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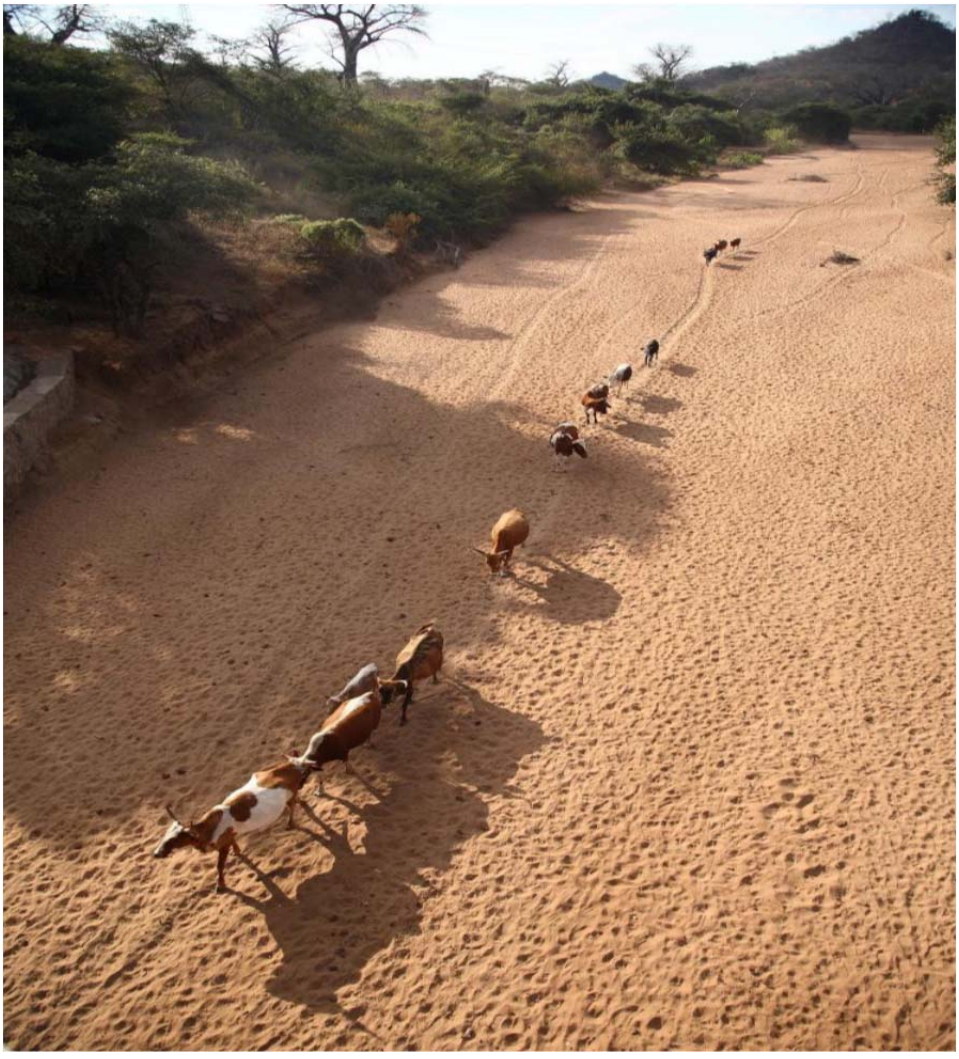
Governo Provincial de Tete
Direção Provincial de Saúde

Situational analysis on health equity and social determinants of health, Tete Province, Mozambique



Tete, February 2015

Situational analysis on health equity and social determinants of health, Tete Province, Mozambique

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Training and Research Support Centre

In co-operation with DPS Tete and Embassy of Denmark

Mozambique, February 2015

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Photo credits: *Cover* Cattle trek home along a dry riverbed in Pacassa Village, Tete Province, Mozambique #1 photo credit: ILRI/Mann 2008 used under creative commons

Executive Summary

In 2014 the Provincial Health Directorate (Direcção Provinciais de Saúde (DPS)) in Tete Province commissioned an assessment of evidence on social determinants of health (SDH) and health equity as input to its strategic five-year plan. The work was implemented between April 2014 and February 2015 through Training and Research Support Centre (TARSC), working in co-operation with DPS Tete and the Danish Embassy in Mozambique. This report presents the situational assessment on the current SDH and health inequities in Tete province. It outlines the current policies, institutions and services for addressing SDH and proposes options for strengthening responses to SDH and improving health equity in the province, within the three major goals of the PESS 2014-19. The assessment is based on published reports, government strategies and statistical evidence, key informant interviews and evidence from ad hoc surveys.

The province has a health profile of:

- Slow improvements in child survival and perinatal mortality and high maternal mortality;
- High and early fertility, a mature and declining HIV epidemic, prevalent communicable disease (malaria, TB, diarrhoea, respiratory conditions) and reproductive health burdens;
- Chronic undernutrition in children, adolescent females and lactating women and in poorest, food insecure households; and
- Rising levels of non communicable disease (NCD), including transport accidents, circulatory problems, cancers, harmful alcohol use and occupational disease and injury.

The 2014-2019 PESS priorities to reduce maternal, neonatal and under-5-year mortality, fertility, chronic malnutrition, endemic and NCDs are thus very relevant for Tete. However the province also needs to address a high population influx, improve birth registration, more rapidly accelerate reductions in IMR and U5MR; improve early screening and uptake of maternal health services, promote SRH in adolescents; sustain prevention interventions and promote improved water, sanitation, household energy and child nutrition. A double burden of communicable and NCDs in the next five years calls for a provincial survey of the distribution and determinants of NCDs to plan responses, and measures are proposed to raise population and health worker awareness on NCDs and for their prevention and early detection.

Persistent chronic undernutrition in Tete arises from inadequate nutrient intake, prevalent infections and early pregnancy; poor access to or intake of nutritious food; deficits in health care, water and sanitation, poor food storage and processing; land pressures and a loss of biodiversity affecting food variety. Underlying this are low adult literacy, high poverty and gender inequalities. The distribution of undernutrition in districts would need to be surveyed to inform DPS work and contribution to intersectoral actions in the province. Education is a key SDH. Adult literacy in Tete is lower than national averages, as is enrolment, attendance in and completion of primary school, especially for girls. This undermines health and limits the coverage of health literacy and school health interventions.

The rapidly growing economy in Tete from energy, mining and agriculture, investments in power, transport and communications infrastructure, population perception of an improved economic situation and fall in poverty are potentially positive features for health. However, this economic growth is dependent on capital intensive extractive activities, with low fiscal contributions and weak investment in local processing, with weak improvements in human development and persistent socio-economic inequalities. Cahora Bassa, a district with significant new power projects, has poorer health status outcomes than districts with less investment; Moatize, where the mines are concentrated has lower health service resources and coverage outcomes, while Tete City, a richer area and focus of economic activity also has poor health status outcomes. This raises a demand, recognised in government strategies, for wider benefit from economic activities, through value added local production, including in small and household enterprises and their market links to large projects and infrastructures, through improved corporate fiscal and other resource contributions and improved quality of public spending education, health and other social services. The report outlines the environment and health risks of these economic activities, including from involuntarily resettlement, and raises the option of strengthened co-operation between MICOA and DPS in integration of health and social impacts in environmental (and

social) impact assessments (referred to as EIAs/ESIAs), including the cumulative impacts of all projects in the same district and in the province.

The current situation, projected trends in these key SDH, the priorities they signal and those raised in government strategy documents and by key informants in the province were used to identify key areas of work on SDH that would improve health *and* be feasible to implement within the next five year provincial health strategy. Measures by DPS and district health services and co-operation between health and other sectors are proposed to

1. **Close the gap in improved living conditions (water, sanitation, waste management and energy) to reach up to 225 000 households over the 5 years,** with a costed investment plan and technologies to meet shortfalls, implemented though an intersectoral mechanism. It proposes ensuring that all schools and health centres are connected to the power network; promoting SME production of clean technologies for household cooking and energy; earmarking budgets and levies from local businesses for rapid improvements in rapidly growing settlements, such as Tete city and Moatize, where epidemic risk is high; raising heath literacy and monitoring risks, interventions and health impacts.
2. **Promote and protect workers and community health in production activities,** with measures outlined to protect workers health and safety, including for workers in public services; to protect community health from production related risks, including through using ESIAs as above; by involving health in oversight of corporate duties on resettlement, and by integrating company roles and resources in health services and activities in their districts.
3. **Contribute to the co-ordinated multi-sectoral strategies to improve food security** and nutrition as set out in the PAMDRC, especially through community health, disease prevention and control, promoting local food procurement for therapeutic / supplementary feeding; stimulating production of nutritious foods in school and community gardens; referring groups in need for social protection assistance; working with with other sectors on the norms, food processing, storage and markets that affect nutrition and providing evidence of nutrition impact to encourage all sectors to achieve shared results.
4. **Expand and improve equity in access to PHC,** to position the health sector in national and provincial plans as a key redistributive sector to enhance inclusive development. The report raises areas to close availability, access and coverage gaps in services for SRH, HIV, prevalent communicable diseases and options for awareness, screening, control and management of key NCDs, occupational and environmental diseases; including through entry points in schools and workplaces. It proposes options for private sector contribution to health care services in the province; for enhanced health promoting small enterprise activity to generate health and employment gains, and for enhanced community health literacy, community health committees, and training of 4 425 new community health workers (APEs).

A range of capacities, resources and co-ordination measures are needed to deliver on these strategies. MISAU would need to increase key categories of personnel in Tete for current health programmes (to 2/1 000 people), and DPS to strengthen capacities of existing personnel in ESIA, OHS, social communication, NCDs, and health system management, including for improved medicine supplies, and on use of health information for planning and evaluation. Tete has a low central budget allocation relative to need for both health and education, and faces a significant deficit on national 2014-2019 PESS minimum budget estimates for planned activities of $28/capita for districts, particularly in Angonia, Changara, Chifunde, Macanga, Mutarara and Tsangano. The actual cost of deficits would need to be assessed at district level, through gap analysis for capital costs. Strengthened co-ordination between district health services, DPS and district and provincial governments on financial planning and resource allocation would support Tete to engage central government and the private sector on their resource contributions and to improve equity in allocation of resources. Learning from the SETSAN-Tete, the report proposes cross department working groups to wider intersectoral arrangements on: (i) water, sanitation, waste management and energy; (ii) integrating health in ESIAs; (iii) prevention and control of risk factors for NCDs; (iv) the organisation of infrastructure and services in resettlement areas; (v) school, and workplace health programmes; and (vi) on networking community level workers and methods to integrate disadvantaged individuals within programmes and services.

1. Introduction

Population health is largely defined by the social determinants of health (SDH), including social, economic, living and community conditions, culture, traditions and social relations and networks and factors in people's lifestyles and physical characteristics. The Mozambique National Health Sector Strategic Plan (Plano Estratégico do Sector Saúde (PESS) 2014-2019) aims to promote health and prevent ill health, to avoid unfair social inequalities in health, to provide more and better health services and to develop new strategies for health financing and human resource development, including through intersectoral collaboration (MISAU 2014). The Provincial Health Directorate (Direcção Provincial de Saúde (DPS)) in Tete Province thus sought to obtain evidence on SDH and health equity as input to its strategic five-year plan. The work was implemented between April 2014 and February 2015 by Training and Research Support Centre (TARSC), in co-operation with DPS Tete and the Danish Embassy (see acknowledgements).

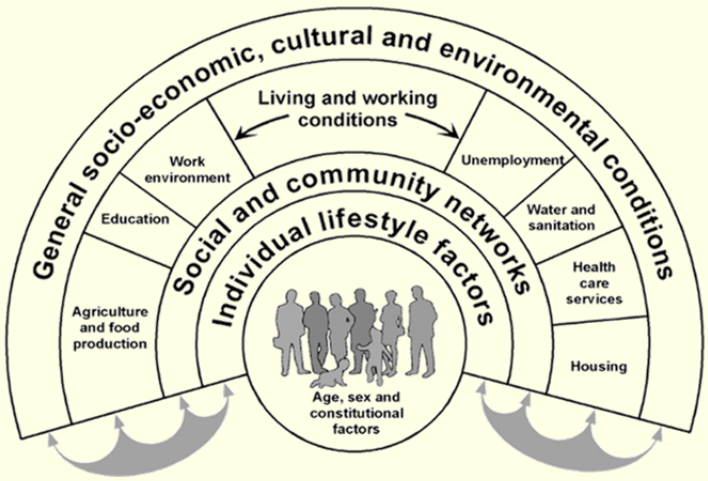
This report presents a situational assessment on the current SDH and health inequities in Tete province and, where feasible, trends for the next five years. We outline the current policy, institutional and programme / service responses to the SDH and propose options for strengthening responses to SDH and improving health equity in the province. The assessment locates the analysis within the three major goals of the PESS 2014-19 to:

1. Improve health sector delivery to address priority population health needs
2. Promote health in major development activities in the province, and
3. Strengthen resources and capacities for health (MISAU 2014)

2. Methods

In line with the terms of reference for the project, a broad conceptual framework was developed mapping key health outcomes in Tete province, their distribution and determinants. We drew on the rainbow model of SDH referred to in the Mozambique PESS 2014-19 (*Figure 1*), adding further attention to administrative factors and the co-operation across sectors and community and stakeholder participation necessary for addressing SDH (*Appendix 8.1*).

Figure 1: The 'rainbow' model of determinants of health



Source: Dahlgren and Whitehead, 2007

The framework was reviewed with DPS Tete and the Danish Embassy at a workshop in Tete in May 2014. The revised framework and templates for collection of evidence were agreed to and used by TARSC and DPS Tete. We included evidence from 205 publications from 1995 to 2014 obtained from internet searches, from Danish Embassy, DPS Tete and from key informants (KIs). They include health and other sector strategies, government and Instituto Nacional de Estatística (INE) reports at national and Tete provincial level, Tete province routine health information, journal papers and other institutional reports. KI interviews with key sectors and stakeholder institutions from Tete province and at national level were implemented by TARSC and DPS Tete using a structured interview in May–August 2015 (See KI list, *Appendix 8.2*). The evidence was discussed with DPS Tete and the Danish Embassy at various stages to identify the priority areas of focus discussed in *Section 4*. There is an impressive body of published evidence and routine health data on Tete. However the situation in Tete is also changing rapidly and not all changes are assessed or reported. Some indicators have been redefined over time, limiting comparability. The reported levels of some indicators vary across different sources, and gaps in data on some SDH and limited geographical and social disaggregation of most data limit equity analysis. Hence, while we have largely included peer-reviewed and official evidence, we have complemented this with KI interviews with provincial institutions, and evidence from ad hoc surveys.

3. Contexts for and trends in social determinants of health equity

3.1 Tete province and its population

Tete is a landlocked central province in Mozambique. Its 97 285 km² covers 13 districts, including the provincial capital, Tete City (*Figure 2*). The province shares a border with Zambia, Malawi and Zimbabwe, raising cross border economic, social and health features, discussed later. The Zambezi River divides the province into districts north of the river (Angonia, Moatize, Mutarara Tsangano, Zumbu, Chifunde, Chiúta, Macanga and Marávia) and those south of it (Cahora-Bassa, Changara, Mágoè and Tete City). While the river has led to flooding, it also yields numerous opportunities, including fertile and water retentive soils in the river valleys. The Cahora Bassa reservoir has a storage capacity of 65 million m^3 of water, generating hydroelectric power and supporting ecotourism, fishing and other activities. The province has a rich biodiversity. The tchuma-tchato wildlife area in the south has abundant wildlife in the mopane woodland, including globally endangered species such as the wattled crane (MPD 2013). The Moatize and Mucanha–Vuzi basins have about 20 million tonnes of coal reserves, projected to produce up to 25% of the world's coking coal by 2025 (Besharati 2012), raising both socio-economic opportunity and challenge.

Figure 2: Mozambique and Tete province

Sources: PB works 2014 and GoM Tete province 2014b

Mozambique's population of 24.4 million in 2013, was forecast to increase to 27.1 million by 2017. The country and province have a broad based population pyramid and the demographic transition is not yet underway (*Tables 3.1a,c*, MISAU 2014). Nearly half (49.4%) of the province's population are children, one in five are under five years of age and one in eight children are orphans (*Tables 8.1;* INE and UNICEF 2009). Maternal and child health is thus an evident priority. However the country also has the third largest older population in southern Africa, many living in precarious circumstances (Sepulveda 2014).

Tete also faces wider population pressures. It has had a significantly higher than average population growth of 104% between 1997 and 2013 (compared to 59% in Mozambique). This was a result of natural growth, higher fertility, the return of people displaced by war and in-migration to tap the opportunities from investments in coal mining. It is third most populous province in the country, with highest growth rates in Moatize, Macanga and Chifunde (*Tables 3.1b,8.1,* MPD 2013). Fertility rates in 2002-2007 were particularly high in Maravia, Changara and Zumbo (>8.3) and lowest in Angonia (5.8) suggesting that most of the population growth is explained by in-migration. One in every ten Mozambicans now lives in the province. Despite this growth, the population density in the province (23.1 people/ km²) is still below the national average (30.5 people/ km²), albeit higher in Tete city, Angonia, Tsangano, Mutarara and Moatize districts (*Table 8.1).* Recent migrants include many young men, many of whom leave their families behind, while many unskilled women migrate in for domestic and informal sector work, including commercial sex work (Coughlin et al. 2013).

Life expectancy at birth in the province is three years lower than the national average. This is partly a result of a more mature HIV epidemic in central Mozambique (SARDC et al. 2007), and partly due to higher child mortality. Perinatal mortality in 2011 was 42% higher in Tete than for the country as a whole, infant mortality (IMR) 20% higher and the under 5-year mortality (U5MR) 16% higher than the national average (*Table 3.1a*). Hence while Mozambique has nearly met its Millennium Development Goal (MDG) targets for IMR and U5MR (67/100 and 106 /1 000 respectively), it has not yet done so in Tete province (GoM et al. 2010). While infant and child survival has improved in Tete after 2008, the rate of improvement in 2008-2011 has been slower than for the country as a whole (*Table 3.1b*).

It is difficult to make a clear inference on maternal mortality due to the absence of reliable data. The national maternal mortality rate (MMR) fell from 1 000 /100 000 in 1990 to 500 /100 000 by 2007. UNFPA (2011) cited a MMR in Tete of 272 /100 000 in 2007, lower than national rates, but there is some caution on this figure given large variances in MMR and the underestimation from facility estimates (GoM et al. 2010). The 2011 demographic and health survey does not include MMR and the most recent census analysis of these rates was not publicly available. There are indications that MMR and poor health outcomes from sexual and reproductive health (SRH) are a concern for the province. Tete has an earlier onset of sex in those over 15 years old and higher fertility rates than national levels (*Table 3.1a*). For Changara, Chiuta and Maravia, where female-headed households are more common and women play a larger role in household income, a fall in maternal mortality and morbidity is likely to improve household socio-economic security (*Table 8.1*).

Table 3.1a: Most recent demographic data Mozambique and Tete, 1996-2013

Indicator	Year	Mozambique	Tete	% Variance Tete vs. Moz
Population 000s	2013	24 366	2 322	
Population density/ sq km	2013	30.5	23.1	-24
Ave household size	2008/9	4.7	4.8	+2
% Population <5 years	2013	17.0	19.7	+16
% Population ≤15 years	2007	46.9	49.7	+6
% Population 65 years +	2007	3.1	2.9	-6
Total fertility rate	2011	5.9	6.8	+15
% 15-19yr males with onset of sex <15 yrs	2011	17.4	20.5	+18
% 15-19yr females with onset of sex <15 yrs	2011	16.1	17.1	+6
Life expectancy at birth	2007	47.6	44.7	-6
Infant mortality rate /1 000 live births	2011	71	85	+20
Perinatal mortality rate /1 000 live births	2011	38	54	+42
<5 year mortality rate /1 000 live births	2011	108	128	+16
% population that is rural	1997	70.8	85.3	+20
% households with female head (i)	1997	30.5	33.4	+10
% children who are vulnerable or orphans	2008/9	18	12	-33

Sources: DPS Tete 2013a; GoM et al. 2010; INE 1999, 2010a, 2012a,b; INE et al 2013; INE and UNICEF 2009; UNDP et al. 2008 (i) from 1997 census. See Table 8.1 for district level disaggregation; Moz = Mozambique

Table 3.1b: Time trends in selected demographic indicators Mozambique and Tete, 1996-2013

Year	1997	2007	2008/9	2011/2	2013
Population 100 000's Mozambique	152.78	206.32	212.08	237.01	243.66
Population 100 000's Tete	11.45	18.08	19	22.29	23.33
% total Mozambique population in Tete	7.49	8.76	8.89	9.40	9.57
Total fertility rate Mozambique	5.6	5.5		5.9	
Total fertility rate Tete	6.7	6.9		6.8	
Infant mortality rate/ 1 000 live births Mozambique	147	124 (i)	107	71	
Infant mortality rate/ 1 000 live births Tete	160	125 (i)	108	85	
Under five year mortality rate/ 1000 live births Mozambique	219	178 (i)	157	108	
Under five year mortality rate/ 1000 live births Tete	282	205 (i)	174	128	

Sources: Gasper et al. 1998; INE 2004, 2010a, 2010b, 2012a,b; INE et al. 2005, 2013; UNDP et al. 2008; INE and UNICEF 2009 (i) 2003 data

Tete's geographical positioning, significant natural assets and the influx of investment, people and capacities offer opportunities for health. They also pose challenges, with demands on infrastructures and services, displacement of people by economic projects, and shocks such as flooding (MPD 2013). Older people, people with disabilities and chronic illness, orphaned children or single-parent households, found in all districts, have greater difficulty in dealing with such shocks (Wingqvist 2011). This raises the question of how the resources in the province are organised, managed and distributed to improve wellbeing and protect disadvantaged groups. This begins with 'knowing' the families in the districts and their situation, starting with birth registration. The 2008 multiple indicator cluster survey (MICS) found that Tete had the lowest percent of birth registration in children under 5 years (11% compared to 31% nationally), pointing to the need for a stronger

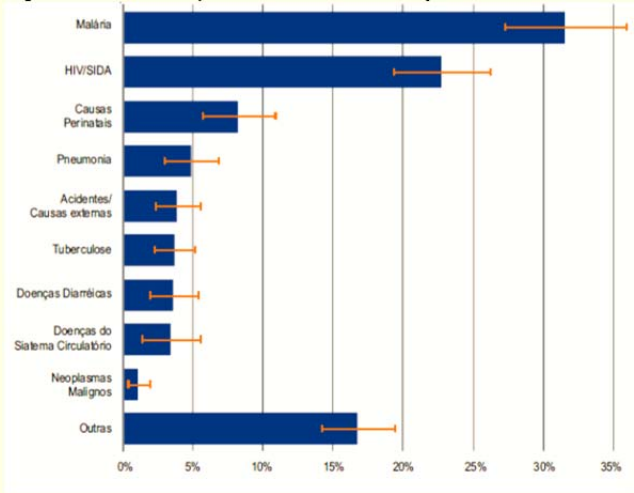
interface between state services and lower income communities. The 2014-2019 PESS proposes to improve birth registration through community health workers (CHWs) and community leaders, mobile phones and co-operation across ministries of health, justice and the statistical institute in civil registration (MISAU 2014). This would need to be intensively implemented in the province and CHWs can also help to identify family and child health needs and enhance service links and uptake, discussed later.

