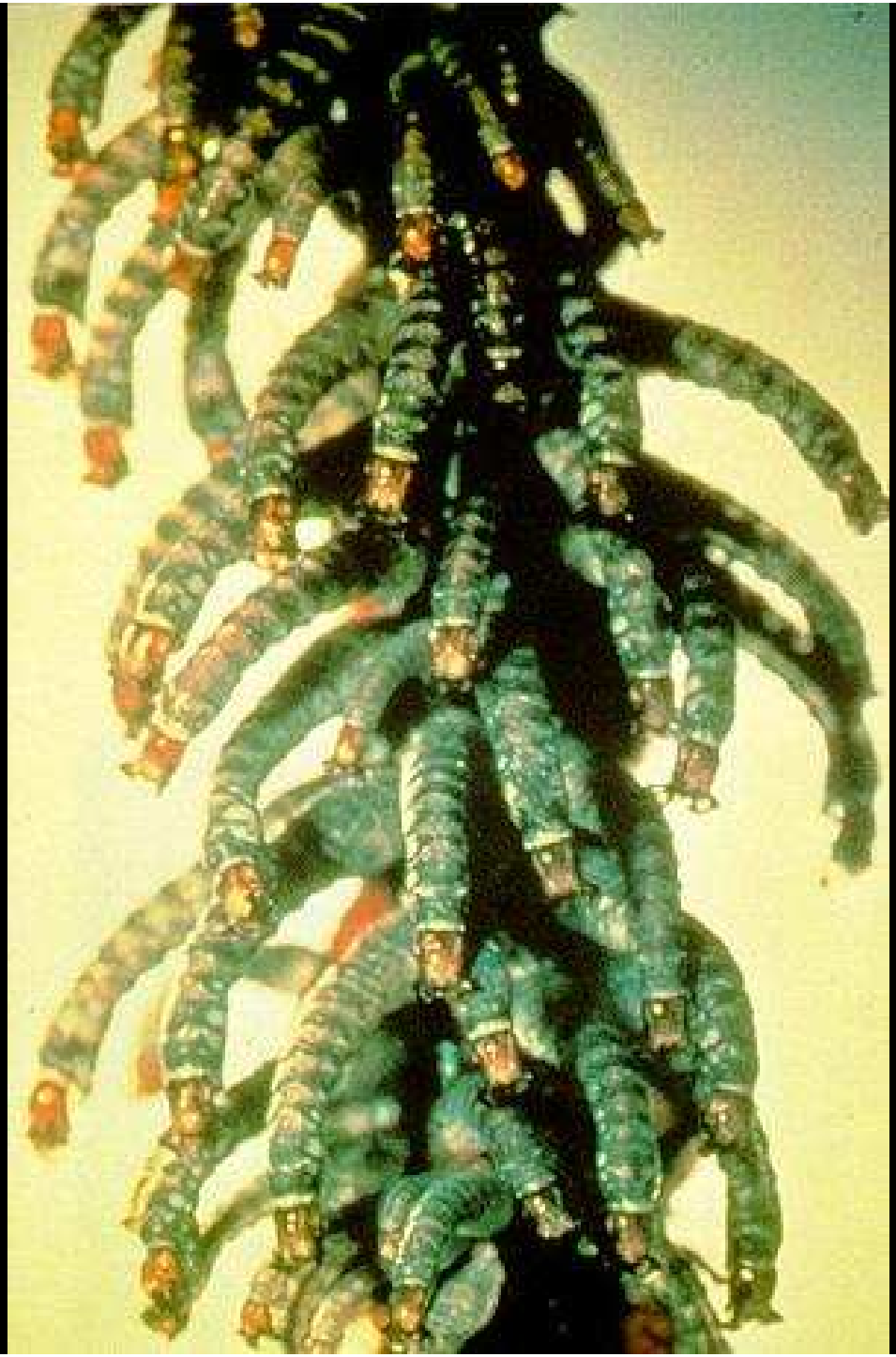


Figure 6.11 The life cycle of *Onchocerca volvulus* and other *Onchocerca* species known to have *Simulium* vectors.