The 2014-2019 PESS priorities to reduce maternal, neonatal and under-5-year mortality, fertility, chronic malnutrition , communicable and non communicable dieases are relevant for Tete (MISAU 2014). However attention would also need to be given to strategies that address the population influx in some districts, that improve birth registration, map family needs and identify disadvantaged people; that accelerate IMR and U5MR reductions and to manage fertility and reproductive health, especially for adolescents and young adults. This is further discussed in subsequent sections.

3.2 Health status distribution and trends

While the evidence in *Section 3.1* suggests that Tete has poorer levels and rates of improvement in many survival indicators, many of its health indicators are similar to or slightly better than national averages, except for those of nutrition (*Tables 3.2a and b).* Malaria is the leading cause of adult mortality (MISAU 2014), while for all ages malaria, HIV, perinatal causes, pneumonia, accidents, tuberculosis (TB), diarrhoea, circulatory conditions and cancers are principal causes of mortality (See *Figure 3.2a).* This profile suggests that NCDs merit attention. Cahora Bassa, Magoe, Moatize and Tete city have higher levels of many prevalent conditions, despite their higher level of economic activity. Angonia appears to have favourable levels of the health indicators shown in *Table 8.2*.

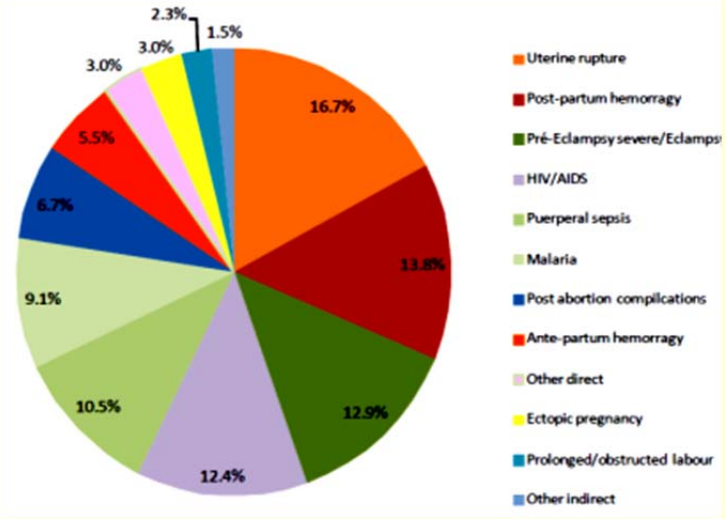
Figure 3.2a. Principal causes of mortality 2007



Source: UNICEF 2013

Tete's HIV prevalence and co-infection of TB and HIV and levels of fever and malaria in children are lower than national levels (*Table 3.2a*). HIV prevalence is higher amongst urban adults (15.9 %) than rural (9.2%) and higher in Moatize and Tete City (DPS 2011). A significant fall in malaria cases up to 2012 was associated with improved coverage of prevention measures (spraying, information and bednets for malaria prevention). Conversely a reported rise in malaria cases in 2013 was attributed to falling levels of spraying and maintenance of bednets (*Tables 3.2a,b*; DPS Tete personal communication 2014; RoM DPS Tete 2014).

Figure 3.2b. Causes of maternal mortality 2008



UNFPA 2011

The health burdens and their determinants change across the life course. Children are particularly susceptible to unsafe living environments (water, sanitation); air pollution from use of woodfuel and charcoal for household energy (see *Section 4.2*) and food insecurity, (see *Section 3.6)*. Malaria and anaemia, acute respiratory infections (ARI) and diarrhoea are their leading causes of death, levels of chronic and acute child undernutrition are above national averages in Tete and child wasting increased between 2002 and 2011/2 more than for the country as a whole (*Tables 3.2a,b;* MISAU 2014l RoM Ministry of Agriculture 2014). Pregnancy and childbirth are also recognised periods of higher risk of ill health. The causes of maternal mortality point to the importance of early screening and uptake of maternal health services (*Figure 3.2b*).

Malaria in pregnancy is also a major cause of premature birth and low birth weight. Nationally about 35% of pregnant women carry the parasite and more than 60% suffer from associated anaemia (RoM 2010). These health service determinants are further discussed in *Section 3.8*. Adults are however also affected by injury and chronic disease from environmental risks, including from work.

Table 3.2a: Most recent health status data Mozambique and Tete, 1996-2013

Indicator	Year	Mozambique	Tete	% Variance Tete vs. Moz
Incidence of diarrhoea in children <5yrs (/100)	2008	18.0	18.0	0
Adult (15-49 yrs) HIV prevalence % total	2012	11.5	7.0	-39
% deaths due to TB with HIV	2007	74.0	61.8	-16
% children <5yrs with fever in past 2 weeks	2011	13.4	12.7	-5
% children tested positive for malaria (i)	2011	38.3	36.9	-4
Malaria cases in children and adults /100 000	2013	Not available	9 556	
% children 6-59 mths with anaemia (ii)	2011	9.4	5.0	-47
% women 15-49 yrs with unmet needs for contraception	2011	23.9	21.5	-10
% women >15 yrs who experienced domestic violence	2011	33.4	26.0	-22
% <5yr olds <2SD on height for age (stunting)	2011	42.6	44.2	+4
% <5yr olds <2SD on weight for height (wasting)	2011	5.9	5.6	-5
% <5 yr olds <2SD on weight for age	2011	14.9	17.0	+14

Sources DPS Tete 2005, 2008, 2011, 2012, 2013. ; DPMAS 2011, 2012; INE et al. 2005; 2013; INE and UNICEF 2009; MISAU et al. 2010; GoM et al. 2010; UNICEF 2013*:* RoM 2010 (i) % children 6-59 mths positive for malaria based on rapid diagnostic test (ii) Haemaglobin < 8.0g/dl

Table 3.2b: Time trends in health indicators Mozambique, Tete, 1996-2012

Year	2002/3	2007	2008/9	2011/2012
Adult (15-49 yrs) HIV prevalence % total Mozambique			7.9	11.1
Adult (15-49 yrs) HIV prevalence % total Tete			7.0	7.0
Malaria cases in children and adults (from routine data) / 100 000 population Tete		19 057	17 569	4 982 (i)
% <5yr olds <2SD on height for age (stunting) Mozambique	47.0		44.0	42.6
% <5yr olds <2SD on height for age (stunting) Tete	53.6		48.0	44.2
% <5yr olds <2SD on weight for height (wasting) Mozambique	5.2		4.0	5.9
% <5yr olds <2SD on weight for height (wasting) Tete	2.7		2.6	5.6
% <5 yr olds <2SD on weight for age Mozambique	19.7		17.5	14.9
% <5 yr olds <2SD on weight for age Tete	20.8		18.5	17.0

Sources: DPS Tete 2005, 2008, 2011, 2012, 2013. ; UNICEF 2013; DPMAS 2011, 2012; INE et al. 2005; 2013; MISAU et al 2010; Gov of Mozambique National Statistics Institute and UNDP 2010; (i) Risen again to 9 556 in 2013

A number of health burdens are however rooted in deeper social and gender inequalities. HIV prevalence is higher in adult women (8%) than in men (5.7%) (DPS Tete 2011), as it is for other countries in the region (EQUINET SC 2012). A quarter of women over 15 years old in Tete reported having experienced domestic violence, which while lower than the national average is still high (*Table 3.2a*), and there are gender inequalities in wage employment (University of Roma TRE 2007). Tete's earlier age of onset of sex and high fertility rates, noted earlier, together with commercial sex and domestic violence signal a priority for promotion of SRH.

Economic developments in the province, discussed later, bring possibilities for improved health from improved employment, incomes and infrastructures. They also bring risks of injury, respiratory conditions, poisoning and chronic conditions (cancers, liver and kidney disease, birth defects) related to chemical/ pesticide exposure. There are nutritional and communicable disease risks along migration and transport routes, discussed in *Sections 3.5* and *4.2.* These conditions are not well reported, but a third (32%) of workers believe that their health is adversely affected by their working conditions nationally, with fatigue, hearing problems and back pain most frequently reported. Occupational accidents are reported to be common, but few employers are reported to comply with

statutory obligations to prevent and insure workers against occupational accidents (ILO Tripartite DWCP Drafting Committee 2011).

With its rapid demographic and economic changes and its cross border position facilitating trade, including in harmful products, Tete may experience a more rapid rise in these and other NCDs. There is already evidence indicating that there will be a growing double burden of communicable disease and NCDs in the next five years. NCDs already account for 28% of deaths in Mozambique, 12% of which are due to cardiovascular disease, 3% cancers and respiratory diseases and 2% diabetes. NCDs contributed to 13% of total child deaths in a survey in Manhica town, Gaza province, including from rheumatic heart disease, asthma and injuries (Sacarlal et al 2009). A tenth of 13-15 year olds use tobacco, rising in 25-64 year olds to 40% of men and 18% of women. Alcohol consumption was found in over half of adult men and a quarter of women (MISAU 2014; Silva-Matos and Beran 2012). Many NCDs that have particular relevance for Tete, such as road traffic accidents or occupational diseases, are poorly monitored. The fact that economic development may further raise these risks is signalled by the increase found in alcohol consumption in those at *higher* levels of income and formal education (Silva-Matos and Beran 2012). The evidence signals that it is timely to act now to prevent the 20% escalation in chronic conditions projected for African countries by 2020 (WHO 2008). There appears to be low literacy on and service screening for NCDs, with late diagnosis and treatment raising costs for both communities and services. For cervical cancer, the most frequent cancer for women 15 and 44 years old, a 2005/6 survey in Beira found that almost 80% of these cancers were diagnosed late, at inoperable stages. In 2009 only a tenth of people with diabetes knew they had the condition and of the 33% of adults found to have hypertension, only 18% were aware of it and only half of these were under treatment, moreso in women than in men (Damasceno et al 2009).

The health burdens in the province call for a continued focus on prevention and management of communicable diseases, especially prevention interventions and those promoting improved water, sanitation, household energy supplies and child nutrition. Promotion of SRH and maternal health also remains a priority, with more focus on early screening and uptake of maternal health services, promotion of SRH in adolescents and interventions on gender violence and discrimination. The double burden of communicable and rising NCDs in the next five years calls for a survey on the distribution and determinants of NCDs in Tete to plan responses, as further discussed in *Section 4*, and measures to address occupational, environmental, food and transport related NCDs, to raise population and health worker awareness on NCDs and to improve prevention and early detection.

3.3 Environmental assets and challenges for health

Tete's land, water, plant and mineral resources are assets for the 86% of its population involved in small scale agriculture and fishing and for new investors in mining and power (MPD 2013). There is ample and reliable rainfall, particularly in Angonia, Tsangano and Macanga, the most productive agricultural districts, but the province experiences both drought and flooding (MICOA 2012; Wingqvist 2011; INE 2012b; MPD 2013). Land has also been relatively abundant, but new economic activities, coal mining, land intensive shift agriculture, livestock grazing and intensive use of woodfuels is generating greater pressure on available land (Wingqvist 2011). In 2005, the United Nations Environment Programme (UNEP) identified Tete as one of Mozambique's five provinces where all five ecosystem elements (bio-diversity, food production, water supply, energy resources and flood regulation) are threatened, affecting nutrition, clean water, household energy and livelihoods (Wong et al. 2005).

Table 3.3a summarises the distribution of opportunities and challenges in Tete's environmental resources. Drought and floods mostly affect Chiúta, Moatize, Muturara and poorly drained areas of Tete city, although climate related loss of arable land in other provinces (estimated at 0.6% by 2040) could further intensify in-migration to Tete (SARUA 2014; GoM Tete 2014; WFP 2014). Environmental challenges currently affect

- Households depending on land, water and biodiversity for food and other farming and fishing;
- Dense urban/ peri-urban settlements where pollution, flooding, unsafe environments raise the risk of epidemic outbreaks;
- Women and children, given their vulnerability to water-related diseases, and
- Those displaced to less productive land by large economic projects (SARUA 2014).

Table 3.3a: Opportunities and challenges from environmental resources, Tete province

Area	Opportunity	Challenge	Groups (most) affected
Bio-diversity	Biodiversity of forest products (bush meat, honey, beeswax, grass, bamboo, mushrooms, edible plants and fruits), and ten medicinal species.	Loss of biodiversity, pollution due to land clearing for mining, agriculture, transport and power projects. Loss of forests from wildfires. Possible increase in temperatures from coal mining emissions.	High proportion of families in the province dependent on land, water, biodiversity for livelihoods, energy and food security. Economic activities depending on biodiversity – ecotourism, traditional medicines (including for export)
Land- including soil, and mineral resources	Lower land degradation in Mozambique vs other SADC (*) countries. Angonia growth pole (Angonia, Tsangano and Macanga) has good soils and rainfall for agriculture. High coal reserves in Moatize and Mucanha-Vuzi basins.	Mining, transport and power activities and in-migration reduce land availability. Mining waste, agrochemicals contaminate soil. Soil erosion, desertification from drought, reduced water in tributaries, uncontrolled clearing, tree felling, most affecting Moatize, Magoe, Changara, Chifunde and Tete City.	Households dependent on land quality and access, and on wood fuels for energy (Changara, Chiuta, Mutarara), particularly if energy from power projects not accessed in these districts. Incomes, food security for beneficiaries of large investments improved, and wider benefit from transport and energy infrastructures but inequalities in income and food security (see later).
Water supply, quality and safety	Zambezi river has high renewable water resources and fish and a large share of the 12 500 megawatt (MW) potential energy capacity in Mozambique, with 2 075 MW potential in Cahora Bassa.	Supply affected by upstream use in adjacent countries; by drought and mining. Risk of flooding. Water quality affected by pollution from mining, agro-chemicals; urbanisation, poor sanitation. Biodiversity, fishing affected by hydropower construction.	Households as above benefit from water for agriculture and livestock, and fishing and wellbeing may be negatively affected by challenges if not managed. Benefits of substantial water supplies for large investments and hydropower. See later for discussion of equity in distribution of these benefits.

Sources: FAO Forestry Department 2000; Wong et al. 2005; Wingqvist 2011; Banco Espirito Santo 2012; Besharati 2012; University of Roma TRE 2007; GoM Tete 2014; WFP 2010; MICOA 2012
(*) SADC = Southern African Development Community

There is potential for Tete's natural resources to benefit *both* households and larger scale investors. Clean technologies can avoid risks and enhance sustainable use of resources (a public health-environment win win). Measures that adapt to climate change and restore welfare losses are argued to cost less to introduce than the costs of not adapting (Wingqvist 2011). A switch to affordable clean energy from hydropower investments in Cahora Bassa (including for the 43.2% of households using woodfuels in this district shown in *Table 8.5*) would, for example, improve services, reduce burdens of fuel collection and respiratory disease from woodsmoke. Various measures are being explored, discussed further in *Section 4.2,* and including:

- water harvesting, soil/moisture conservation, agro-forestry and farm forestry;
- affordable household access to clean efficient energy, stoves, lighting and other equipment;
- sealing of unpaved roads to reduce flood damage (Wingqvist 2011; MICOA 2012).

Mozambique has a range of laws, policies and mechanisms to realise opportunities and manage risks in the exploitation of its natural resources, detailed in *Appendix 8.4*. A National Environmental Fund established in 2000 collects funds from external partners, fees and fines for environmental management and uses them to support capacities for environmental management, clean technologies and environmentally acceptable production processes and to purchase equity in companies or institutions that benefit the environment (MICOA 2012; RoM MICAO 2012a). Ministerial Decree 93/2005 requires that 20% of revenues from exploration of forest and wildlife resources be paid to communities. This is slowly being applied to the forestry and wildlife sector post 2006, with 35 beneficiary community groups registered in Tete in 2006-8, although dependant on non-state actors supporting community groups to access the funds and nearly half the amounts owed outstanding by 2010 (RoM MICOA 2012a; Wingqvist 2011). However the Environmental Strategy for the Sustainable Development of Mozambique 2007-2017 does not discuss mineral resources or forests, both of which are relevant in Tete (Thoke 2012) and the budget allocation to environmental management at 0.9% of Gross Domestic Product (GDP) is below the 1.4-2.5% GDP recommended by the World Bank for developing countries (MICOA 2012).

The Environmental Law (Law n. 20/97) and the Environmental Impact Assessment Regulations (Decree n. 45/2004) provide for Environmental Impact Assessments (EIAs) to be done where activities are close to sensitive ecosystems or have potential impacts on local livelihoods (MPD

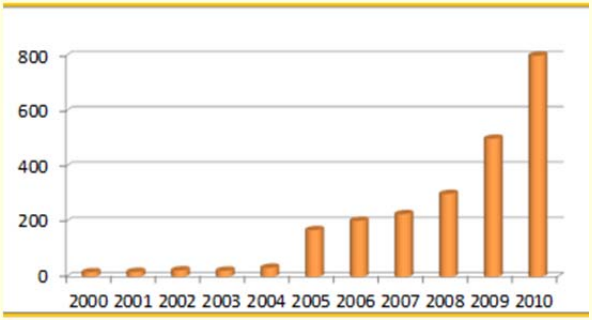
2013). EIA capacities now exist in provinces, including Tete, with plans to extend them to district level (MPD 2013). The reports have impact. By 2011, 146 out of 437 projects had been stopped for environmental reasons (Aaboe and Kring 2013).

Bio-diversity, food production, water supplies, energy and land resources and floods are assets for health in the province, but increasingly under threat, affecting nutrition, living conditions and livelihoods. Clean technologies such as for water harvesting, household cooking and lighting, production activities and road sealing can avoid health risks and enhance sustainable use of resources. While laws and measures are in place, there is need to better identify and direct resources towards managing shared risks to environments and health. This could be achieved by strengthened co-operation between MICOA and DPS in the implementation of EIAs, particularly if these can integrate consideration of social and health impacts in both EIAs and ESIAs. Key informants support this, and proposed that EIAs/ESIAs also consider the cumulative impacts of all projects in the same district, and that local communities be more informed and involved (MPD 2013; ICMM 2010; provincial and national KIs; Aaboe and Kring 2013; HRW 2013).

3.4 The economic context: high growth, high poverty, high inequality

Mozambique has had a decade of over 6% annual growth in GDP, with 7-8% growth projected to 2016 (World Bank 2014b). Foreign direct investment (FDI) soared by 400% between 2009 and 2010, mainly in construction and coal mining (ADB 2011). Tete province had the second highest GDP growth of all provinces between 2002 and 2008 (*Table 3.4a*), with investments post 2005 detailed in *Appendix 8.3.* It has a high Business Confidence Index and a rapidly rising share of inhabitants perceiving their economic situation to be improving between 2002 and 2008, higher than for the country as a whole (MPD 2013,*Tables 3.4a, b*).

Figure 3.4a. Value of Tete mining concessions 2000-2010 (US$ millions)

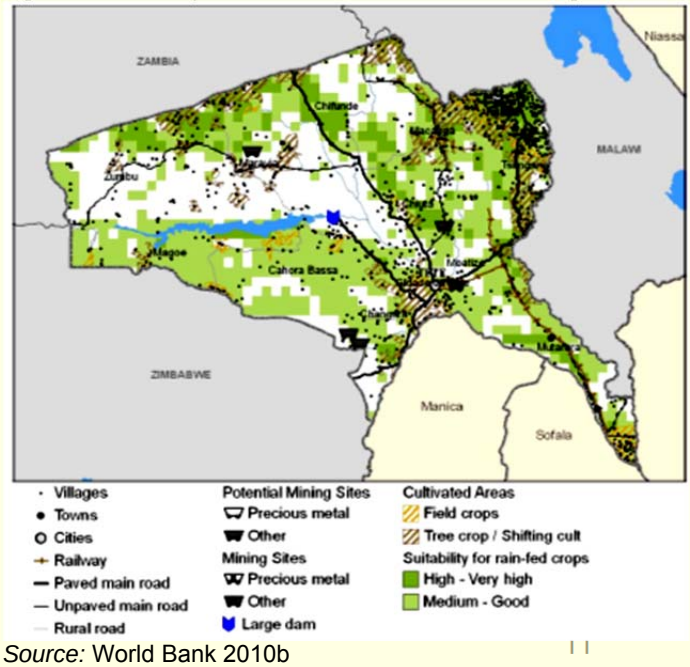


Source: GoM Tete 2014

In 2007-2010 the province derived its income returns largely from hydropower, other services; agriculture, forestry, animal husbandry and fisheries; and from hotels and restaurants (GoM Tete 2014; *Figures 3.4a,b*). Smallholder tobacco producers are contracted to the US Mozambique Leaf Tobacco, Lda (Banco Espirito Santo 2012). Energy exports from Cahora Bassa contributed to over 40% of the province's GDP in 2008 and are projected to grow with new planned hydroelectric and coal powered plants (MPD 2013; *Appendix 8.3*).