Onchocerca volvulus – the cause of Onchocerciasis




♂
ADULT
♀
Aerial
or
Aquatic
EGG
I
II
III
IV
V
VI
VII
PUPA
(in cocoon)
LARVAL STAGES
RWC



Simulium damnosum s.l. larvae are concentrated together in breeding sites



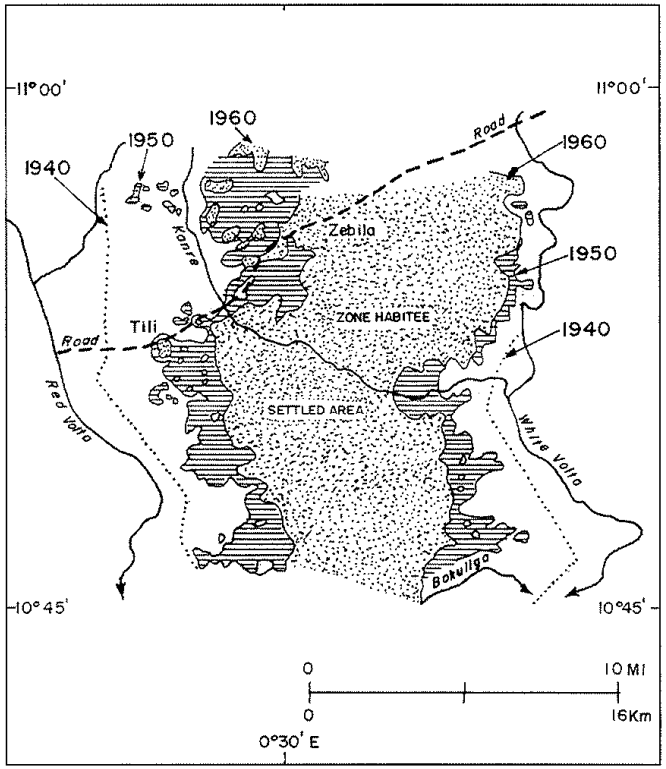



Simulium damnosum s.l. – the main vector of onchocerciaisis

Adult flies are dispersed:

Onchocerciasis Threat:

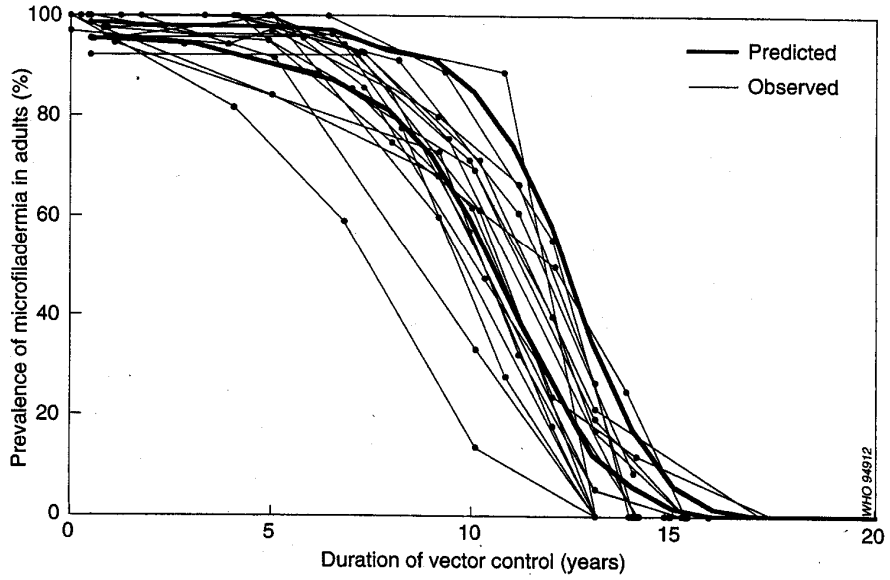
In 1955 a rice irrigation scheme in Tiao river valley (Burkina Faso) became an area of intense onchocerciasis transmission. Prevalence reached c100% by 1962 with high levels of blindness



Pattern of population retreat in the Zebila area of North-Eastern Ghana, between 1940 and 1960.