Coal mining has dominated new investments in the past 5 years. Over 100 coal licenses have been granted in Tete to 45 national and international companies (triggering increased flights to and banks in the province) (*Figures 3.4a, b*). While the outputs had not yet come fully on-stream by 2014, mining and energy are projected to be the fastest growing sectors in the next five years, followed by transport (largely for export of coal) and communications (See *Appendix 8.3).* The level of growth will depend on energy and mineral prices and on the adequacy of rail transport and the deep water port terminals to facilitate exports (World Bank 2014b; Mahumane et al. 2012). Government has indicated, however, that any medium / long-term growth strategy in the province should consider energy, mining and agriculture as primary growth engines (GoM Tete 2014).

Figure 3.4b. Tete province cultivated areas and mining sites



Source: World Bank 2010b

Table 3.4a: Most recent economic and employment data Mozambique and Tete, 1996-2013

Indicator	Year	Mozambique	Tete	% Variance Tete vs Moz
Real GDP growth (% year-on-year)	2012	7.5	8.0 (i)	+7
Agriculture % GDP	2006	27.9	19.0	-32
% >15yrs employed in agriculture	2008/9	81.0	92.7	+14
Mining and quarrying % GDP	2006	1.4	2.9	+107
% employment in extractive, transformative sector	2005	3.4	1.8	-47
% >15 yrs employed in extractive industries	2008/9	0.2	0.6	+200
Manufacture % GDP	2006	14.6	2.4	-85
Public expenditure as % GDP	2006	23.4	12.2	-48
% Population below total poverty line	2008/9	54.7	42.0	-23
Multidimensional poverty index (incidence+intensity)	2011	0.389	0.466	+20
Gini coefficient	2011	0.46	0.55	+20
Monthly expenses per capita in MT (ii)	2008/9	829	814	-2
% economically active population	2008/9	86.5	90.3	+4
% employment own enterprise with workers	2008/9	52.1	46.3	-11
% employment Family without salary	2008/9	35.4	48.3	-36
% other employment	2008/9	12.5	5.4	-57
% households perceiving improving economic situation	2008/9	27.9	37.9	+36

Sources: ADB et al. 2012; INE 2004; 2006, 2010a, 2010b; DPMAS 2011, 2012; UNDP et al. 2008; MPD 2013; INE et al. 2013; GoM et al. 2010; OPHI 2014 (i) for 2005-2008. (ii) 24.17 MT in 2008 = 1US$

Table 3.4b: Time trends in economic and employment indicators Mozambique, Tete, 1996-2012

Year	2002/3	2007	2008/9	2012
% real GDP annual growth Mozambique		8.5		7.5
% real GDP annual growth Tete		11.0		8.0
% Population below total poverty line Mozambique	54.1		54.7	
% Population below total poverty line Tete	59.8		42.0	
Calorie adjusted poverty rates Mozambique (iii)	64		50	
Calorie adjusted poverty rates Tete (iii)	81		39	
Gini coefficient Mozambique	0.42			(ii) 0.46
Gini coefficient Tete	0.40			(ii) 0.55
% > 15 years employed in agriculture Mozambique		78.5	81.0	
% > 15 years employed in agriculture Tete		86.0	92.7	
% > 15 years employed in mining Mozambique		0.3	0.2	
% > 15 years employed in mining Tete		0.0	0.6	
Monthly expenses/ capita US$ current exchange rate (i) Moz	13.65		31.04	
Monthly expenses/ capita US$ at current exchange rate (i) Tete	15.84		30.48	
Perception of economic situation improving Mozambique	21.0		27.9	
Perception of economic situation improving Tete	18.0		37.9	

Sources: INE 2004,2006, 2010b; UNDP et al. 2008; INE et al. 2013; (i) 23.73 MT = 1US$ in 2003; 26.71 MT = 1US$ in 2009 (ii) 2011 demographic and health survey (iii) 2002 column figures are for 1997. Calorie adjusted rates adjusts for households underreporting calorie intakes (below 800 calories/ person

There are, however, cautions over this growth path. The first is on the sustainability of a growth that is generated by depleting resources. While rapid and with potential benefit in infrastructures, it could lead to lower growth and wellbeing in the future unless linked to wider, diversified economic activity. Mozambique has one of the lowest shared of *produced* capital in southern Africa (World Bank 2014a). The second caution is over how far this growth has translated into a growth in per capita incomes, employment and wider benefit to households in the province, with:

i. **Weaker per capita growth,** because of high levels of population growth;
ii. **Highly capital and skills intensive activities,** at about US$109 100 / job, with limited local long term employment, especially after construction phases (World Bank 2010b).
iii. **Investments concentrated in few districts,** with 86% of total authorized investment in Moatize and 11% in Tete city, new job creation mainly in Tete City, Moatize and Angonia (World Bank 2010b; DPT Tete, 2013), growing disparities in income and some loss of land and markets from land acquisition for mines (*Table 3.4b;* Kabemba 2012).

iv. **Limited new investment in processing** to improve value added and employment.

v. **The largest share of employment in small scale agriculture and fishing** (86%) with a much lower GDP share (19%), in part due to low-levels of technology and dependency on climatic and environmental factors (*Table 3.4a*, MPD 2013; MICOA 2012).

vi. **Weak links between small scale agriculture and the new mining, transport and power projects.** Small scale producers in the province produce food crops (maize, beans, sorghum, groundnuts, wheat, potatoes, vegetables in Angónia, Tsangano, Maravia, Mutarara and Moatize) and cash crops (tobacco, cotton and paprika in Macanga and Angonia) and engage in animal husbandry (pigs, cattle and goats) and in small scale fishing in Cahora Bassa, Zumbo, Magoe, Mutarara. Food security and nutrition is further discussed in *Section 3.7.* While farmers in Angonia and Tsangano sell in Malawian markets and sardines are exported, in general poor roads, underdeveloped agricultural markets, lack of storage facilities and processing units weaken returns from farming and fishing (MPD 2013; World Bank 2010b). The mining companies represent a significant potential consumer of reliable and high quantity supplies of food. However much of this food is imported from South Africa and company canteen menus do not reflect local food preferences (Mosca and Selemane 2011; Coughlin et al. 2013). There has been some, but slow increase in local procurement, discussed further below, with mining companies attributing the slow pace to skills and quality deficits in local suppliers (Besharati 2012).

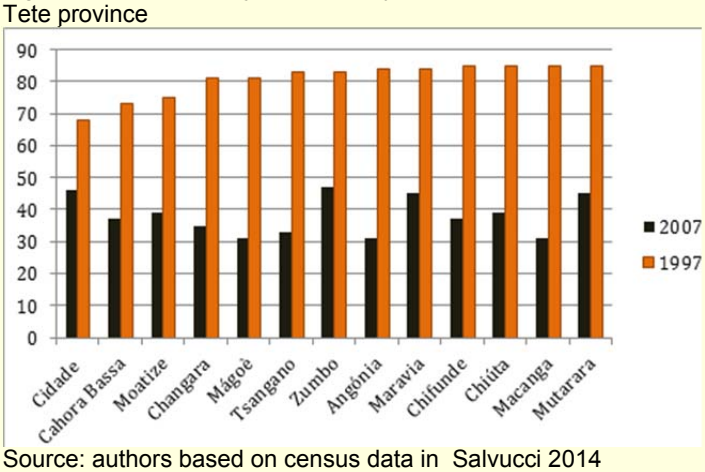
vii. **A low fiscal (tax) contribution from large companies**. While Mozambique's share of taxes to GDP is above average for a low income country (*Table 3.4a*), the mineral sector makes a low fiscal contribution. There is mounting opinion that tax benefits for large projects are too generous and that capital flight needs to be better monitored. Loopholes in tax collections from sales of shares outside the country have been closed and capital gains taxes on large projects increased, with US$400mn collected in 2013 (Aaboe and Kring 2013; UNDP 2013). However, revenue will also need to grow from taxes on profits as outputs grow. While the list of taxes on mining activities is relatively long, the list of exemptions is even longer. Mozambique publishes tax payments made by companies in the extractive sector in compliance with its Extractive Industries Transparency Initiative (EITI) obligations. This evidence suggests that removing exemptions in mining would raise tax revenues as a share of profits from 5% to 30% (World Bank 2014a). With tax collected centrally, beyond issues of fiscal contribution, transparency and efficiency of collection, any provincial benefit would depend on how public spending is *prioritised and distributed*, given the low relative share of social budget allocations to Tete, discussed in later sections (World Bank 2014b)**.**

Poverty and inequality:

In addition to the unequal distribution of growth across districts, there are also social inequalities in income. The province has a lower share of people living below the poverty line than national levels and is closer to achieving the MDG target of 40% below the poverty line by 2015 (GoM et al. 2010; *Table 3.4b).* However poverty is still high. The incidence and intensity of poverty as measured in the Multidimensional Poverty Index (which captures a wider range of dimensions of poverty) is higher (at 0.466) than the national average (0.389) and the province has a higher and faster rising income inequality post 2008 than for the country as a whole (*See Table 3.4a,b*).

There are persistent socio-economic differentials between women and men and poor and rich. Poor households have traditionally been found in rural, farmer and female-headed households and in households with less formal education (Wingqvist 2011), associated with low farm productivity and recurrent weather shocks. While all districts have shown a relatively large reduction in poverty in between 1997 and 2007, those with lower poverty levels in 1997 (Tete city, Cahora Bassa and Moatize) did not have the largest decline, and their calorie adjusted poverty rates are now higher than most districts that were worse off in 1997 (See *Figure 3.4c*).

Figure 3.4c. Calorie adjusted poverty rates 1997, 2007 districts in Tete province



Source: authors based on census data in Salvucci 2014

This is important as it suggests that economic growth is not adequately translating into poverty reduction in these districts. One reason may be rising costs of food, fuel, housing, transport and other needs. People who are resettled or those moving from food to cash crop production face new and rising costs of food. There is also gender discrimination in women's lower access to employment, incomes, productive resources and lower involvement in decision making structures (Sepulveda 2014; ADB 2011; RoM 2010). Employment is segmented by education, and while there have been improvements in both access and the quality of education, discussed later, poorer education is a barrier to employment and income opportunities (Fox and Sohnesen 2013). This appears to have an intergenerational spillover. While one in five children aged 5-11 years old are involved in some form of child work in Mozambique, twice as many children of mothers with no schooling do child work compared to those whose mothers have at least secondary education (INE and UNICEF 2009).

A slower pace of poverty reduction in the face of robust economic growth has been identified as a defining development challenge in Mozambique (World Bank 2014c). The current Government Five-Year Plan (GFYP) (2010-2014) states the intention to ensure fairer growth and human development. Government joined the EITI in 2009 to promote transparency in the extractive sector and is, as noted earlier, reviewing its tax policies and contracts with investors to improve their returns to the domestic economy, including by increasing local share ownership (Besharati 2012, *Appendix 8.3)*. Legal reforms oblige mining investors to avail 5-20% of their equity to the Mozambican public on market terms. Some tenders, such as a 2014 call for coal prospecting in Marávia, Zumbo and Changara, are reserved for national companies (Macuahub News June 2014a). Other measures for a more sustained and equitable growth include investing in human and physical capital, managing savings in a sovereign wealth fund, introducing local content requirements and improving project evaluation and public finance management capacities and the quality of public spending (Aaboe and Kring 2013; World Bank 2014c).

There is also more focus on inclusive growth in poverty reduction plans. While the 2005-2010 plan to eradicate poverty, Plano de Acção de Redução da Pobreza (PARP) 1, emphasized the role of economic growth and private sector investment, PARP 2011-2014 gives more focus to more *inclusive* growth, promoting employment in agricultural and fisheries; investment in labour-intensive industries and infrastructure public works; credit and services support for small and medium enterprises; linking small and big firms and promoting social services and human development (RoM 2011). The 2009-2014 Tete Provincial Development Plan (shown in *Appendix 8.5*) also proposes a more integrated development. The draft Strategic Development Plan 2012-2021 for Tete Province (PGT 2012-2021) prioritises diversified investments in agriculture, mining, fishing and tourism, improved productivity and value added for smallholders, including through linkages with large projects and development of basic infrastructure. The plan proposes improved human development to both support and benefit from these drivers of growth, including through expanding availability, coverage and quality of provision of health, education, housing, energy, water and sanitation services (GoM Tete 2014).

Some of prioritised developments are already being implemented in the province. A $39 million Innovation and Demonstration Catalytic Fund is investing in upgrading local infrastructure, improved smallholder production, increased agro-processing and smallholder farms links to agribusiness value chains, including with the large mines. A range of agro-processing activities are underway, discussed in *Section 3.7,* with investment in a grain processing plant and agricultural machinery. Mining companies are working with the provincial government, small scale producers and development partners to locally-source food, and companies are supporting reforestation and maize marketing (MPD 2013; see *Appendix 8.3*). These initiatives are supported by information portals and enterprise forums (HCB 2013a, b). Mining companies have invested in vocational training, together with Mozambican institutions like the University of Eduardo Mondlane in Maputo and the Instituto de Geologia e Minas in Moatize, to improve locally available qualified technicians (Aaboe and Kring 2013).

There have been challenges in implementation. State officials indicate that they were unprepared for the rapid expansion of new projects in the province and faced skills gaps to manage effective engagement. The limited incentives and capacities for SMEs still make it cheaper to import than produce many products used in the province and some agro-processing investments have

progressed slowly. Household enterprises are excluded from the policy definition of 'micro-enterprises', despite their role in the economic activity of poorer and less formally educated communities (Fox and Sohnesen, 2013; KI interviews).

The rapidly growing economy in Tete from energy, mining and agriculture, business confidence and population perception of an improved economic situation are positive features, as is the fall in poverty. With current growth dependent on extractive industries, highly capital intensive activities, low fiscal contributions, weak investment in local processing and persistent socio-economic inequalities, future wellbeing depends on how far economic activity is diversified and linked to measures to improve value added and address inequality in benefit, as recognised in the draft Strategic Development Plan 2012-2021 for Tete Province, such as by:

a. improving employment and incomes from household and small scale enterprise and investing in SME production, including in technologies and products that support improved health;
b. diversifying and geographically spreading investment and adding value in local economic sectors and markets, including through links to the supply chains of large projects; and
c. improving fiscal contributions to and quality of public spending, to invest in both adult and child education, health and other areas of human development.

Within the range of measures to deliver on the policy intention of more inclusive growth, this report focuses on those that are relevant to the social determinants of health and to the comprehensive primary health care (PHC) agenda. The next sections thus discuss the infrastructures that affect health; food security; and services for education, health and social protection, areas that have been prioritised in 2012-2021 plans (GoM Tete 2014).

3.5 Expanding transport, energy, communications infrastructure

Past investment in infrastructure nationally and in the province has been low, both large scale and at household level. The Africa Infrastructure Country Diagnostics assessment reported in 2011 that Mozambique needed US$1.7 billion to be invested annually in power, transport, water and sanitation over the next decade to catch up with other low and middle income countries, at a time when the annual investment (including external and private funding) was US$0.7 billion (Dominguez-Torres and Briceño-Garmendia 2011).

Investment in infrastructure has, however, grown in the past decade. *Table 3.5a* summarises the infrastructure developments in energy, transport, communications and irrigation in Tete, all of which have the potential to improve health and access to and provision of quality health services (Dominguez-Torres and Bricerio-Garmendia 2011). These developments can also raise health risks, such as from involuntarily resettlement when land is acquired for developments; from exposure to injury, chemicals, dust and noise during construction of infrastructure; or from reduced downstream flow and waste water from irrigation schemes. The larger risk arises, however, when infrastructure is not accessible to local communities or does not support their economic activities.

The intention to improve access to infrastructure is found across numerous policies. The Energy Management Strategy for 2008–12 and the PARPA II both state intentions to provide energy to rural schools, administrative posts and hospitals/clinics, with solar power in the specifications for 6 clinic sites in Tete (in Magoe, Maravia, Moatize, Changara, Angonia and Macanga) (MISAU et al. 2013; Chambal 2010; RoM 2006). Household access is noted to take longer, with biomass and solar alternatives suggested (Chambal 2010). The provincial government plans to extend the existing ICT system in the next 10 years (GoM Tete 2014), and the 2000 ICT Policy seeks to increase public access through community based ICT services, such as community radio stations and multimedia centres (Souter 2010; UNDP et al. 2008; InfoAsAid 2012). Although there has been some pilot use by health services of electronic records for clients with HIV, electronic means are still largely limited to compiling and sending basic reports (DPS Tete personal communication 2014). This is further discussed in *Section 5.*

Table 3.5a Trends, opportunities and challenges in infrastructure development in Tete

Trends	Opportunities	Challenges
Energy • 45% existing installed capacity from hydro-power and further increases planned. Tete has the largest hydropower from Mapanda Nkua, Boroma, Joyce I and Lupata II dams in addition to Cahora Bassa. • Relatively good performance and quality in the sector with lower hidden costs • Specific agency (FUNAE) to support rural access to low cost power, off grid energy and electrification.	• Hydro-power supports economic activity; electrification of all *district capitals* with 84% districts linked to the network. • Energy Development and Access project with Tete city one of 5 urban areas prioritised for network extension/upgrade and customer connections due to high electricity demand. • Ncondezi Energy plans to build a thermal power plant in Moatize. • FUNAE inputs and investment in alternative energy, including solar energy, in rural schools and health centres, and for tele-communications and businesses.	• Limited household access to energy: 35% energy exported. Slow progress in extending the grid to poor/rural house-holds. Projected to electrify 47% of households without access to electricity by 2030. • Reliance on grants, soft loans for off-grid rural electrification. • Cost to rehabilitate ageing plants not covered in current tariffs. Investments delayed in power lines to export energy from Cahora Bassa, Mphanda Nkuwa Dams and Moatize's coal-fired power stations. • Work on Kariba dam wall to prevent downstream flooding.
Transport • Two transport clusters, and new investments reducing cross-border trading costs. • 83% of roads reported to be in good / fair condition in 2007, although may have deteriorated. Fuel levy revenues for road fund doubled to $61mn by 2007. However 80% deficit on costs of maintenance and rehabilitation of existing road network. • Private sector investments rehabilitating Beira-Moatize and Moatize-Nacala lines.	• Support to export markets: A rail corridor built from Moatize to Nacala via Malawi for coal export from Tete. • Potential to address a more effective spending balance between investment and maintenance the road fund and private investment, and for giving local residents improved transport options. • Extension of rail lines (Moatize to Beira and to Nacala) raise the potential for increased access to markets for and revenue to producers in the province.	• Defining regional agreements and building regional infrastructure with Malawi. • High dependence on private or external funding for road maintenance. • Poor quality of rural roads (40% in poor condition) and west-east corridors needing high sustained investment. • Mine production significantly outweighs current transport capacities, and inadequate transport investments adversely affecting investment and economic activity.
Irrigation • Low cultivated area equipped for irrigation and lack of irrigation systems. • 95% current irrigation through family / small scale schemes sector.	• Potential to improve farm returns by extending irrigated area by a further 502 184 hectares of land requiring US $459 mn investment. • Potential for increase in small-scale irrigation. Mining area has is irrigation potential.	• Low possibility of extending areas through large scale schemes • Vulnerability to water shortages also require improved measures for food production and storage.
Communications • Accessible fast internet due to connection to the submarine cable. • Liberalization of the mobile market with coverage expanding from 14% in 2000 to over 80% in 2008	• There are now three mobile operators raising opportunities for reducing costs and mobile internet services providers. • Two fibre optic submarine cables should add internet capacity and reduce prices. Further gains and price reductions from connections with neighbouring countries.	• Internet still unaffordable for much of the domestic market, and development slowed by high cost of satellite connections. • Gap in licensing of additional fixed-line operators inhibiting private sector investment in ICT sector.

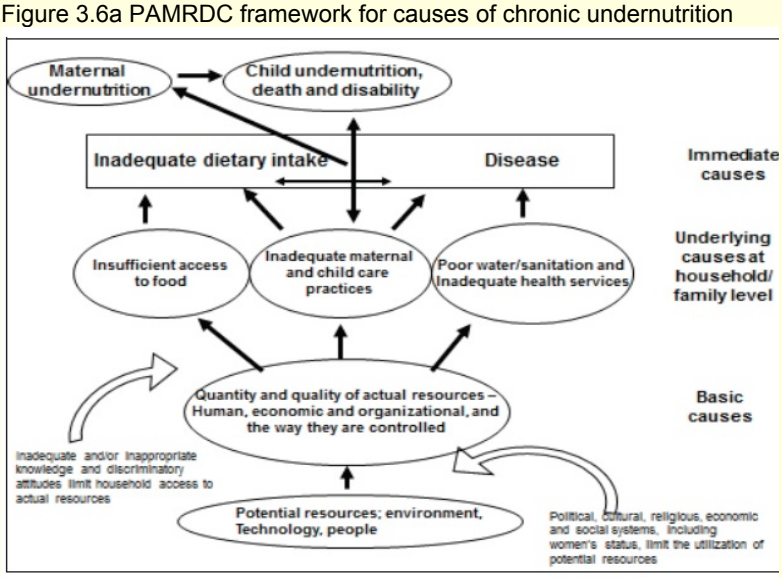
Sources: Dominguez-Torres and Bricerio-Garmendia 2011; Aaboe and Kring 2013; UNDP et al. 2008; MoEnergy 2009; Mahumane et al. 2012; Macauhub News Agency 2014c; ADB 2011; Chambal 2010; Almeida-Santos et al. 2014

Investments in energy, transport and communications in Tete can, if made accessible to social services, SMEs and households, contribute significantly to improved health and healthcare, while their health risks, from involuntarily resettlement, construction hazards and waste water need to be controlled. Improved household water, sanitation, waste management and shelter infrastructures are key SDH and a strategic priority area for the province, particularly given their poorer coverage in the province compared to national averages (See *Table 4.2a*). Section 4.2 further outlines the options to widen household and service access to essential infrastructures and to control health risks from infrastructural developments.

3.6 Determinants of food security and chronic undernutrition

Section 3.2 outlined the relatively high levels of chronic and acute undernutrition in children under 5 years in the province, albeit with falling levels between 2002 to 2011/2 (*Table 3.2a,b*). Tete (and Zambezia) had the highest percent of chronically food insecure households (45%) in 2009, with a further 26% of households acutely food insecure, spending more than 45% of their monthly expenditure on food (WFP 2010; 2014a). While a national nutrition survey was done in 2013, district level data was not available (RoM Ministry of Agriculture 2014). This presents a significant gap in planning responses to food security. Higher levels of child diarrhoea, adult malaria and TB in Cahora Bassa, Magoe and Tete city suggest that there may be cause to look more closely at nutrition in these districts, while the higher calorie adjusted poverty rates in Tete city, Maravia, Mutarara and Zumbo further draw attention to these districts. It would, however, be better to have a nutrition survey that provides district data in the province to guide planning.

Figure 3.6a PAMRDC framework for causes of chronic undernutrition



Source: RoM 2010a:18

Food security - having access to sufficient quality and quantity of food in a socially and culturally acceptable form – is thus a key determinant of improved health in the province. Food insecurity is seasonal, with greatest stress between October and January (the end of the dry and planting season) (RoM 2010a, 2012). *Figure 3.6a* shows the conceptual framework used in the Multisectoral Action Plan for the Reduction of Chronic Undernutrition in Mozambique 2010-2020 (Plano de Acçao Multisectorial para a Redução da Desnutrição Crónica PAMRDC). The plan seeks to reduce chronic undernutrition in children <5 years to 30% by 2015 and to 20% by 2020 (RoM 2010a). It prioritises children under 2 years (due to their risk and the irreversible negative health and social consequences of undernutrition); children <5 years (due to their high levels of illness and mortality and chronic undernutrition); adolescent females and pregnant and lactating women. The framework highlights immediate dietary and disease causes, underlying food access, maternal and child care, water, sanitation and health service factors, and the socio-economic causes underlying these factors. The determinants for Tete are shown in *Table 3.6a* overleaf. The national PAMRDC, implemented through the Technical Secretariat for Food and Nutrition Security (SETSAN), tackles *basic* and *underlying* causes, linking with other strategies such as the Food and Nutrition Security Strategy (ESAN II), the Integrated Plan for the attainment of MDGs 4 and 5 and the National Multi-Sector Strategy for HIV/AIDS (RoM 2010a; Ferrao 2014). Tete focuses on the same priority social groups as the national plan, covering all districts.

Chronic undernutrition is high in Tete province, with major determinants of food insecurity from

a. **Immediate causes,** in inadequate nutrient intake, prevalent infections and early pregnancy.
b. **Underlying causes,** in poor access to / intake of nutritious food; poor care of children and adolescent girls; limited access to health care, and to improved water and sanitation. Other factors discussed elsewhere in this report include harmful alcohol use, poor food storage and processing; land pressures and a loss of biodiversity affecting food variety.
c. **Basic causes,** in low adult literacy, high poverty levels and gender inequalities. Other sections of the report raise further that limited irrigation, rainfall patterns, limited local food processing, insecure employment and child work may also contribute to food insecurity.

A clearer understanding of the distribution of undernutrition and the determinants of food insecurity would be obtained from a survey that provides district level data. Improving food security and nutrition is a key area of work for DPS Tete for the next 5 years, to promote improved breastfeeding and dietary patterns and address disease causes of chronic undernutrition and to provide evidence and input to intersectoral actions on the literacy, gender inequality, food production, storage and processing causes, further discussed in *Section 4.3.*

Table 3.6a: Determinants of food insecurity and interventions for improved food security

Determinants of food insecurity	PAMRDC recommended interventions	Interventions in Tete and gaps (i)
IMMEDIATE DETERMINANTS		
In Mozambique: poor nutrient intake; poor quality diets (diversity, quantity); low household food stocks, unstable production due to natural disasters, poor rainfall); parasitic infections; HIV/AIDS, TB, STIs and other diseases. **In Tete**: Inadequate nutrient intake, consumption of *xima branca*; high rates of infectious diseases (malaria, diarrhoea); early pregnancy.	• Iron and folic supplementation for adolescent girls (10-19 years); Quarterly fortified nutrient supplements to all children between 6-59 months; Vitamin A supplements for post-partum women and children 6-59 mths • Deworming adolescents, pregnant and lactating women; children 11-59 mths; weekly micronutrient supplements for pregnant/ lactating women by APEs (*) and outreach services. • Malaria Intermittent Presumptive Treatment, treated nets in pregnancy • Treatment for women with HIV, STI (*) • Testing home salt for iodisation by APEs for pregnant and lactating women	Basic package - exclusive breastfeeding to 6 months, vitamin A and iron supplements to and deworming of pregnant and postpartum women and children and family planning. 6 mths of food supplements for pregnant women. **Gaps:** Incomplete coverage of deworming and Vitamin A supplements in children and women. Community based interventions on disease causes; addressing preferences for xima
UNDERLYING DETERMINANTS		
In Mozambique: Limited purchasing power (cash, access to markets); food costs; infant and child care practices e.g. exclusive breastfeeding to 6 months, complementary feeding (number, quality of meals); access to health services, water and sanitation **In Tete**: Changing or limited availability of nutritious foods; food safety deficits due to limitations in clean water; and limited food storage. Breastfeeding, hygiene practices, early onset sexual activity; low health literacy. Access deficits in health care, SRH, contraception, water and sanitation services	• Health education and awareness especially for adolescents out of school by APES; on early marriage; pregnancy, iodised salt, toilets, hygiene practices • Counselling and contraceptive methods to adolescents through Health Centres, SAAHs and APEs. • School nutrition education, gardens. • Counselling and contraceptive methods in Health units for control of birth spacing • Control weight gain during pregnancy via antenatal care and counselling • Exclusive breastfeeding in first 6 mths by health centres, APEs, mothers' groups • Compliance with Code of Marketing of Breast-milk substitutes • Improved food processing and storage • Income (cash) transfer to the poorest households with adolescents, children or pregnant and lactating women. • Financial support, subsidies and technical assistance for small animal breeding particularly for adolescent mothers	Farming of orange sweet potatoes and moringa; Repair of water pumps; School gardens; Fish farms; rabbit breeding and grain mills; Community radio; Model mothers groups and cash for work programmes; grain mill projects (*Table 3.7d*). Promotion of exclusive breastfeeding; proposed creation of 70+ small and medium scale fish farms **Gaps:** Engaging community early in planning; awareness of guidelines for rabbit breeding; local purchase of seedlings. Use of local expertise to hand-construct fish dams. Slow roll out and sustainability of school gardens. Funding borehole repairs; Household food storage options
BASIC DETERMINANTS		
In Mozambique: Poverty, Low adult literacy, education Gender inequality; low focus on household enterprises **In Tete**: Low adult literacy, female secondary school enrolment, poverty and gender inequalities; economic change outpacing measures for widening benefit	• Research, and promotion of production of foods with high nutritional value through the agriculture extension system • Increase availability of fortified foods with essential micronutrients in the market (National Committee established and regulations for food fortification) • Increased availability of good quality iodised salt in the market via regulation, and support to producers	Adult literacy, school sponsor-ships, nutrition education; Demonstration Catalytic Fund to improve agro-processing; District Development Fund promoting food production; Agro-Dealer Devt Project strengthening dealer networks. **Gaps:** Only 17% DDF beneficiaries female; Few processing, storage options

Sources: RoM 2010a; RoM MAAS 2014; Roma Tre 2007; Ferrao 2014; INE 2011; DPS Personal Communication 2014; IFDC 2012;. (*) Sexually transmitted infection (i) Activities initiated in Angonia and Tsangano now cover all districts, but not all affected people in those districts. (**) APE= Agentes Polivalentes Elementares DDF= District Development Fund

3.7 Social development, education and social protection

Human Development: Despite improvements since 1990, Mozambique is below the African average for its Human Development Index (HDI) (UNDP 2013, *Tables 3.7a,b*).

Table 3.7a: Most recent social development data Mozambique and Tete, 1996-2013

Indicator	Year	Mozambique	Tete	% Variance Tete vs. Moz
Human Development Index (i)	2008/9	0.466	0.422	-9
Adult Literacy rate (>15 years)	2011	40.2	23.8	-41
% women 15-24 that are literate	2008	47.2	25.5	-46
Net enrolment in primary education (6-12 yrs)	2011	74	64	-14
Net attendance ratio among children 6- 12 yrs	2008/9	81	69	-15
Primary school completion rate	2008/9	15.3	5.3	-65
% children 13-17 years attending secondary school	2008/9	20.7	12.2	-41
Primary school completion rate Girls	2010/11	4.8	2.8	-42
Primary school completion rate Boys	2010/11	7.8	5.0	-36
Girl: boy ratio in primary school	2008/9	0.89	0.95	+6
Pupils/teacher in primary school EP1	2012	63	62	-2
Pupils/teacher in primary school EP2	2012	33	37	-12

Sources: UNICEF 2013; INE et al 2005; 2013; INE 2004; 2010b; 2012a,b; UNDP et al. 2008; DPEdC 2014; GoM et al. 2010 (i) To allow for comparisons the pre 2012 mode of HDI calculation has been used

Table 3.7b: Time trends in social development indicators Mozambique, Tete, 1996-2012

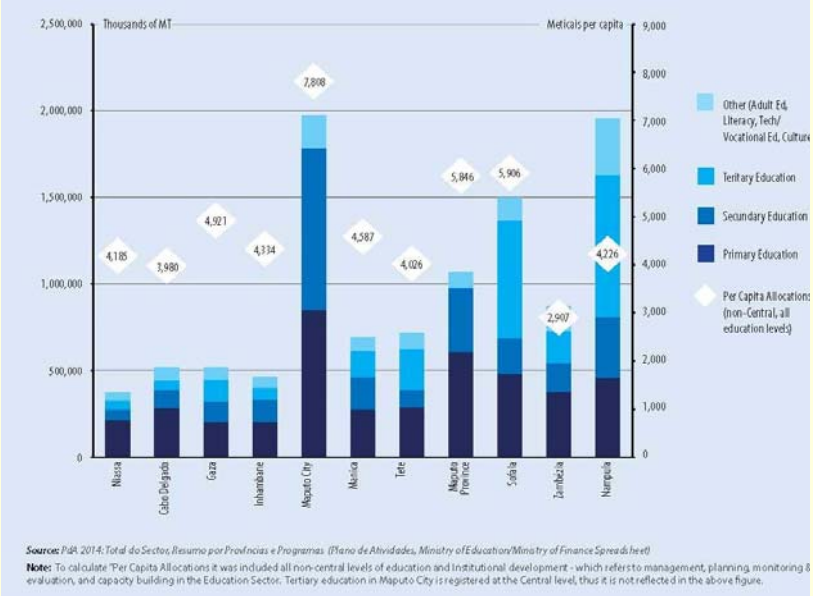
Year	2002/3	2007	2008/9	2011/2012
Human development Index Mozambique (i)	0.282		0.466	
Human development Index Tete	0.284		0.422	
Pupils/teacher in primary school EPI1 Mozambique	58	74		
Pupils/teacher in primary school EPI1 Tete	54	70		
Pupils/teacher in primary school EPI2 Mozambique	40	41		
Pupils/teacher in primary school EPI2 Tete	34	37		

Sources: INE et al 2005; 2013; INE 1999; 2004; 2010b; 2012a,b; UNDP et al. 2008; DPEdC 2014
(i) To allow for comparisons the pre 2012 mode of HDI calculation has been used

Mozambique's lower inequality adjusted HDI at 0.277 in 2013 reflects inequalities in life expectancy, income and education. Gender inequality contributes to this, with a gender inequality index (based on maternal mortality, adolescent fertility, parliament seats held by women, female access to secondary education and employment) at 0.657 and Mozambique ranking third last of 149 countries (UNDP 2014). In 2008/9, Tete had a lower HDI and a slower rate of improvement in its HDI than for Mozambique as a whole (*Tables 3.7a, b*).

Education: Adult literacy in Mozambique is relatively low but improving. It is, however, significantly lower in Tete province, where literacy rates ranged from 46% in Cahora Bassa to 16% in Zumbo in 2005 (MISAU and TARSC 2010, *Table 3.7a*; *Table 8.1*). Demand for education is high but public resources allocated to the sector at 5% GDP in 2006 were below the developing country average. Tete has lower enrolment and attendance in primary school and extremely low rates of primary school completion of 5%, even lower for girls at 2.8% (*Table 3.7b*). Despite it being one of the provinces with poorest MDG education outcomes, together with

Figure 3.7a: Per capita education budget allocations by province 2014



Source: FDC et al 2014a:10

Nampula and Cabo Delgado, Tete was allocated the lower per capita budget shares in the country (*Figure 3.7a*). This signals a need for improved equity in distributing the education budget (FDC et al. 2014a). The same is found later for health, despite these being key sectors for ensuring wider social gain from economic growth in the province. It would be useful at national level to carry out a gap analysis for capital spending and to integrate deficits in achievement of key education outcomes (adult literacy, primary and secondary completion and gender equity) in recurrent resource allocation (FDC et al. 2014a). Further, as central budgets have shifted from provincial to district level after 2007, with the direct shares to districts increasing from 8% to 45%, greater attention also needs to be given to both gap analysis and equity in resource allocation from the central to the district level (MoEd 2012, FDC et al. 2014a).

Education indicators in the province are poorer than for the rest of the country. The teacher availability for both EP1 and EP2 schools, while improved since 2002/3, are not significantly different between Mozambique and Tete, so this on its own does not account for the large differences in enrolment and completion. There was no documentation of factors affecting the disparities between Mozambique and Tete and this merits further investigation. A number of factors have been more generally identified as limiting completion, including teacher availability and cost barriers (particularly for secondary education, which is not free) (MoEd 2012). The low overall funding may have weakened the quality of education. Within Tete, primary school availability and teacher density is highest in Zumbo and Chiuta and lowest in Tete city and Mutarara. Gender parity in education was greater in Maravia and Zumbo and lower in Mutarara (See *Table 8.4*).

The population influx to the province is raising pressure on the education system. Some mining companies (Vale, Rio Tinto) have played a part in addressing new demand and the displacement due to land acquisition, by building new primary and secondary schools (HRW 2013). For its part, the strategic plan for the sector proposes to address skills shortfalls through professional and vocational training, including to build the labour force skills for key sectors, such as mining and energy (ADB 2011; MoEd 2012). This is further discussed in *Section 4.5*.

With education a significant SDH - 'a social vaccine'- poorer outcomes and gender inequality in education is a significant constraint to improved health in the province, limiting the coverage of health literacy and health promotion and school health interventions such as school gardens, vaccination, de-worming and micronutrient supplements, and the benefits from improved water and sanitation at schools (MoEd 2012; Ferrao 2014). Improved equity in central budget allocations for education (through gap analysis and allocations supporting outcomes) could support the proposals in the Strategic Plan for Education and Culture 2006-2010/11 to improve adult literacy and enrolment and retention of pupils, especially girls (MoEd 2012). KIs argued further for strengthened collaboration between the health and education sectors in Tete in the coming 5 years, to: incorporate gender and health issues in the school curricula; provide SRH counselling, health literacy and services to reduce adolescent pregnancy and early marriages; and to organise separate sex accommodation for adolescent females boarding at secondary schools (KI Tete Directorate Education and Culture 2014). The demographic and health data in *Sections 3.1* and *3.2* confirms the relevance of these measures for improving health.

Social protection: The inequalities inherent in Tete's dual economy imply very different levels of social and income security, as indicated in prior sections (Mosca and Selemane 2011; Aaboe and Kring 2013). Tete has a slightly lower share of female headed households and a lower share of vulnerable children than in Mozambique (*Table 3.1a*), although Changara, Chiuta and Maravia had a higher share of female headed households (*Table 8.1).* Older people, people with disabilities and chronically ill people; orphans and vulnerable children; people who are food insecure, malnourished and seasonally vulnerable, women in female headed households and in rural areas and people living with HIV are all identified as in need of some form of social protection (RoM 2012; ADB 2011; World Bank 2012).

The right to social security is guaranteed to all Mozambicans under Article 95 of the National Constitution and Law No 5/89. Since 2007 the Government has sought to establish, including by law, a structured social protection system (the ENSSB) involving different sectors and providing basic; mandatory and complementary social security. It is based on principles of alleviating absolute poverty, guaranteeing subsistence of workers when they are unable or have limited ability to work,

surviving family members in the event of death, all within the constraints of available resources (RoM 2012). The measures include:

- Direct social assistance, though cash transfers for poor people and those who are unable to work, including an unconditional cash transfer program and food subsidy programme, managed by Ministry for Women and Social Action (MMAS);
- Education Social Action, including school feeding to encourage attendance;
- Health Social Action to promote access to basic health care for vulnerable groups; and
- Productive Social Action to improve access to work opportunities through public works and social funds with government agencies able to support employment, such as planning and development, public works, agriculture and labour (RoM 2012; World Bank 2012).

Appendix 8.7 outlines the various direct social assistance programmes and their constraints. A cash transfer programme (Programa de Subsídio Social Básico, PSSB) has expanded rapidly to target extremely poor households in which no adult is able to work. It does not, however, cover all those in need, the eligibility criteria are not uniform across districts and there is a lack of awareness about the procedures that prevents eligible beneficiaries, such as people with disabilities, from accessing payments. Health professionals who are responsible for certifying the clinical status of persons with disabilities are reported to not communicate effectively with National Institute for Social Action (INAS) and the scheme weakly covers chronically ill people and vulnerable children (Sepulveda 2014). While the organisation of social security and co-operation across sectors and institutions sets a basis for progressive expansion, the range of schemes and entitlements may be confusing for disadvantaged people or those with low literacy (Sepulveda 2014). The 2008 MICS survey found, for example, that 22% of households with orphans or vulnerable children received some formal support for child care, to support access to education, as material or monetary support and medical assistance. However only 20% of children in the *poorest* quintile received this support, compared to 27% and 17% per cent in the fourth and fifth (wealthier) quintiles (INE and UNICEF 2009).

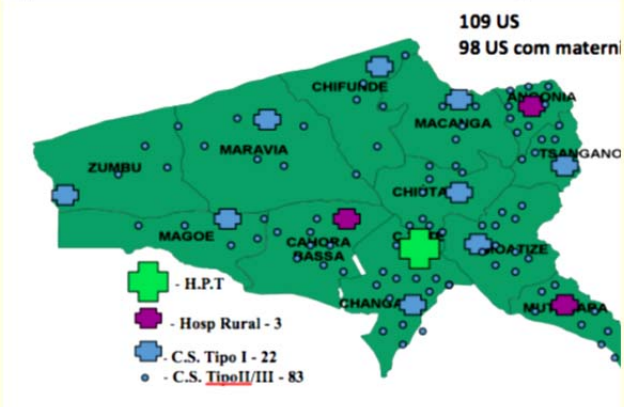
The evidence suggests a need to harmonise and simplify social protection programmes and eligibility criteria to support access, to ensure free access by disadvantaged people to education and health services within social protection approaches, including food and treatment for malnourished people with HIV or TB (RoM 2012). Health workers in services and at community level play a role identifying and referring vulnerable people, raising the need for social mapping, registration of children and of vulnerable households and individuals (as raised in *Section 3.1)* and effective referral by health workers of eligible people to other services.

3.8 Health service resources, coverage and distribution

Health services play a necessary, but not sufficient, role in addressing these SDH and in improving health equity. The determinants of social inequities in health largely lie outside the health system, but inadequate access to health services can deepen social inequalities in health, and health systems play a key role in population health. The Mozambique Constitution recognises a right of access to health services that protect and help people maintain their health, that prevent them from becoming ill and that ameliorate their suffering when they do become sick (RoM 1990: Article 116). Health systems contribute to increasing life expectancy and reducing inequities in health, particularly through preventive services and health promotion, by improving access for lower socio-economic groups and by ensuring that the services provided are needed, acceptable and affordable for marginalised groups (Loewenson and Whitehead 2012).

The public sector National Health Service [Serviço Nacional de Saúde-SNS] is the most comprehensive health service provider in Mozambique and in Tete, both geographically and technically, with a smaller private for-profit, not-for-profit and traditional medicine (PMT) sector (MISAU 2014). Tete has a tenfold lower clinic and hospital density per 1 000 people than the national average, and its population density per facility has grown between 2008 and 2011 (*Table 3.8a*).