Before 1974 in northern Ghana prevalence was above 60%.
Visual impairment 40%
(of which blindness was 10%).
50% of males over 40 were blind.
= Economic collapse and desertion of fertile river valleys

Predicted and observed trends in the prevalence of microfiladermia during vector control in the original OCP area[a]



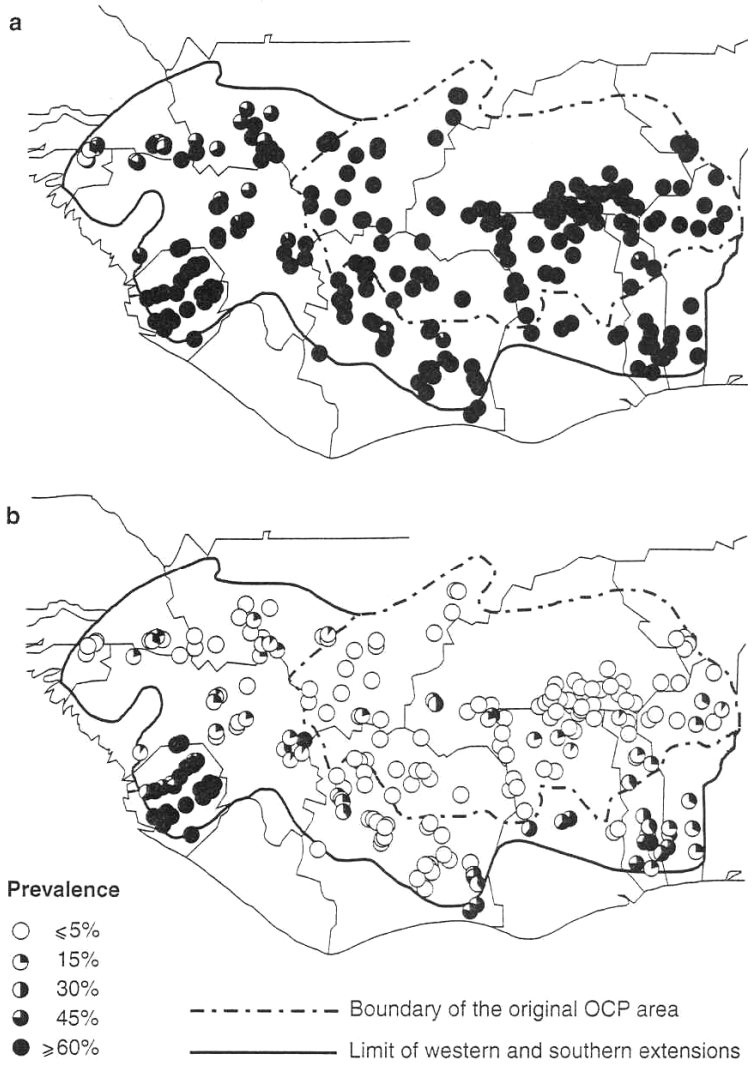
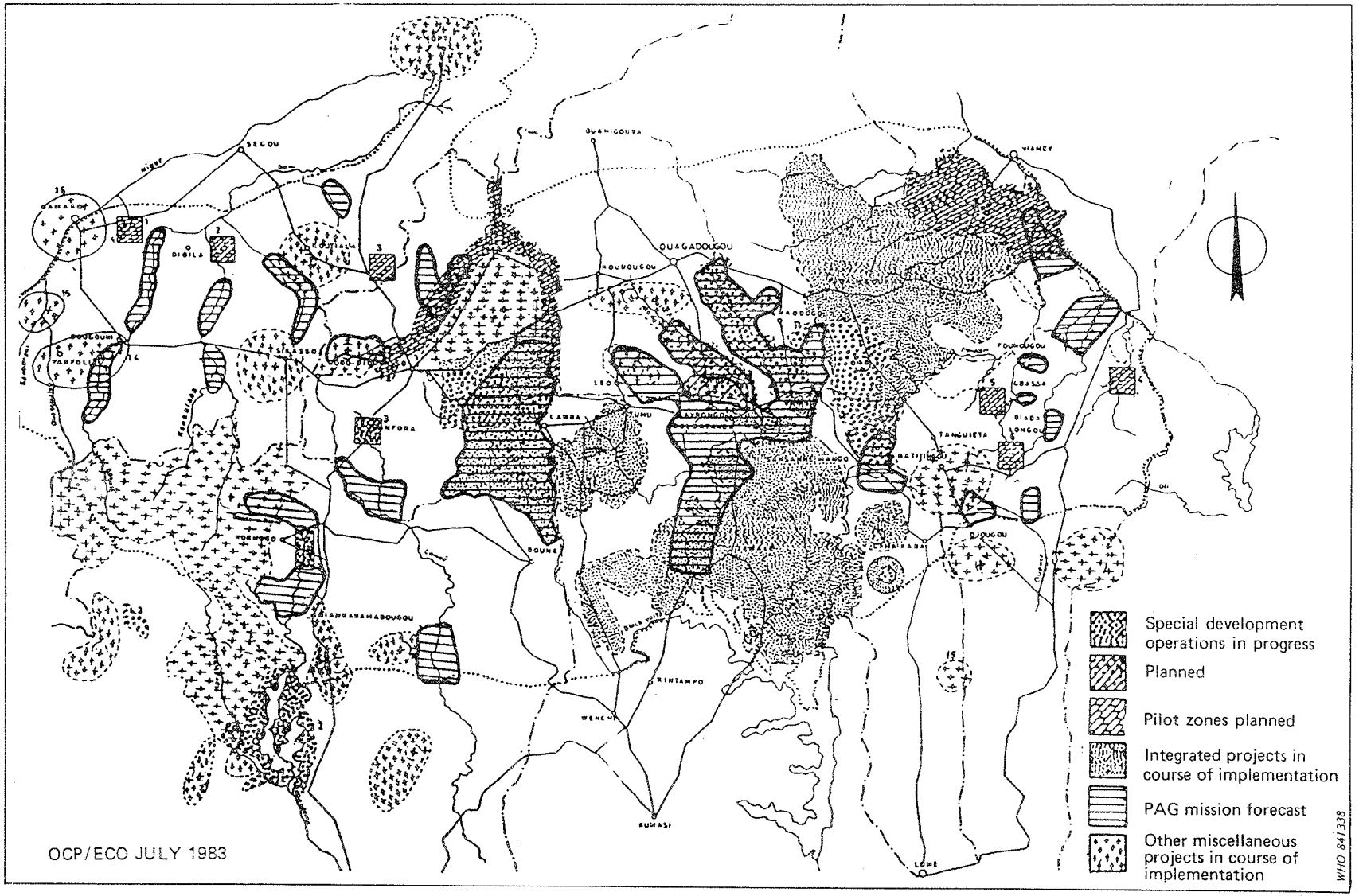
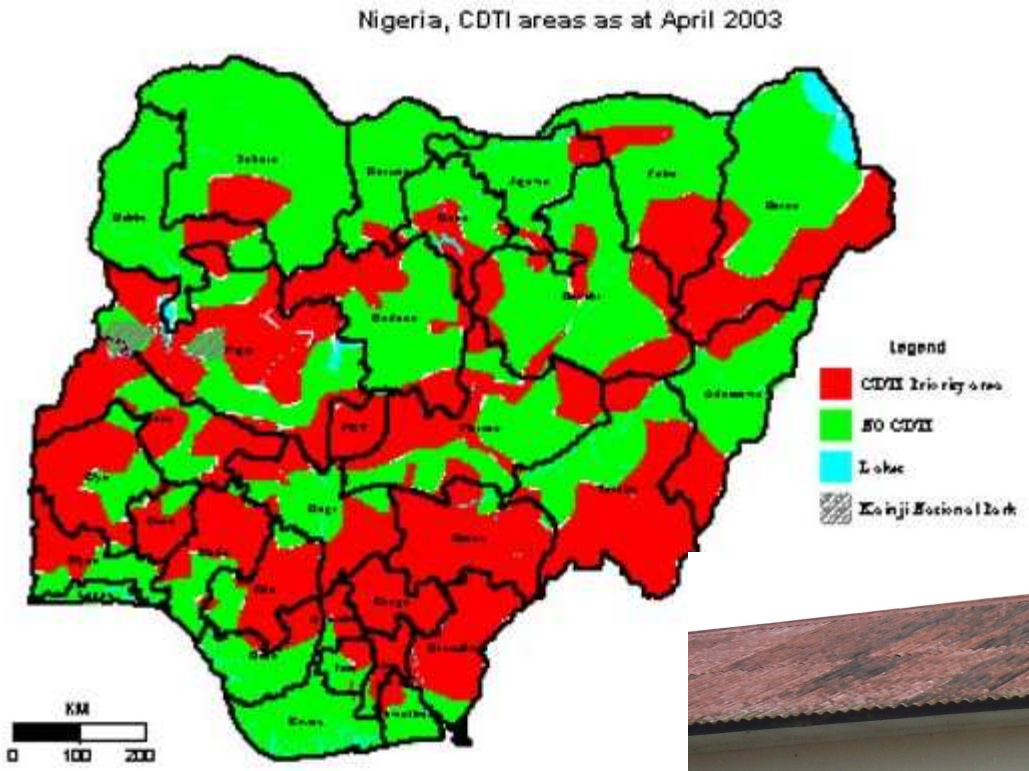