Figure 3.8a. Distribution of health services, Tete province



Source: MHI 2013

Table 3.8a: Most recent health systems data Mozambique and Tete, 1996-2013

Indicator	Year	Mozambique	Tete	% Variance Tete vs Moz
Clinic (Level 1) facilities/ 1000 population	2012	1 377	103	
Hospital (Level 2) facilities / 1000 population	2012	42	3	
Inhabitants / facility	2013	16 862	21 704	+29
Beds / 1 000 inhabitants	2013	1.37	0.66	-52
% change in inhabitants / unit 2009-2013	2013	9	31	+244
Inhabitants / technical personnel	2013	1 341	1 453	+8
Physicians / 100 000 *	2012	2.6	0.03	
Nurses / 100 000	2012	na	0.17	
Utilisation per person	2013	3.32	2.49	-25
Consultations per person	2013	1.24	0.87	-29
% people who consulted a health post	2013	28.1	14.7	-48
% people who consulted a health centre	2013	50.0	70.6	+41
% people who consulted a hospital	2013	12.7	9.0	-29
% people who consulted a private clinic	2013	1.1	0.3	-73
% Children<1 years immunised for TB	2011	91.1	88.7	-4
% Children <1yrs with completed immunisation	2011	64.1	58.0	-10
Pentavalent 1-3 % points fallout (%PV1- %PV3)	2010/11	15.1	9.0	-40
% children <5 yrs with fever treated for malaria	2011	29.9	16.8	-44
% children <5 yrs sleeping under a bed net	2011	32.0	29.9	-7
% women with 1 ANC visits (for DHS - births in three years preceding the survey)	2011	90.6	90.1	-1
% women with 4 ANC visits	2008	49.5	na	
% women with delivery by trained health worker	2011	54.3	51.7	-5
% pregnant women counselled and tested for HIV	2008	46	39	-15
Contraceptive use in % women 15-9 yrs in union	2011	11.3	15.1	-35
% unmet need for family planning	2011	28.5	26.4	-35

Sources: DPS Tete 2005; 2013c; INE et al. 2005; 2013; MISAU et al 2010; INE and UNICEF 2009; INE 2003; 2010a; 2011, 2012a; Gaspar et al 1998; UNICEF 2013; MISAU 2014, 2014b; UNFPA 2011; RoM 2010, WHO 2015 * 2008 national level

Table 3.8b: Time trends in health system indicators Mozambique, Tete, 1996-2012

Year	2002/3	2007	2008/9	2011/2012
Clinic (Level 1) facilities/ 1000 population Mozambique			1 260	1 377
Clinic (Level 1) facilities / 1000 population Tete			99	103
% Children<1 years immunised for TB Mozambique	79.4			86.7
% Children<1 years immunised for TB Tete	88.3			88.7
% Children <1yrs with completed immunisation Mozambique	42.8			45.7
% Children <1yrs with completed immunisation Tete	55.0			58.0
% children <5 yrs with fever treated for malaria Mozambique			37	29.9
% children <5 yrs with fever treated for malaria Tete			32	16.8
% children <5 yrs sleeping under a bed net Mozambique			42	38.9
% children <5 yrs sleeping under a bed net Tete			23	35.4
% women with assisted delivery by trained health worker - (for DHS - births in three years preceding survey)				
Mozambique	47.7	55.3		56.1
Tete	46.8			53.4
% unmet need for family planning Mozambique	18.4			28.5
% unmet need for family planning Tete	20.3			26.4
% women 15-49 yrs using modern contraception in Tete (i)	23.0			15.1

Sources: DPS Tete 2005; 2013c; INE et al. 2005; 2013; MISAU et al 2010; INE and UNICEF 2009; INE 2003; 2010a; 2011, 2012a; Gaspar et al 1998; UNICEF 2013; MISAU 2014, 2014b (i) Evidence from a DPS provincial survey in 2014 suggested that the contraceptive prevalence rate had risen to 48.5% in women 15-49 years, as a result of health promotion and improved service delivery, used to limit family size rather than to delay pregnancy (GoM Tete 2014c).

Tete has 22 Type I health centres, 83 Type II/III health facilities and three rural hospitals (MHI 2013; *Figure 3.8a*). Level I offers essential primary care services, (through health centres and health

posts), level II provides the first level of referral care through district hospitals and levels III are provincial hospitals, oriented for more specialized curative care and referrals from levels I and II. Tete hospital is the only tertiary health facility in the province. Angonia and Tsangano have the highest and Magoe and Zumbo the lowest density of people per facility (See *Table 8.6*), and the west (on infrastructure) and northeast (on population density) of the province appear to have poorer infrastructure. Deficits in primary care can lead to overburdened referral services (MISAU 2014).

The ongoing decentralization implies that the public funds assigned by the Ministry of Finance for health are assigned directly to the provincial governments, DPS, provincial hospitals and indirectly through the provincial governments (DPPF) to the district goverments who then assign them to the sectors, including the district services for health, women and social action (Serviços Distritais de Saúde, Mulher e Acção Social SDSMAS). The central level in the health sector is responsible for purchase of medicines and equipment and for some public sector capital investments. The provincial level is responsible for purchasing larger volumes of equipment and materials for districts, for operating costs of DPS itself, of training institutions and of Tete City health services, excluding the provincial hospital. The district level in the health sector is responsible for the operating expenses of their Level I and II services (MISAU 2014). Clinical staffing is set by MISAU centrally, but the budgets for staff are included in the funds allocated by Ministry of Finance to provincial and district levels (MISAU 2014). The budgetary limits for the allocations by DPPF to the district secretariats are set by the provincial government (MISAU 2014), although the specific funding parameters used for this in Tete were not available. Central allocation of the Prosaude (sector wide health fund) was reported to be based on a formula that takes into account the differing needs of the provinces and districts (MISAU 2014). District health services report to the district local government secretariats and to DPS. The decentralisation and allocations through DPPF and local government provide an opportunity for inter-sectoral co-ordination, but also suggest a need for strengthened communication between DPPF, DPS and the SDSMAS's on the criteria and planning for budget allocations and expenditure plans, to align resources to needs and goals and to co-ordinate programmes across the districts in the province.

Coverage is affected by the availability of health workers and medicines and the effectiveness of service delivery. Tete's health sector had a total of 2,464 employees in 2014, with 52 doctors, 381 nurses and 269 mother and child health personnel (DPS Tete 2014e). Physician density improved in all districts after 2005, with at least one physician per district by 2010 (*Table 8.6;* GoM Tete 2014). Despite this, the density of doctors, nursing and maternal and child health personnel in Tete is lower than that suggested in WHO or MISAU standards, except for Tete city, with greatest shortfalls in Tsangano and Macanga, and least deficits in Tete city and Cahora Bassa (*Table 8.6)*. The province would need a further 46 doctors, 175 nurses and 118 maternal and child health personnel to address deficits against MISAU standards. Medicine availability is also below desired levels and varies widely across districts (*Table 8.6)*. Availability of medicines for management of childhood conditions was lowest in Angonia, Changara and Macanga and highest in Chifunde, Chiuta, Mutarara and Tsangano. For emergency obstetric care medicine availability was lowest in Magoe and highest in Maravia. Angonia and Changara had poorer medicine availability overall. More remote districts or those with fewer health workers did not necessarily have poorer availability and would be important to understand the reasons for the wide variations in medicine availability.

The province thus has poorer infrastructure, personnel and medicines availability than national averages, with significant variability across districts. At 0.87 health care consultations / inhabitant, uptake of services in the province is well below the national average of 1.24 health care consultations / inhabitant, and utilisation rates are 25% lower than national averages (MISAU 2014b). Tete has a higher proportion of health centre than hospital consultations than for the country, which would have pro-poor benefit if there is effective service provision at primary care. However *Table 3.8a* also shows that Tete has lower coverage than national figures for many key indicators of service performance, across maternal, child health and disease control and slower improvements in TB immunisation coverage and assisted deliveries 2003-11.

There have been areas of progress: There is report of contraceptive prevalence rising to 48.5% coverage in 2014 after its decline 2002 to 2011 (GoM Tete 2014c; *Table 3.8b*). At 90% coverage for one ANC visit, the province is close to the MDG target of 95% coverage. The share of births attended by skilled personnel at 52% based on the 2011 national household survey is still well below the MDG target of 66%, although a 2014 smaller provincial survey in Tete suggest that levels

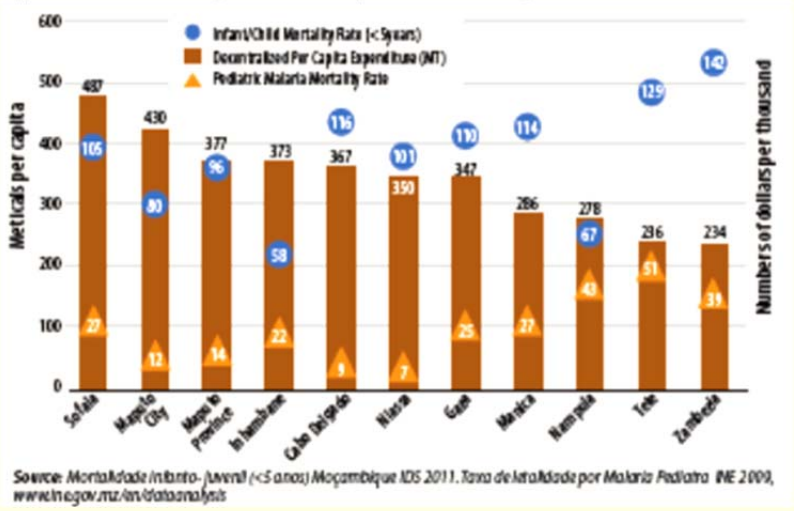
may now be higher (INE et al 2013; GoM Tete 2014c). DPS facility data shows high (80%) coverage of full immunisation in infants and a low (8%) fallout from pentavalent 1 to 3 (*Table 8.6*). Population data suggests a much lower coverage at only 58% full immunisation compared to 64% nationally in 2011 (INE et al 2013). Deliveries and vaccination coverage have improved across all districts 2009-2013, but overall MCH contacts have not (*Figure 3.8b)*.

Figure 3.8b. Change in deliveries, vaccination and maternal and child health (MCH) contacts, Tete 2009-2013

Source: MISAU 2014b
Key: green represents improvement and dark green improvement of above 50%. Red represents a decline

Health services can protect against the impoverishing costs of ill health. While vulnerable groups such as pregnant women, children and older people are exempt from paying for medications, there is some report that exemptions in Mozambique are not always applied (Sepulveda 2014). This would need to be monitored in Tete as exemptions are often poorly applied when services are underfunded (EQUINET SC 2012). Prevention services protect against the costs of ill health, with a positive sign in the more rapid rise in children sleeping under a bed net between 2008 and 2011 than national levels and the associated reductions in malaria, raised in *Section 3.2* (*Table 3.8a).* Prevention interventions not only address SDH, but they can also reduce pressure on curative services, important in a resource constrained environment. Between 2009 and 2013, both preventive and curative services in the province increased (by 25% and 34% respectively), albeit with a greater increase in curative care (MISAU 2014b).

Figure 3.8c. Provincial health budget allocations vs. child health indicators 2014



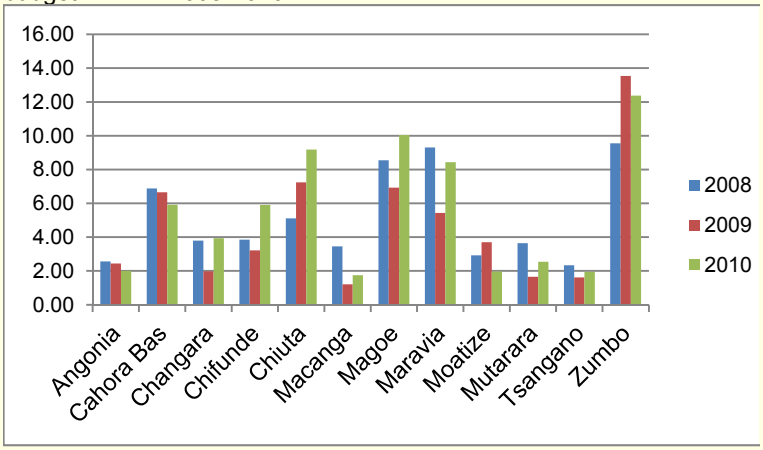
Source: Mortalidade infanto- juvenil (<5 anos) Moçambique IDS 2011. Taxa de letalidade por Malaria Pediatra INE 2009, www.ine.gov.mz/en/dataanalysis

Source: FDC et al. 2014c

For both prevention and curative services, improved equity depends on progressively distributing resources to and within the province in relation to health need and workloads, accompanied by measures to absorb and use the resources effectively. While an analysis of gaps against service norms and of resource allocation was beyond the scope of this study, there is some indication of inequities in the distribution of resources in relation to health need, both *to* the province and *within* the province. A 2014 budget brief highlights that Tete province (with Zambesia) had higher health need in relation to infant mortality, paediatric malaria mortality and child undernutrition, but also with Zambesia has the *lowes*t per capita health budget allocation in Mozambique in 2014 (FDC et al 2014c; *Figure 3.8c*).

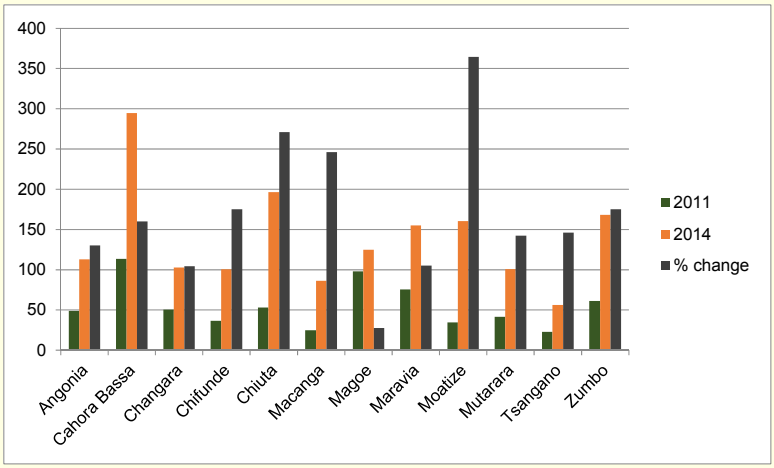
In 2010 to 2014, the provinces received a decreasing share of resources, and the shares to districts and central level rose, associated with a wide variation in per capita shares across the provinces (FDC 2014b,c;*Table 8.6)*. Equity analysis in services thus increasingly needs to be done at district level, and to take account of *within* district inequalities. In terms of budget allocations, the per capita operating budgets for 2008-2010 and 2011-2014 for the districts are shown in *Figures 3.8d and e*. In 2011 those districts with lowest per capita budgets were Chifunde, Macanga and Tsangano. By 2014, using data provided by DPS Tete, the greatest rise in operating budgets were in Chifunde, Chiuta, Macanga and Moatize (*Figure 3.8e*). Changara, Chifunde, Macanga, Mutarara and Tsangano had the lowest per capita operating budgets by 2014.

Figure 3.8d. Per capita district health and social action operating budget in MZM 2008-2010



Source: Authors from DPS Tete 2014f

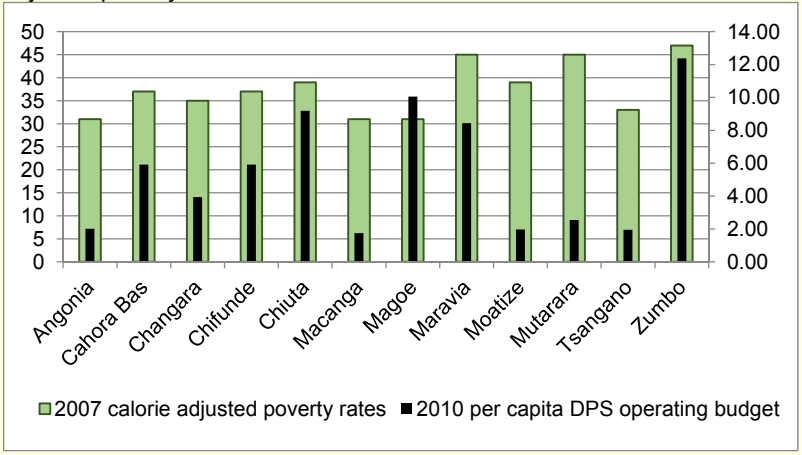
Figure 3.8e. Per capita district health and social action operating budget MZM2011-2014



Source: Authors from DPS Tete 2014g.

Relating budgets to poverty levels as an indicator of health need, districts with high poverty and low per capita budget allocations are Angonia, Changara, Macanga, Moatize, Mutarara and Tsangano (*Figure 3.8f*). Using a 2014 provincial sample survey of 1 023 households, Angonia, Chifunde, Macanga, Moatize, Mutarara, and Tsangano, were reported by DPS to have less health service resources in terms of facility and health worker densities andoutreach clinics, and lower coverage of selected maternal and child health services) (GoM Tete 2014c).

Figure 3.8f. Per capita DPS operating budget US$ 2010 vs. calorie adjusted poverty levels



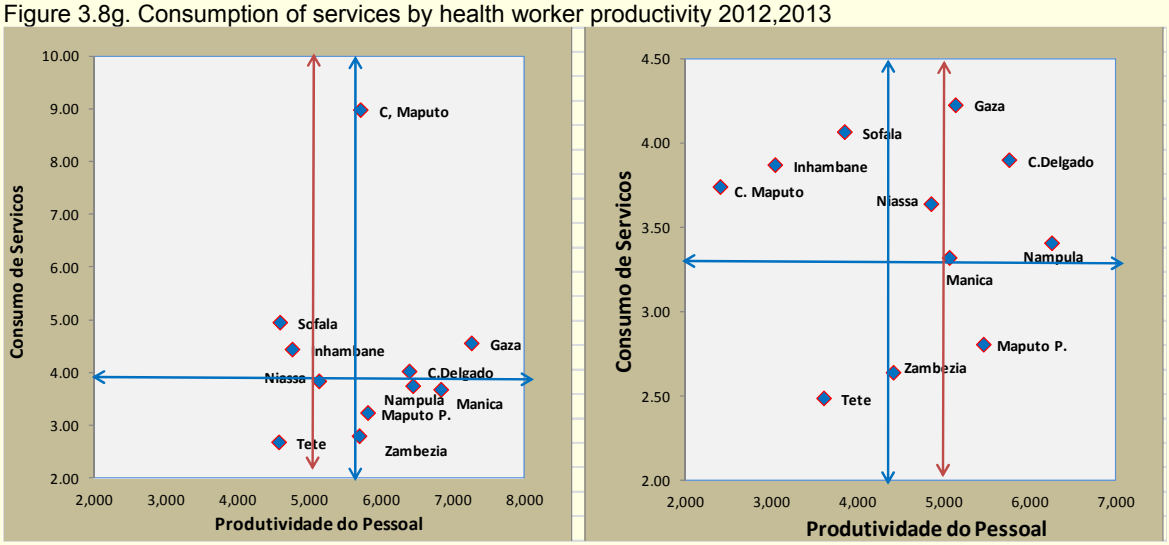
Source: Authors from DPS Tete 2014f, UNDP et al. 2008;

Taking the three sets of data into account it would appear that greater inequities are found in health needs vs resources in Angonia, Changara, Chifunde, Macanga, Moatize, Mutarara and Tsangano, although the operating budget in Moatize has improved in recent years. This suggests that the growth in economic activity in this district may have levered significantly increased support for health services from the public health sector. The funding for the strategic priorities is further discussed in *Sections 4.4 and 5.1.* There is some indication that inequities in resource distribution are affecting health care outcomes. Changara, Macanga, Maravia have lower coverage rates than other districts on several indicators (*Table 8.6).* Better resourced districts (Magoe, Tete city, Cahora Bassa, Chiuta) do generally appear to have improved coverage on key services. The evidence suggests the need to analyse gaps in service standards as an input to resource allocation. However, there is no automatic direct relationship. Angonia with lower *densities*

of services (more people/facility) and lower budgets has improved health coverage outcomes. This suggests that other factors play a role in service outcomes. Improved service coverage is also not directly associated with improved health *status* outcomes, with outcomes poorer in better resourced Cahora Bassa and Tete city than in less well-resourced Angonia and Tsangano.

Beyond resource allocation, the effective management and use of resources and the early uptake of services also affects coverage rates. Tete had lower levels of health worker productivity and service uptake than other provinces in 2012/3 (*Figure 3.8g)*. The constraint in personnel and commodities may be affecting worker productivity, as well as uptake and quality of care. There is evidence of late uptake of services and 91% of people in household surveys said they were not satisfied with their health service experience (compared to 72% nationally) mainly due to long waiting times (INE 2011). Beyond quantitative facility coverage levels, there is thus a need to assess quality of care. For example, a 2013 DPS Tete survey found that while Changara theoretically had the highest bed net coverage in the province, many were in poor condition (Tete DPS communication 2014).

Figure 3.8g. Consumption of services by health worker productivity 2012,2013



Source: MISAU 2014b

Lack of transport, long distances to health centres, out of pocket costs, perceived poor quality of infrastructure and care and fragmented care were noted to discourage women's uptake of maternal health services in Mozambique. So too did low levels of knowledge of services and gender inequalities, with many women needing to get partner or family permission to use SRH services (Sepulveda 2014; Geelhoed et al. 2013a,b; Agha 2012, GoM Tete 2014d). While Mozambican law provides for gender equality in many areas, customary law and social norms and lack of awareness of legal rights means that de facto such laws may be weakly implemented (Sepulveda 2014). Social and cultural perceptions, including by male partners and mother-in-laws, can mean that even well publicised practices such as exclusive breastfeeding are not practised (Arts et al. 2010). Such barriers have not been comprehensively surveyed in Tete, but factors described in other sections (low literacy, poverty, poor household transport and income insecurity) suggest similar social barriers to uptake in Tete.