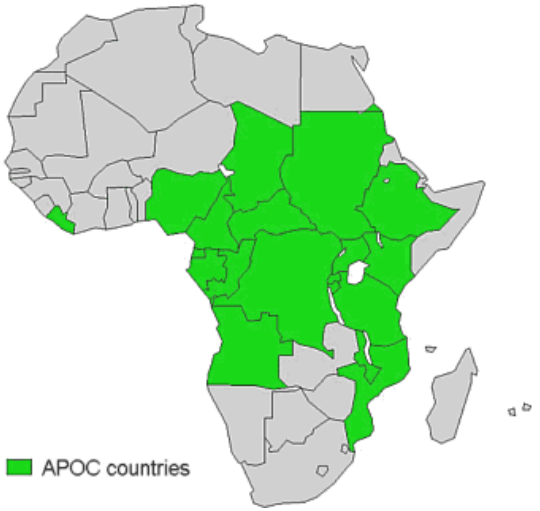
Fig. 1. Prevalence of positive skin-snips in villages of the OCP before control (a) and in 1993–1996 (b) (redrawn after Ref. 4).

OCP 1974-2002

FIG. 16 MAIN ZONES WITH ECONOMIC DEVELOPMENT PROJECTS, FROM 1973 TO 1983







APOC 1955-present

CURRENT THREATS FROM ONCHOCERCIASIS TO DEVELOPMENT OF SAVANNAH REGIONS

Locality	**Threat**	**Action**
Ex-OCP	Re-emergence	Be part of MoH/WHO monitoring scheme
APOC	Emergence	CDTI through MoH health system
Other	None	None
Near vector breeding site	Biting nuisance	1. Site away 2. Environmental modification 3. Localised vector control 4. Personal protection

CONCLUSIONS:

1. Major health hazards can be identified, assessed and ameliorated through the HIA.

2. Threats from infectious and parasitic diseases are real, but many can be significantly ameliorated by advance planning.

3. Planning involves physical (engineering, architectural, environmental, etc solutions) and proper co-ordination with the Health Services.

THE END