This section highlights that the province faces shortfalls in personnel, particularly in Tsangano and Macanga, significant variations across districts in medicine availability, and a level of service uptake that is well below the national average. A reliance on health centres and gains in contraceptive prevalence, ANC attendance, deliveries and vaccination coverage indicate the possibilities for producing similar gains in poorer performing areas by investing in primary care and in the continuity of prevention services. In part this depends on improved resource allocation from central level, and in part improved distribution of resources to districts in line with capital gaps and health need (such as to Angonia, Changara, Chifunde, Macanga, Moatize, Mutarara and Tsangano). It also depends on improving health worker productivity and barriers to uptake, such as costs and shortage of transport, perceived poor quality of care, low knowledge of services and low female autonomy in acting on health. The PESS 2014-19 strategies are relevant for many of these challenges, with the specific options for Tete discussed in *Section 4.4.*

The PESS 2014-2019 aims to provide more and better health services, especially at primary care level, to give attention to community health and CHWs, particularly the Primary Polyvalent Workers (Agentes Polivalentes Elementares (APE), and to address priority health problems raised earlier. It aims to improve equity in availability of health facilities, qualified health workers and medicines, and to enhance community involvement in health (MISAU 2014). A first phase seeks to accelerate progress to meet commitments, especially in maternal mortality, neonatal malnutrition, malaria, HIV and TB. A second phase seeks to implement a holistic decentralization to strengthen the health system, to sustain or generate gains in health equity and address NCDs and their determinants, supported by institutional mechanisms for intersectoral collaboration, including with civil society (MISAU 2014). *Section 4.4* discusses the options for Tete within the PESS 2014-2019 to address the inequities between needs and resources raised in this section, to accelerate progress in current health commitments and for the health sector role in addressing the SDH raised in other sections.

The large companies have a role in this. Cahora Bassa, a district with significant new power projects, has poorer health status outcomes than districts with less investment; Moatize, where the mines are concentrated has lower health service resources and coverage outcomes, while Tete City, a richer area and focus of economic activity also has poor health status outcomes. At minimum the service needs of workers and resettled people need to be addressed (HRW 2013). This and other roles for the large projects in health care are discussed in *Sections 4.4 and 4.5.*

3.9 Projections for key determinants

Table 3.9a indicates the gap in current levels of many SDH and health care coverage in Tete and MDG targets. Closing the gap to meet these targets continues to be relevant in the next 5 years. The data and trends in the prior sections also indicate likely trends in the next five years for some of the key health determinants. Broad projections are outlined in *Table 3.9b* below, with an indication of how likely the projection is, and the implications for the health sector. Where there is an official projection, this is shown. For other areas the projections are qualitatively estimated by the authors, given the limitations in data quality and consistency of evidence. These projections are largely intended to focus attention on areas that are more likely, that have more significant implications for health and for which action is feasible, to inform priorities discussed in *Section 4*.

Table 3.9a: Tete and Mozambique Health system indicators Tete districts, 2005-2013

Indicator	MDG target	Year	Tete	Mozambique	Tete gap
Percent below the poverty line	40	2008	54.7	42.0	+14.7
% children <5 yrs underweight	17	2011	17.0	14.9	0
Primary school completion rate	100	2011	5.3	15.3	+94.7
Ratio of girls to boys in EPI 1	1:1	2008	0.95	0.89	+0.05
U5MR	108	2011	129	97	+21
IMR	67	2011	86	64	+19
% 1 yr olds vaccinated against measles	95	2011	75.8	81.5	+19.2
Maternal mortality rate	250	2011	271 (*)	490	+21 (*)
% deliveries by skilled health worker	66	2011	51.7	54.3	+14.3
Adult HIV prevalence	Na	2011	7.0	11.1	Na
% access to improved water source	70	2011	43.5	51.0	+26.5
% access to improved sanitation	Rural 50; Urban 80	2011	22.3	26.1	+27.7

Source: ROM 2010, INE et al 2013 NA= not available (*) wide variance so level not reliable

Table 3.9b: Five year estimated projections for key health determinants

5 year projection	Likelihood	Health sector implications
Population		
National census projection of 30.55 mn people by 2020 implies a 2020 Tete population of 3 mn, more if higher growth rates, with more older people and a still high child share. At current trends 2015 MDG targets / 1 000 for IMR (67) may be achieved by 2016 and for U5MR (106) by 2015, but not for all groups. MMR target may not be achieved.	High, Given demo-graphic trends	Growing pressure on resources, infrastructure and services, raising pressure for environmental health, including in urban planning. Maternal and child health remains relevant but rising demand from NCDs. Socio-economic inequalities may widen differentials in health outcomes.

5 year projection	Likelihood	Health sector implications
Health and nutrition		
Rising pressure on resources, climate shocks, price increases may widen social differentials in undernutrition, together with a small rise in obesity, increased alcohol use. HIV will continue to decline, although transmission may be higher along new transport routes, and in low income women near large projects. Malaria and TB may decline but diarrhoea, respiratory conditions, cholera, typhoid and other environment related conditions may rise. Rising adolescent fertility, STIs, and a 20% increase in NCDs – hypertension, diabetes, COPD, cancers - by 2020. Rising levels of co-morbidity (communicable and non-communicable combined). Rising occupational health, injury, chemical related disease and traffic accidents in selected areas.	Medium Outcomes depend on actions on SDH and service coverage	Increased pressure on health services. Demands to address shocks from natural disasters and epidemics from population movements and environmental risks. Raised demand to address nutrition related disorders, including undernutrition, wasting, obesity and alcohol use. Demand to improve prevention and detection services for family health, epidemic control and to reach social groups most at risk *within* districts to close area and social gaps in service coverage (i). Rising levels of NCDs (ii) and co-morbidity raise the need for person and family focused care and services to detect and manage rising occupational disease and traffic related injury.
Environment, physical and natural resources		
Natural disasters, temperature rises and rainfall extremes may be intensified by climate change and mining emissions. Increased land use for projects reduces biodiversity, and land pressures reduce soil quality. Waste and pollution may increase. A rise in clean energy, but reduced fish population. Water stress is higher in Moatize, Magoe and Changara, Chifunde and Tete city. Increased environmental awareness and returns from ecotourism.	High unless stronger protect-tions within develop-ment activities	Raised demand for health sector to manage natural disasters and environment / climate related diseases and nutrition. Policy (iii), legal and strategic frameworks exist for disaster management, including for climate change to reduce emissions, improve resource management. Trends call for co-ordination to implement strategies between health and environment sectors.
Economic development, employment and incomes		
Rising investment in coal and hydropower, but pace may depend on international economic trends and pace of related infrastructure investments. Possible changes in ownership towards more emergent economies and national ownership. Some (limited) increase in fiscal contributions from profits. Increased wealth and sustained growth in the province but further reduction of poverty and inequality uncertain without efforts to strengthen labour intensive employment, SMEs (*) and other measures for socio-economic inclusion.	Medium Growth, revenue and inclusive-ness depend on global trends; and national measures	Raised demand for health services to provide care for workforces and address health impacts of new developments; to ensure investments support health service access in lower income groups (iv, v); and to work with Mozambican and foreign owners to facilitate dialogue on improved health promotion, prevention and care. Health sector pressures to integrate new companies within public, comprehensive PHC strategies; to identify health risk to engage corporates on interventions.
Large projects may reduce natural resource availability (land, water) for SMEs, increasing inequality, but may also improve production opportunities if links made in markets and value chains. Household and micro-enterprises may widen for lowest income but unlikely to benefit from SME or large projects unless through intermediaries. Employment and income insecurity may generate pressures for harmful occupations, eg. alcohol use, commercial sex. In contrast economic links, rising education, new energy resources, ecotourism may reduce income insecurity.	Medium-low Outcomes depend on measures to widen benefit and opportu-nity	Potentials for improved health or widening inequalities in health depending on labour market and economic policies. Demand on health sector to identify and manage health risks (pesticides, machinery, chemicals) and widen health/OHS promotion and health literacy. Household enterprises may be more vulnerable to poverty, calling for community health and intersectoral co-operation with education, public works, social protection and food processing and storage activities, to support income and health (v, vi, vii, viiii)
Infrastructure – transport, energy, communications		
Expanded transport, communications and power infrastructure likely, but may be constrained by international / national resources, including for maintenance. Increased population pressure on water, waste management and sanitation infrastructures and potential for major deficits unless new domestic and household capital investment resources are applied.	High for large scale; Uncertain household infra-structures	Risk of HIV transmission along transport lines. Opportunities to negotiate for power, communications and roads for health facilities. Demand to integrate PHC in projects, enforce health standards for household infrastructures; and promote clean technologies for energy, water, sanitation, waste recycling (ix, x)
Food security		
Poor quality diets, limited local food markets and processing untreated disease and social practices sustain chronic undernutrition. Natural disasters and price rises raise acute wasting. New trends in imported processed foods raise NCDs. Inequalities in levels and	Medium PAMRDC seeks to reduce <5	Nutrition affects all health outcomes. Demand for health sector to implement nutrition surveillance, growth monitoring and detection of groups in need; to enforce public health standards for living environments and support

5 year projection	Likelihood	Health sector implications
forms of malnutrition widen. Households may shift to wage employment and cash crop production reducing food production and reducing local food security unless markets for local foods strengthened. Implementation of PAMRDC will widen improvements in immediate and underlying food security determinants but gains may be slower in basic determinants.	yr stunting to 20% by 2020.	early uptake of services to reduce disease factors; deworm, promote breastfeeding, use of local foods in supplementary feeding; control of alcohol, fast food use and promote healthy local food markets. Within SETSAN, promotion of household food production, processing, storage and local markets for healthy foods.
Education and social protection		
Literacy, school enrolment, retention and completion and vocational training improvements may be slow unless larger investments made, especially to support access by females, lowest income groups. Increased coverage and use of IT, mobile phones and social media raise new (non state) information channels. Persistent inequality and vulnerability raises the need for social protection but schemes may be underfunded unless higher contribution from economic activities.	High for ICT trends Lower certainty of education, literacy, social protection coverage.	Expanding education coverage and widening ICT, social media raises opportunities for health outreach, health literacy, school health services and adolescent health. Expanding early child education important to support child health. Demand on health sector to integrate health in education; build capacities for community media and health literacy outreach; reach and refer lowest income groups for social protection (xi).
Health systems		
Trends noted above raise demands for expansion of services, widening coverage, new services for prevention and management of NCDs and capacities and mechanisms for intersectoral collaboration. A more active civil society will raise demand for information, access, quality and accountability in care. Projections 2014-19 indicate gaps in personnel, eg generalist and specialist doctors. Resources available to improve levels of public funding and possibilities for improved resources from private actors, although weaknesses in public-private co-ordination may limit private contributions to wider population benefit. Addressing equity will depend largely on district capacities.	Medium certainty on demands. Lower certainty on capacities and resources	Raised demands on the health sector to respond to widening coverage of existing programmes, introduce new measures for NCDs, occupational health, health literacy and integration of health in sectoral policies, in line with PESS 2014-19. Public health sector remains essential for equity and coverage. Health sector responses will depend on capacities within the sector to organise health worker capacities, tap and co-ordinate private contributions to public services, integrate health in other sectors, especially education, environment, infrastructure, food and production (xii)

Sources: Kulima et al. 2013; ADB 2011; IMF 2011; Dutta et al 2014; WHO 2008; Silva-Matos and Beran 2012; ILO Tripartite DWCP Drafting Cttee 2011; MPD 2013; Afrobarometer 2012; UN 2012; UNDP et al. 2008; InfoAsAid 2012; Souter 2010; Wong et al 2005; Coughlin et al 2013; (*) SMEs = Small and medium enterprises (i) RoM MISAU 2007, 2012 (ii) MISAU 2008 (iii) INGC 2013, RoM MICOA 2012b (iv) RoM 2010b (v) RoM 2011 (vi) RoM 2011 (vii) Ministry of Trade and Industry 2007 (viii) MoEd 2012 (ix) Dominguez-Torres and Briceño-Garmendia 2011 (x) ME 2008 (xi) MoEd 2012 (xii) NDHR 2008.

The scenarios described in *Table 3.9b* highlight the mix of trends that will affect health. It is likely that new social capacities, increased literacy and education, raised economic activity and incomes, and a continued decline in HIV, malaria and TB will improve health and survival. However, population growth, in-migration, urbanisation, rising NCDs, commercial food markets and processes and environmental emissions and shocks will raise health risks and demands on the health sector.

Other trends are less certain, but also more amenable to action. The benefit from new economic projects depends on making links between them and local processing, SMEs and household production, in securing investment in social services and in healthy technologies and markets and preventing harmful pollution, hazards, and trade in food and other products.

This raises demand on many sectors, but the health sector specifically has a role to play in providing evidence, such as that provided in this report, and public health authority to promote healthy living, working and community environments and to promote and protect health and nutrition in economic and market activities. In part this depends on ensuring equity in access to and resources for priority PHC, level 1 and 2 health services. It also implies strengthening capacities, programmes and co-ordination with other sectors to address new challenges in public health and NCDs, and to organise community action and corporate contributions on SDH and health care.

These are discussed within five key areas in the final two sections.

4. Areas of focus on SDH and health equity for the strategic plan

4.1 Selecting areas of focus on SDH and health equity

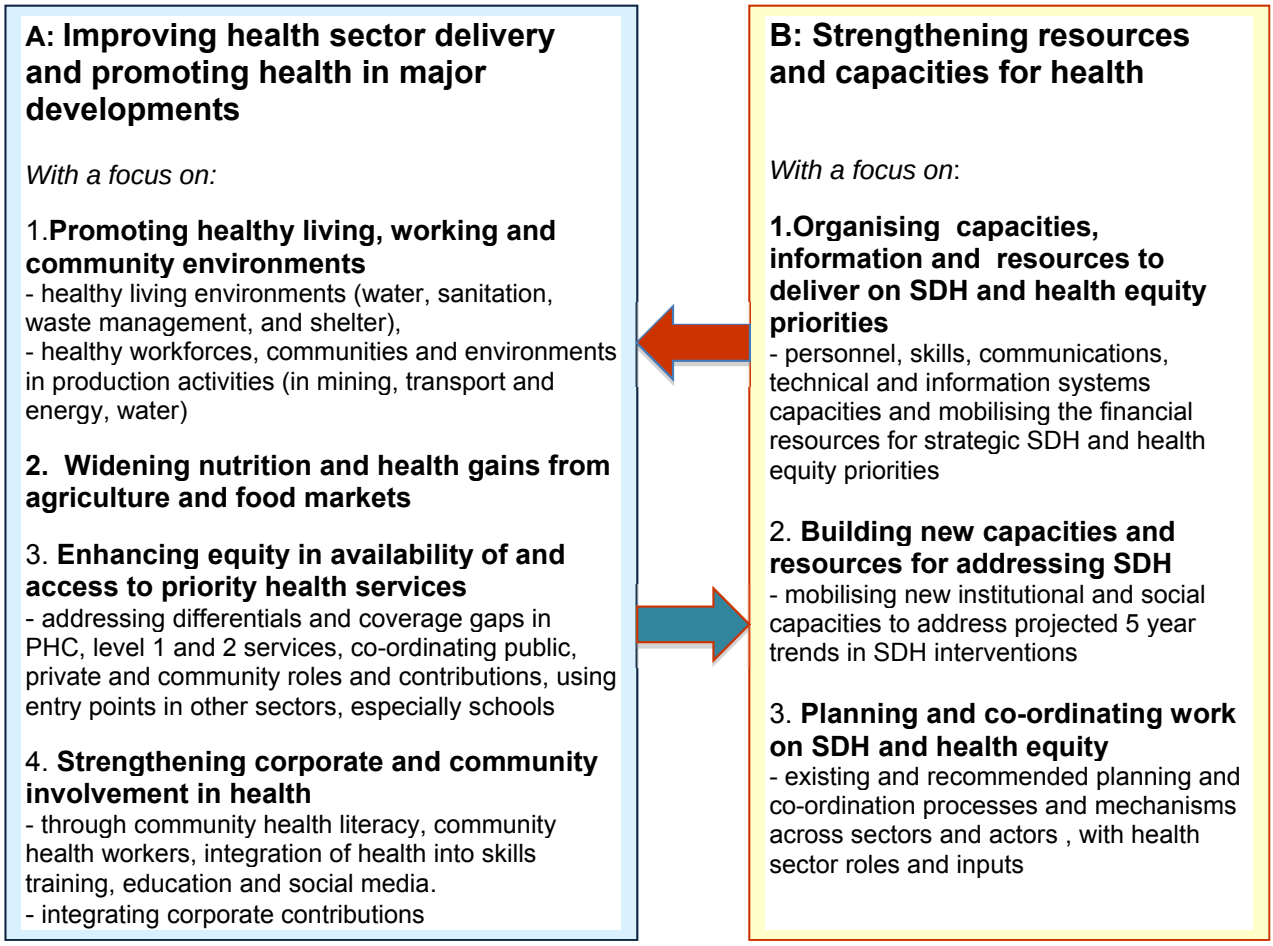
The context for work on SDH and health equity for the province is set by the three major goals and priorities for the PESS 2014-2019), viz: (i) improving health sector delivery to address priority population health needs (ii) promoting health in major development activities in the province and (iii) strengthening resources and capacities for health. In 2012, health stakeholders identified that this calls for public health capacities to

- identify, plan for, monitor, diagnose investigate and provide innovative solutions for preventing and managing health risks in the community;
- set and enforce policies and laws that support public health;
- ensure adequate, effective and quality services and a competent workforce to respond to and evaluate priority public health conditions and for disaster preparedness;
- inform, involve and empower people to act on health and to use services (INS et al. 2012).

The policy and evidence outlined in *Section 3,* the views raised by key informants and the feedback from DPS Tete and Ministry of Health Mozambique, reinforces these areas with a focus on those areas identified as most important for improvement of health *and* as most feasible to implement within the next five year provincial health strategy. These are shown in *Figure 3* and include:

1. Promoting healthy living, working and community environments.
2. Widening and protecting nutrition and health gains from agriculture and food markets.
3. Enhancing equity in availability of and access to priority PHC, level 1 and 2 health services.
4. Strengthening corporate and community involvement and roles in health.
5. Strengthening health sector resources and capacities for delivery on the strategies, including the planning and co-ordination mechanisms and processes across sectors and actors.

Figure 3: Areas of focus on SDH and health for the provincial health strategy



Sections 4 and 5 present the evidence and recommended actions on these areas of focus.

4.2 Healthy living, working and community environments

Many of the disease burdens described in *Section 3.2* call for improvements in living environments, and particularly in water supplies, sanitation, waste management, household energy and housing. The growth in agriculture, mining, hydropower and transport outlined in *Section 3.4* raise the opportunity and need to ensure healthy working conditions and community environments within these developments. These strategic areas are discussed in this section.

4.2.1 Closing the gap in healthy living environments for all

Safe water: Demand for water in the province is projected to increase due to the population growth, urbanisation, economic development, irrigated farming and climate change (*Section 3)*. Expanding access to safe water is thus a strategic public health priority, not only for households but also for schools and health facilities. Tete has lower household access (at 43.5%) to improved water than the national average, and people have to go longer distances to access it.

Table 4.2a: Most recent living environment data Mozambique and Tete, 1996-2013

Indicator	Year	Mozambique	Tete	% Variance Tete vs Moz
% households with improved water source (i)	2011	51.0	43.5	-16
Distance to nearest improved water source (average time in minutes for a return trip)	2011	43	48	+11
% households with improved sanitation (i)	2011	26.1	22.3	-15
% households with brick/ cement and zinc housing	2008/9	18.6	17.2	-9
% households by energy source for cooking				
electricity	2011	0.8	0.4	-50
petrol / gas	2011	0.4	2.6	-35
charcoal	2011	7.8	16	+105
wood	2011	90.1	80	-11
% <30 minutes to improved water	2008/9	87.8	88.1	0
% <30 minutes to food market	2008/9	66.2	48.0	-27
% <30 minutes to public transport	2008/9	66.4	41.0	-38
Household Ownership of a radio	2011	50	55	+10
Household Ownership of a mobile phone	2011	21.4	34.1	+59
% households with access to electricity for lighting	2011	20.0	11.8	-41

Sources: INE et al 2005;,2013; MISAU et al 2010; INE 2010b; 2012a-b; UNICEF 2013; Tarp et al. 2002; INE and UNICEF 2009. (i) tabulations from a baseline survey implemented in 2013 suggest that in Tete by 2013 access to an improved water source may have risen to 59% but that access to sanitation has remained low at 24% (DPS personal communication 2014)

In-migration in the 2000s generated greater pressure on water supplies, with a dip in access to 2008, and a steady rise thereafter (*Figure 4.2a)*. The most rapid improvements in access have been made in Cahora Bassa, Magoe, and Changara, and the slowest in Chifunde, Moatize and Zumbo (*Table 8.5).* Data was not available for Tete city where there are public health concerns. Access to clean drinking water varies significantly by household wealth in Mozambique, with 13% of households in the lowest wealth quintile accessing safe water compared to 85% in the highest (INE and UNICEF 2009). Nearly two thirds (64%) of households in Tete still do not have improved water. In 86% of these households it is women who fetch water for domestic use, while children do this task in 9% of households (INE and UNICEF 2009). Poor access thus raises additional work for women, and may reduce water use and hygiene in the poorest or least labour endowed households, further raising their risk of ill health.

Figure 4.2a Trends in percent households with access to improved water and sanitation, Tete and Mozambique, 2002-2011

Source: authors from Table 4.2b; INE et al 2005; INE 2010a; 2013

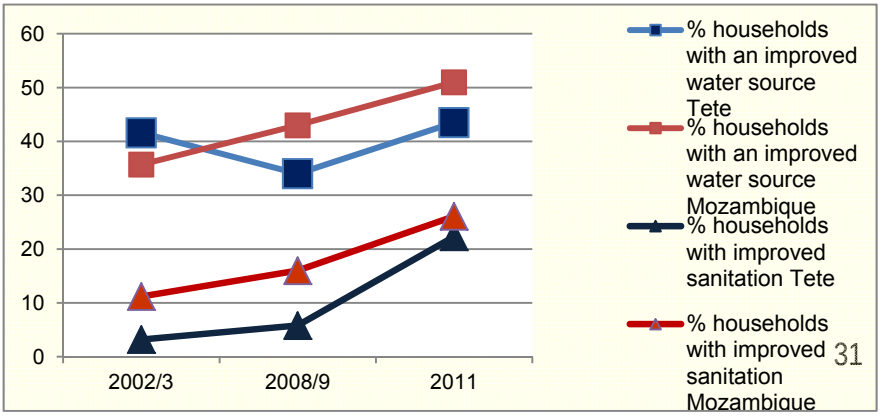


Table 4.2b: Time trends in health system indicators Mozambique, Tete, 1996-2012

Year	2002/3	2007	2008/9	2011/12
% households with improved water source Mozambique	35.7		43	51
% households with improved water source Tete	41.6	33	34	43.5
% households with improved sanitation Mozambique	11.2		16.0	26.1
% households with improved sanitation Tete	3.2		5.8	22.3
% households with brick/ cement and zinc housing Mozambique	15.9		18.6	
% households with brick/ cement and zinc housing Tete	8.8		17.2	
% households <30 minutes from improved water Mozambique	90.4		87.8	
% households <30 minutes from improved water Tete	95.6		88.1	
% households <30 minutes from food markets Mozambique	58.6		66.2	
% households <30 minutes from food markets Tete	42.9		48.0	
% households <30 minutes from public transport Mozambique	53.9		66.4	
% households <30 minutes from public transport Tete	45.0		41.0	

Sources: DPS Tete 2014a; INE et al 2005; 2013; MISAU et al 2010; INE 2003; 2004; 2010b; 2012a,b; UNICEF 2013; Tarp et al. 2002; INE and UNICEF 2009; GoM et al. 2010.

Sanitation and waste management: As shown in *Figure 4.2a* and *Tables 4.2.a,b*, progress in coverage of improved sanitation was slow, but rose more rapidly after 2008. It remains, however, at very low levels (22% by 2011). Higher coverage is found in Tete city and Cahora Bassa, but even here the levels in 2011 were 35% and 12% respectively, while Chiuta, Maravia, Magoe and Changara all have very low coverage rates of less than 4% (*Table 8.5*).

Household fuel supplies: Safe sources of energy support improved household incomes and reduced respiratory and other health problems from pollution from woodfuel and paraffin. Household access to electricity is very low, at 5% in Tete city, lower in rural districts and only 9% of households in Cahora Bassa, despite living next to a large power generating plant (*Table 8.5*).

The significant deficits in household access to improved water, sanitation, waste management and energy in the province calls for a multi-sectoral strategy. The 2012-2017 Tete Provincial Strategic Development Plan equally identifies this as a priority and plans to apply a participatory community- and school-led total sanitation approaches in rural areas (GoM Tete 2014). This calls for a costed investment plan and technologies to meet the shortfalls, including for Tete city, and co-operation across health and public works to ensure uptake in disadvantaged households.

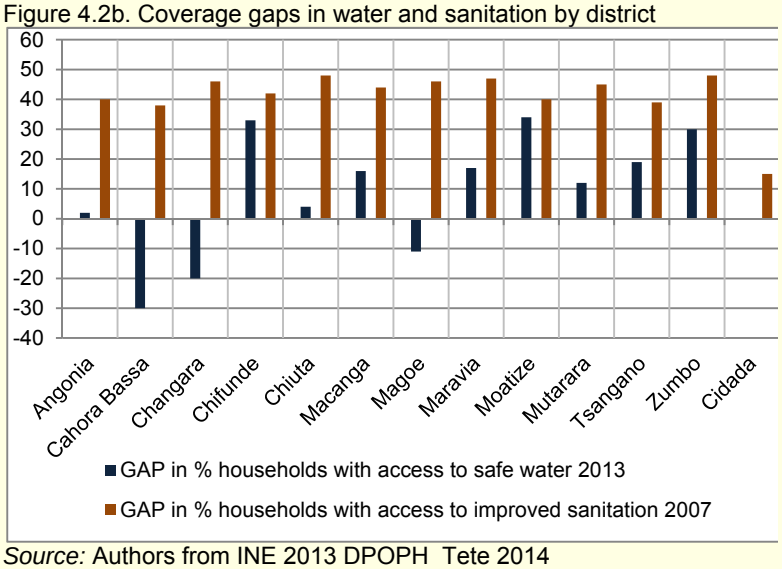
The One Million Initiative (2006-2013), a Mozambique - UNICEF – Netherlands partnership with communities, has built and rehabilitated water and sanitation for families and schools in Angonia, Changara, Chifunde, Maravia, Tsangano and Zumbo, backed by hygiene promotion and management capacity strengthening (Ministry of Foreign Affairs 2011). Macanga and Mutarara should be added to these high need districts. Communities contribute MT 2,500 ($70) per water point before construction begins. They network with the engineering and drilling companies and many organise a monthly household payment of 5-15 MT (50c) for using the improved supply. Evaluations in 2011 and 2012 found existing installations to be sustainable, but needing measures to ensure the continued functioning of water and maintenance committees and of hygiene practices, such as by

- resupplying committees with kits for maintenance and promoting local spare parts shops;
- encouraging committees to establish bank accounts and written contracts for repairs;
- improving women's participation in water committees; and
- funding provincial and district public works departments to monitor and support community roles, including for maintenance of toilets (WE Consult 2013).

The current budget is however inadequate for this, or for expanding the programme. The Department of Public works is estimated to have a tenth of the budget it needs for planned water and sanitation improvements (KI Tete). At the same time Tete had one of the lowest rates of spending of environmental funds in 2005-2010, with funds mainly used for training (RoM MICOA 2012a). There is thus need for a costed budget and investment plan to meet shortfalls. *Figure 4.2b* overleaf shows, for example, the coverage gap by district in water and sanitation (based on available evidence) to indicate the level and prioritisation of resources in such an investment plan. The size of the coverage gaps against MDG targets of 70% with safe water and 50% with safe

sanitation suggest a gap of 48000 households needing improved water and 225 000 households needing improved sanitation over the 5 years, using the 2013 population and 4.6 people per household. Within districts there would be need for further measures to ensure uptake in households with highest need, especially for female headed households who cannot afford the time costs of fetching water and those with small children. This suggests a co-operation between community health and public works within districts, discussed in *Section 4.4*.

Figure 4.2b. Coverage gaps in water and sanitation by district



Source: Authors from INE 2013 DPOPH Tete 2014

The national power utility (EdM) aims to connect all 128 districts to the national grid by end 2014 and 100 000 new households annually (Mahumane et al. 2012). The roll out has been slower than planned. As discussed in *Section 3.5*, even with an electrification rate of 47% by 2030, 17,5 million Mozambicans would not be able to access the grid (Mahumane et al 2012). If these are the more marginal or disadvantaged households, this would widen inequality.

Ensuring that all schools and health centres are connected to the power network would be one priority to enable wider benefit. Cahora Bassa's hydroelectric facility (HCB) is exploring options to link wholesale power suppliers to small enterprise purchasers (Macauhub 2014). A further strategy for the next five years would be to promote SME production and distribution of clean technologies for stoves, solar and biomass energy (Aaboe and Kring 2013; Chambal 2010).

This assessment would suggest, therefore, that a high level framework be set up on these four key elements of safe living environments to '***close the gap in access to healthy living conditions'*** , as a levelling up strategy in the province as a whole, implemented by district public works, health and other services, reaching approximately 48 000 households for improved water (or 9600 annually in the plan period), and 225 000 households for improved sanitation (or 45 000 annually in the plan perios) to access improved living conditions, based on the district coverage gaps.

This implies:

i. Setting up / using an intersectoral mechanism to co-ordinate sectors and stakeholders, to plan, cost, mobilise resources, implement, monitor and review delivery and its impacts, at both provincial and district level;
ii. District targets to close the gap on MDG goals and provincial norms for improved water, electricity and sanitation in 100% of schools and health facilities and in household access to safe water, sanitation, waste management (segregation, recycling, waste pits etc.) and safe energy sources and technologies (see for example *Figure 4.2b*);
iii. Earmarking of urban budgets and levies from local businesses to make more rapid improvements in rapidly growing urban / peri-urban areas, such as Tete city, Moatize, where poor supplies in a growing dense population raises a risk of epidemics, such as of cholera;
iv. Using awards and business start-up funds (including from companies) for SME production and marketing of appropriate technologies for safe water, waste management and recycling, cooking and energy;
v. Raising heath literacy on safe environments through schools and community awareness, local leadership champions, and rewards for communities that attain/sustain an 'open defecation free' status; and
vi. Community schemes to collect counterpart funds to maintain supplies, with monitoring to ensure that payments do not act as a barrier to the right of access to a minimum level of safe water for health (estimated at 20 litres / individual / day of which about 7.5 litres is for consumption) for any household, including for orphans and vulnerable children (WHO 2003).

Tete city itself needs a forum chaired at high level to map current conditions, to set fair and enforceable rules on the location and minimum standards for new urban settlements and to develop a costed plan for the public infrastructure, including to remedy existing problems. **This is a high priority to avoid deepening the public health risk in the city**. The co-siting of informal food markets, open waste water and sewage flows and waste dumps raises the risk of cholera and typhoid. The absence of a waste/water treatment plant in Tete city means that sewage currently goes directly into the river that is also used as a water source and for fishing. As one key informant commented, rural people are perplexed at urban workers coming to promote hygiene when open defecation is being practiced in the city! Tete City Health and DPS could map the 'hot spots' in the city where risk is high (including through photography) and brief the leadership of the province on the urgency of the situation (See photos in *Figure 4.2c*). A co-operation across the Department of public works (who manage sanitation and rural waste management); the council (for urban waste management), DPS Tete, community leaders and other agencies (MICAO, education, energy, minerals and resources) could agree on planning norms and – with technical support as needed – on the technologies and social processes needed to address the water, waste management and sanitation problems, to inform a costed and phased investment plan to mobilise private, public and international funds and capacities.

Figure 4.2c. Tete city suburbs showing environmental risks, mixed food markets, waste management

Source: TARSC 2014

In Moatize, Cahora Bassa, Angonia and Tete city there is scope for greater private sector contribution for these plans. Some companies, such as Rio Tinto and Vale, have invested in living conditions, but the scale of demand calls for involvement of all companies and co-ordination of public, private, international and community actors, such as through the intersectoral mechanism above, to improve coverage in all districts. New credit lines such as the Indian Export-Import Bank (EXIM) credit line of US$217mn for Mozambique to fund public works and housing projects could also contribute to this (African Review 2013). This would need high level support from political and business leaders and communication with all those affected in the community.

The resettlement of people from land reallocated for mining or other projects needs to be included in such co-ordinated planning, to secure the basic public health requirements *before* people are moved. Some companies report that they implement appraisals and community meetings on resettlement plans, and make investments in schools, markets and health services and support for small enterprises and job creation schemes in resettlement areas, in line with their corporate guidance documents (Vale 2014). However early resettlement programmes were reported to be implemented in a top down manner, without consultation, disrupting cultural patterns, economic activities and access to services, especially for women, and providing substandard conditions, leading to conflict between communities and authorities (Besharati 2012; Mosca and Selemane 2011, Kabemba 2012; KI International agency).

Government has since strengthened protections in resettlement through Resettlement decree 31/2012 that sets requirements on housing and social service infrastructure, requires companies to produce a resettlement plan to be vetted by the relevant district government and that sets up a

Technical Resettlement Monitoring and Supervision Committee with representatives from the district and provincial governments, relevant sectors and community. Neither Health nor Women and Social Action are explicitly included in the list of sectors and this would be an oversight to remedy. It is argued that the decree needs to strengthen its protections on land quality, water supply standards, on requirements for housing, schools, health posts, and infrastructure to be established *prior* to resettlement, on timing of moves to avoid disruptions to farming and on grievance mechanisms (HRW 2013). These plans need to be co-ordinated with the wider public plans for improved water, sanitation, waste management and energy outlined in this section.

In summary, the assessment highlights the need for a co-ordinated multi-sectoral and multistakeholder mechanism, goals and plan for ***closing the gap in improved living conditions*** (water, sanitation, waste management and energy) that will reach up to 225 000 households over the 5 years, with resources for and efforts by districts according to coverage gaps on targets, and with input from public, private and community resources and capacities, and targeting high need households. Tete city would need specific attention on urban planning. DPS can support planning and co-ordination across districts, map (with data and photography) and identify high risk areas for disease outbreaks, encourage district links with community health literacy and outreach and monitor health impacts. Political leadership and championing of the plan from the provincial Governor would support this being taken as a responsibility for all (KIs Tete).

4.2.2 Healthy production for workers, communities and environments

The investment in large projects has brought benefits in energy, transport, employment, markets and incomes, but also inequality in the distribution of these benefits, as discussed in *Section 3.4*. The health sector, with other sectors, can support the policy intention of more inclusive growth by ensuring that production does not generate harm to health and by levering resources from economic activities for health promotion, prevention and care services. *Table 4.2d* summarises the benefits and risks from key areas of economic activity that have relevance for health.

Table 4.2d: Benefits, risks to health and actions to promote health in production activities

Area	Potential benefits, beneficiaries	Potential Risks and vulnerable groups
Coal mining	Increased formal employment, secure incomes and an organised workforce provides entry points for health and nutrition promotion, healthy living conditions and health screening and care services. The beneficiaries are higher income, skilled workers (not all local), their families and enterprises linking with mines.	Air pollutants (CO2, nitrogen,sulfur oxides, hydrocarbons) can be inhaled causing eyes, nose and throat irritation and leading to lung (black lung, silicosis, complicating TB) and skin diseases; radionuclides lead to respiratory disease, lung cancer and gastrointestinal problems; and burns, falls, injury lead to disability and loss of income. Injuries from accidents in transport of coal. Carbon, nitrogen gas emissions and NCD risks in communities living around mines. Water, soil and air pollution from waste spills, fly ash spills, mercury, cadmium, copper, nickel, ammonia and fluoride. Malaria from stagnant pools of water. Income differentials and insecure employment can increase alcohol consumption, commercial sex work and STIs in mine communities. Increased population pressure on infrastructure and services.
Trans-port	Employment and income benefits as above for formal workers and their families. Improved transport supports access to referral services; commodity and food distribution for those on transport routes	Accidents, injury, mechanical, ergonomic and chemical (carbon, nitrous and sulphur oxide) emission risks for workers and communities in contact with major rail and road transport construction projects and routes. Risks of STIs, HIV, communicable diseases due to population interactions and movements along transport routes.
Energy (hydro-power)	Employment and income benefits as above for formal workers and their families. Improved sources of clean energy (hydropower for electricity) reduces exposure to woodfuels, paraffin for communities accessing power supplies	Asbestos, dust, chemical (lubricants and insulation products) and mechanical risks. Electrical hazards and risks from equipment contaminated with Polychlorinated Biphenyls (PCBs) in workers and communities living in the area of power projects. Environmental changes increase risks of natural disasters (flooding), reduced water supply and fish population downstream of projects.

Sources: Epstein et al. 2011; ICCM 2010; Chadderton et al. 2011; Aaboe and Kring 2013; HRW 2013; Ministerio de Energia 2009; MPD 2013; DPT Tete 2013; van der Goltz and Barnwal 2014; Coughlin et al. 2013.

The benefits of expanding production activities can be secured by

i. Ensuring that occupational benefits (health, maternity, pension, disability, funeral) are provided for all local employees, and cover use of public services.
ii. Communities in the area surrounding large projects having access to company health facilities and company investments in public services in their areas of operation.
iii. Company investment in public health and SDH for their surrounding communities (including schools, adult literacy, community infrastructures);
iv. Implementing local procurement regulations and supporting links with and food safety and quality in small scale producers of nutritious local foods for consumption on mines.
v. Encouraging company health promotion / campaign activities for workers covering all priority health problems and for programmes to include surrounding communities.

Measures to protecting against harm include:

i. Companies having health and safety (OHS) procedures that are compliant with the 2007 Labour Law (Articles 216-236), known by workers, and overseen by joint management and worker health and safety committees. Companies with more than 100 employees or those with unhealthy or dangerous activities must have health units on site (MPD 2013).
ii. Workplace inspection by district labour and health services to control occupational and environmental hazards at source and ensure provision of personal protective equipment, with training support from Provincial Directorate for Work (DPT) and DPS.
iii. Ensuring that companies prevent and manage injury in coal transporters.
iv. DPT, DPS support to districts inspecting and identifying OHS improvements for small mines.
v. Ensuring companies carry out annual occupational health surveillance, including legally required health checks of food handlers (MPD 2013).
vi. DPS training of local health workers to recognise (and refer) common occupational diseases from coal mining, energy and transport;
vii. MICOA enforcement with companies of environmental standards (Environmental Law 20/97) and monitoring of soil, water, air pollution and effluent emission, using the EIA as a baseline, to ensure compliance with permissible concentrations of pollutants (MICOA 2012).
viii. Implementing through resettlement committees Resettlement Decree 31/2012 to ensure that schools, clinics of adequate standard are built and staffed *before* communities are resettled, and negotiating company support for new staff, equipment and start-up costs;
ix. DPS and districts encouraging company support for and involvement in prevention and promotion activities to manage risks of alcohol consumption, STIs, NCDs (Andarko 2013)

In summary, these plans thus fall into three major areas of strategic activity:

a. Improving the protection of workers health and safety in the province;
b. Promoting health benefit and protecting environmental and community health from production related risks, using ESIAs to integrate health in environmental management plans and including ensuring corporate duties on resettlement and
c. Integrating company roles and resources in health services and activities in their districts.

They call for co-ordination between health and other sectors involved in these areas and between district and provincial levels to synergise plans, goals, roles, capacities and resources, and mechanisms for communication with all producers in districts and with affected communities to organise their roles and contributions. The proposed 'corporate responsibility' strategies for integrating company roles and resources in health services and health activities in their districts are further discussed in *Section 4.5*.

EIAs /ESIAs as discussed in *Section 3.3* provide an important entry point for the second area above. All EIA reports are reviewed by MICOA, and an environmental management plan (EMP) developed to address problems raised as a basis for granting an environmental licence, before the investor obtains other licences. While not legally enforceable, EMPs outline options for mitigating and controlling environmental risks with measures for monitoring and review (Environment Dept World Bank 1999). EIAs and EMP implementation are the company's responsibility. Embedding health (and related social determinants) in this process could be advanced by:

i. DPS developing health indicators for auditing health impacts, consistent with the District Health Systems Audit Tool for prioritised public health functions, with current health standards, WHO guidelines on air and drinking water quality, PESS targets and taking into account the health impacts of production activities identified in *Table 4.2d* (Bishai et al. 2014; INS et al. 2012).

ii. DPS using the 'health checklist' (i) to update provincial standards for resettlement plans and (ii) to integrate health (and social) impacts in ESIA/EIA of mining, transport and energy to reduce harms and maximise health gains (See *Appendix 8.7* on EIA /ESIA resources).
iii. MISAU with MICOA reviewing current regulations and standards against international evidence, neighbouring country standards to address gaps, such as on chemical limits in wastewater discharge from mining and related production activities (as in South Africa; Pondja 2013).
iv. DPS and SDSMAS strengthening processes and capacities for community involvement in ESIA.
v. Districts supported by DPS working with MICOA and other sectors to prepare a district wide strategic health and environmental assessment of the combined health and social benefits and risks from all initiatives and changes together to maximise benefits and reduce harms;
vi. DPS providing a role model by implementing occupational health assessment and improved work environments for the health workforce, including own leading by example in terms of the health of its own workforce including CHWs and other non-professional health workers.

These actions should better enable health and other sectors at provincial level to play a more deliberative and informed role in EIA/ESIA and EMP processes. DPS Tete would implement this in conjunction with (but not limited to) public works, education and culture, women and social action, environment, planning and development, and labour/employment.

4.3 Widening nutrition and health gains from agriculture and food markets

Box 1 PAMRDC Objectives

The PAMRDC seeks to:
1. Improve the nutritional status of adolescents;
2. Improve the health and nutrition of women before and during pregnancy and lactation;
3. Improve child nutrition in the first two years;
4. Undertake household-oriented activities to improve consumption of nutritious foods;
5. Strengthen personnel capacities on nutrition;
6. Strengthen capacities to advocate, coordinate, and implement the multisectoral action plan; and
7. Strengthen food and nutrition surveillance.

The Essential Nutrition Interventions aim to adapt to local conditions and integrate with poverty reduction plans of relevant sectors, including in relation to: social protection mechanisms (and conditional cash transfers); health services particularly for mother, newborns and children; and reducing early/adolescent pregnancy (RoM 2010a).

Sections 3.2 and *3.6* outlined the nutrition and food security situation in the province in relation to the evidence on three levels of determinants in the Multi-sectoral Action PAMRDC) (2010-2014 (2020) (see Box 1).

In 2010, Tete province had only two of the seven interventions underway (school feeding and prevention of unwanted pregnancy) (RoM 2010a:91) with poor nutrition outcomes (low rates of breastfeeding, high stunting and increased wasting; see *Sections 3.2 and 3.8*) varying across districts and social groups. From initial interventions in Tsangano and Agnonia, by 2014 all seven PAMRDC objectives are reported by DPS Tete to now be implemented in the province in all districts, including:

- **For immediate determinants:** Food and iron and vitamin A supplementation; deworming; food supplements for pregnant and postpartum women
- **For underlying determinants:** Farming of orange fleshed sweet potatoes and moringa; repair of water pumps; school gardens; fish farms; rabbit breeding and grain mills; community radio; model mothers groups and promotion of exclusive breastfeeding;
- **For basic determinants:** Literacy programmes and food production.

Table 3.6a outlined the PAMRDC interventions. The determinants outlined in *Section 3.6*, plans and interventions in the PAMRDC, and SDH identified in this assessment suggest interventions:

- **For the Immediate causes**, (inadequate nutrient intake; high communicable disease incidence, early pregnancy) to sustain and widen coverage of the PAMRDC basic nutrition package in all districts, including free nutritious food supplementation for pregnant women with BMI < 18.5, and for children with birthweights under 2.5kgs, de-worming and vitamin A supplementation. DPS could explore options for local procurement of food for therapeutic feeding and school meals. The provincial health system (DPS and district health services) could encourage early-childhood-care centres, oral rehydration and safe water and sanitation to reduce food losses from diarrhoeal diseases; promote school feeding, which helps to keep children in schools, and support improved

early child feeding practices such as the UNICEF Child Friendly District initiative in Changara. The cash transfer (PSA) and direct social support (PASD) could support therapeutic / supplementary feeding for people living with HIV, in home based care, orphans and older people, and the World Food Programme (WFP) Cash for Work programme provide cash for food purchases pre-harvest when food stocks are low, if these programmes were scaled up (Ferrao 2014; MPD 2013; WFP 2014b; Sepulveda 2014; Desai 2008).

- **For the underlying causes**, (poverty; poor child care practices, low levels of breastfeeding; limited health care, poor water and sanitation), improved water and sanitation (described in *Section 4.2)*. The 2009-2014 Regional Development Plan promotes local production of improved seeds and improved farming techniques, such as implemented by the Mozambique ADD project noted in *Section 3.6*, with other initiatives, including: mother groups on child care, use of integral flour / maize rather than xima branca, spread of nutritious crops such as orange fleshed sweet potato and moringa; school gardens; and improved farm methods such as mulching, crop-rotation and inter-cropping with legumes (Ferrao 2014). Female headed households could obtain subsidies and technical assistance for small animal breeding, particularly adolescent mothers, including through WFP support for community gardens for seed stocks and through small or medium scale fish farms as in the Chioke Fish Farm target of 50% female employment (New Alliance 2014; IFDC 2012; Chichava et al. 2013; ADB 2011; MPD 2013; WFP 2014b).
- **In relation to basic causes** (low literacy; gender and economic inequalities) interventions for adult and health literacy are described in the next sub-sections. Various food processing options are being proposed, although without adequate detail to properly assess their health benefit. The African Food Company proposes to invest in production, storage, accessible markets and processing of local fruit and vegetables; and the Tete CB Farm Fresh plans to develop farming capacities and a plant for vegetable freezing and processing (Ferrao 2014; Chichava et al. 2013; ADB 2011; MPD 2013; WFP 2014b; Food Security Task Force 2012; New Alliance 2014). Female headed households and women should be included in such programmes and those aimed at inclusive development, including in the Integrated Growth Poles Project in Angonia, Tsangano and Macanga, in measures in the Strategic Plan for the Agricultural Sector Development 2011-2020 (PEDSA) and in the Tete 2009-2014 Development Plan, including for extending access to irrigation and draught power. Further interventions to support productivity and value-added include: updating the land registry; timely supply of inputs; local production of improved seeds; training in farming techniques; reviving rural trade networks; widening agro-processing, including of local small scale milling; linking SMEs to supply chains with large projects; insuring against weather risks; using professionally managed warehouses to protect against storage risks and to facilitate loans with crops as collateral; and investing in food processing and storage at household, SME and wider level.

Within these multisectoral interventions, the provincial health system (DPS and district health services) can directly and with SETSAN:

a. Implement health promotion, prevention and care to manage diseases undermining food intake, support nutrition in services for SRH, maternal and child health and for NCDs.
b. Work with other sectors in the SETSAN Tete and with communities and civil society to tackle gender, social and cultural norms that affect nutrition through health literacy, school health, maternal and SRH programmes, and identify and refer vulnerable groups to other sectors, including for public works, cash transfers, water and sanitation and farming support.
c. Promote local food procurement for therapeutic / supplementary feeding and stimulate production of nutritious foods in school and community gardens;
d. With other sectors and farmer groups, encourage investment in food processing and promote SME technologies for grain milling, food processing and storage;
e. Inspect food processors and markets to ensure food safety, update and enforce legal duties on food labelling, discourage trade and markets in unhealthy foods, and engage large companies, schools, workers on using healthy local foods in canteens.
f. Encourage discussion of the 2014 PAMRDC evaluation to assess achievement of the health and social goals and stimulate dialogue on intersectoral measures.
g. Provide simpler mechanisms and measures for identifying vulnerable households for interventions, social mapping and evidence of impact for programme review;
h. Strengthen community based approaches, involving APEs and civil society; and
i. Provide measurable indicators for monitoring, evidence of nutrition impact and advocacy for all sectors to achieve shared results, in line with the 2014 PAMRDC evaluation.

Health service interventions and financial protection, the mapping of family level vulnerability and the measures for multi-sectoral co-ordination are further discussed in other sections. SETSAN (discussed in *Section 3.6)* is an asset for this area of work, and is suggested to have shifted partners from purely sectoral priorities to a more shared vision (KI Tete). Only 10% of the DPS budget share was spent in 2013 and only 64% of the overall PAMRDC budget in Tete. The 2014 PAMRDC evaluation recommended strengthening budget execution, ensuring capable nutrition personnel at all levels and strengthening measureable indicators for monitoring, together with decentralised participatory approaches that involve communities and civil society in the interventions to deepen ownership (Ferrao 2014).

4.4 Enhancing equity in availability and access to priority health services

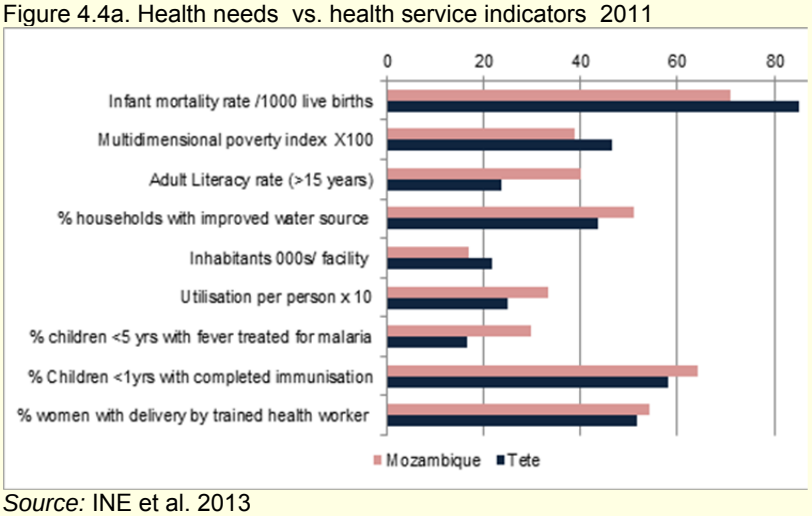
Section 3.2 raises the key health burdens in the province in:

- Slow improvements in child survival and perinatal mortality and high maternal mortality;
- High fertility, late reporting for SRH and prenatal care and a mature, declining HIV epidemic;
- High levels of malaria and TB, and environment related diarrhoea and respiratory conditions;
- Chronic undernutrition in children under 2 years, under 5 years, adolescent females and lactating women and in poorest, food insecure households; and
- Rising levels of NCDs, including transport accidents, circulatory problems, cancers, harmful alcohol use, and occupational conditions.

We were unable to access data to assess the distribution of mental health in the province.

Section 3.8 outlines the health service responses to these burdens and to their determinants. It shows health gains from improved coverage of prevention interventions (for malaria, HIV; ANC, contraception), but also increasing focus on curative care. Despite improvements in many areas of health services and rising wealth generation and infrastructure in Tete, a combination of low literacy, high poverty, food insecurity, poor access to improved living environments and gender inequalities combine with facility, personnel and resource shortfalls and inequality to limit access to care in those groups with highest health need. *Figure 4.4a* shows this in summary: Tete has higher health needs (infant mortality, poverty, literacy, access to safe water) and lower health supply (facility density, utilisation, key service coverage).

Figure 4.4a. Health needs vs. health service indicators 2011



Source: INE et al. 2013

The distribution of availability and access, the coverage gaps identified in *Section 3.8*, the projections of increased population pressure in the province raise a need to 'level up' coverage and close gaps in services. The opportunity of increased economic resources indicates a need to position the health sector in the PARP and national provincial development plan as a key redistributive sector to enhance the inclusiveness of development in the province, through:

a. Measures to strengthen equity in the distribution of public sector resources to close availability, access and coverage gaps in PHC, level 1 and 2 health services;
b. Public sector use of entry points in schools, workplaces and other sectors to enhance access and coverage of promotion, prevention and health care services;
c. Enhanced participation of all private sector actors (large companies and SMEs) in health promotion, prevention and contribution to health care services in the province; and
d. Enhanced roles for communities in health promotion and prevention and in supporting uptake of services and accountability on service performance.

These areas reflect the priorities and strategies in the National Health Sector Strategic Plan (PESS 2014-19) to be implemented in two phases, as discussed in *Section 3.8*, to strengthen primary care, community health and CHWs, particularly the APEs; to promote mother and child health and prevent malaria, HIV, TB and malnutrition, to improve equity in availability of health facilities, qualified health workers and medicines, and to enhance community involvement in health (MISAU 2014). Strategic planning within Tete province to date has similarly aimed to:

i. Improve the quality, provision of and community and level 1 access to services for adolescent reproductive health, prenatal and obstetric care for maternal health and for child health, environmental and occupational health, public health, food safety and mental health;
ii. Combat HIV and mitigate the impact of AIDS through surveillance and team approaches;
iii. Improve equity and access to health care; raising service standards, the health workforce distribution and capacities; increasing coverage of prevention programmes, community volunteers and community involvement; and cross-district exchanges on health plans; and
iv. Link the work of the health sector with that of other sectors that play a role in health; (See *Appendix 8.6*; DPS undated).

Strengthening equity in the distribution of public sector resources to close coverage gaps

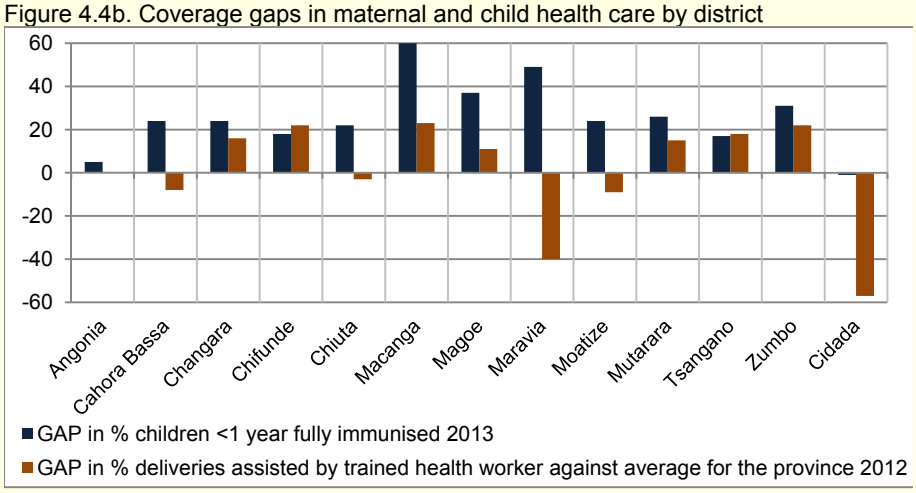
The evidence on current health service provision supports these aims. For HIV it points to the need to address gaps in prevention and access to VCT and ART, including paediatric ART, and for targeted attention to SRH in adolescents, given the rate of adolescent fertility and earlier onset of sex in young men. The health sector is likely to face more intense drivers of SRH, HIV transmission and STIs from the development of new transport routes and from the income inequalities around large projects, demanding specific programmes involving companies and communities for health promotion, prevention, VCT, early detection and ART in these areas.

For the priority infectious diseases the assessment highlights the need for city and district health services, co-ordinating across districts with DPS, to

i. Sustain prevention interventions and level up coverage rates to agreed targets across districts, tracking the resulting improvements in health outcomes, in equity and in reduced costs to households and health services. For diarrhoeal and respiratory conditions, this includes promoting healthy environments, as discussed in *Section 4.2*;
ii. Ensure early detection and response to infectious diseases, including health literacy, household care such as through oral rehydration and early uptake of services;
iii. Address SRH and maternal health issues across the life course, including adolescent fertility and SRH and gender discrimination, including in schools and with CHWs, to identify family profiles and ensure continuity of fertility regulation, pre-natal, delivery and postnatal care; and
iv. Support health literacy, awareness and participation, and early uptake of services.

The PESS sets the major strategies for these programmes. Improving geographical equity implies working the districts to monitor and review progress on closing coverage gaps, to exchange promising practice and explore options for addressing capacity shortfalls and other challenges. *Figure 4.4b* shows, for example, the coverage gaps in key maternal and child health services. Using 2013 population data, a 26% gap on immunisation targets suggests that a 'levelling up' strategy calls for further a 90 000 infants to be immunised in the province, with highest gaps to close in Macanga, Magoie and Maravia. A 22% gap in Chifunde and Zumbo in assisted deliveries implies 35 000 and 17 500 more deliveries respectively carried out by district health services in those two districts that have the largest coverage gaps. Other districts have smaller coverage gaps to close.

Figure 4.4b. Coverage gaps in maternal and child health care by district



Source: Authors from INE 2013

This assessment indicates the need to address social inequalities in access to and uptake of services *within* districts. Outreach activities and CHWs can play a key role in this. Traditional midwives (parteiras tradicionais) already play a role as partners, coming with mothers to health services for deliveries. Community associations, such as the Support Groups for Community Access to ART (Grupos de Apoio à Adesão Comunitária para o TARV), Mother-to-Mother Support Groups and others in civil society have helped to expand and support VCT and ART uptake, including through cinema, theatre and community talks. Mobile service units and mobile telephone platforms such as Movercado have facilitated peer supports and interactive contact with clients for follow-up with health advice and services (MISAU 2014; RoM NAC 2012; Netherlands Embassy 2013). These roles are further discussed in *Section 4.5*. CHWs could map households in their catchment area - using family genograms or social maps - to identify their capacities and vulnerabilities; for communication with the family on health actions and for dialogue with local health and other services on prevention, care and follow up services.

The assessment raises the need for early intervention on emergent NCDs, with accidents, circulatory problems and cancers already leading causes of mortality (*Section 3.2*). In 2008 Mozambique produced a National Strategic Plan for the prevention and control of NCDs that seeks to: widen public literacy on and prevent NCDs; provide access to quality care, treatment and follow-up; prevent disability and premature mortality from NCDs; and strengthen surveillance, research, monitoring and evaluation and advocacy for NCDs (MISAU 2008; Silva-Matos and Beran 2012). All provinces are expected to have NCD focal points to adapt principles of the plan to their local setting and to create a coalition on NCDs that involves government, civil society, media and the general population, starting with promotional activities such as 'health fairs'.

Tete province has both opportunity and need to advance these strategic measures for NCDs, particularly given their economic consequences in productive age groups. This implies:

i. DPS and district health services raising awareness of all sectors, political and community leadership and communities on the health impact of the production and market activities on the province, through information materials, health fairs, screening campaigns;
ii. DPS with INE implementing a community level survey of NCDs (such as STEPWise) to provide evidence for information and planning;
iii. DPS and district health services promoting health literacy on healthy foods and dietary patterns, including in schools and workplaces and in SETASAN-Tete;
iv. District health services screening for NCDs in workplaces and other areas where key target groups are found; inspecting and ensuring food safety and hygiene in public markets;
v. DPS and district health services carrying out specific campaigns and health literacy on alcohol consumption and road traffic accidents, and strengthening management of emergencies, trauma and addiction, with input from relevant companies;
vi. DPS strengthening – with other sectors- capacities for oversight, detection and management of occupational and environmental diseases, as in *Section 4.2;* and
vii. District health services with DPT and workers unions ensuring healthy workplace practices and OHS surveillance for the health workforce.

The provincial health system DPS could involve company ICT, skills, and other resources in these programmes, and co-operate with labour and environment sectors to inspect and promote healthy practice in the private sector using diverse media and approaches.

The 'under-funding' of health services in the province and inequalities in resource allocation discussed in *Section 3.8* can limit the application of these strategies. While out of pocket spending (OOP) on health in Mozambique as a whole fell from 12% in 2002 to 5% in 2012, the same evidence is not available for the province, so it is unclear whether falling per capita spending has raised cost burdens on households (WHO 2014). Shortfalls in the supply of services raise cost burdens due to poor or late uptake and untreated problems, and can make services dependent on less predictable external funding (MISAU 2014). The financial resources needed to deliver these services and address coverage gaps is discussed in *Section 5.2.*

Public sector use of entry points in schools, workplaces and other sectors

Responding to priority areas raised in the situation analysis, the provincial health system could strengthen its partnership with the education sector on school health checks, vaccination, de-worming and iron-administration; health literacy and health promotion, adolescent SRH services;

provision of single-sex accommodation for girls boarding at secondary school, and promotion of school gardens (MoEd 2012; Ferrao 2014, *Section 4.5.1*). District health services can use the workplace as an entry point for raising health literacy and

a. With DPS and MICOA, for implementing ESIAs as outlined in *Section 4.2.2;*
b. With labour, promoting health checks, health services in companies of more than 100 employees and workplace OHS committees involving management and workers, in line with Decree 31 1989 and 2008 Guidelines on Safety and Health in the Workplace;
c. Ensuring compliance with laws on OHS and chemical/pesticides exposure and disposal;
d. Working with labour and education sectors, raising community awareness of OHS and legal duties, including for those who are not formally employed; and with the corporate sector to include health in all vocational training curricula and activities; and
e. With DPS and all sectors, promoting healthy working conditions in public workplaces.

The participation of private sector actors and roles for communities in health are discussed in the next sub-section, *Section 4.5.* The resources, capacities and co-ordination mechanisms proposed for taking these strategic directions forward are outlined in *Section 5.*

4.5 Strengthening corporate and community involvement and roles in health

4.5.1 Community roles

Mozambique has enormous diversity in its culture and beliefs, some of which affect health. There are reports of religious sects who refuse blood transfusion and / or vaccination. Local beliefs about the spread of diseases and gender relations affect exposure to risk, how symptoms are perceived and the uptake of services and follow-up of treatment (MISAU 2014). Mozambicans participate in religious, voluntary or community processes, including through the support groups described earlier (AfroBarometer 2012; RoM 2010a; MISAU 2014). The 2003 Law on Local State Organs provides for district level consultative councils to facilitate community participation in decision-making on public funds, and several non-state programmes also seek to strengthen community involvement in health, with seven billion MzM provided to districts to support community projects (Manning and Marlborough 2012; Kabemba, 2013).

As noted earlier, 2014-2019 PESS and the 2013-2022 Provincial Economic Development Plan seek to empower and encourage active citizenship and community partnership in health services, particularly for women, children, vulnerable children, older people and people with disabilities. In health, the aim is for people to "identify their health problems and define actions that lead to health promotion and disease prevention" (MISAU 2014: xi), with plans to

a. Elevate women's status and participation in society, including by improving support from community leaders on areas such as female education and prevention of domestic violence;
b. Establish and expand pre-school education, adult literacy and female education;
c. Identify and reintegrate homeless children within families;
d. Strengthen health literacy and participation in health programmes, including in schools, through community health workers and use of local media; and
e. Expand the network of community radios and televisions in rural areas to improve access to information; and to disseminate civic education, services and programme achievements.

For DPS Tete and the district health services working with women and social affairs, civil society and local communities, key priorities would appear to be to strengthen community health literacy, train, support training and deployment of one CHW for every 500 people (4 425 new CHWs) and establish and train community health committees at all Level 1 services to support actions on SDH.

These strategies are noted to face a number of challenges, including low levels of literacy, limited access to and poor social familiarity with media and IT, gender, cultural and social norms; fear of 'speaking out' and weak capacities and methods in public sector workforces to work with communities, support information exchange and build health literacy (KI interviews). Community health literacy, CHWs and participatory mechanisms can address some of these barriers.

i. *Health literacy* can be widened through co-operation with schools, workplaces and civil society. In schools, a review of the curriculum by health and education sectors at provincial level can ensure inclusion of key areas such as adolescent SRH, alcohol, tobacco, fast foods, occupational and environmental health, traffic safety and school gardens.

ii. *Community Health Workers* provide a key interface between health services and communities. Expanding investment in CHWs to provide one APE for every 200-500 people (or 4 650 total in the province from the current 225 total) is reported to have the potential to improve coverage by 20% (MISAU NDHR 2008; RoM 2010a). Tete has its own Community Health Team (CHT) programme, piloted in Angonia and now scaled up to all districts. It deploys three types of community workers: Agentes Communitários de Saúde (ACS') that lead and support lower level cadres, serving 15 000 people and 10-15 communities; Voluntarios Comunitários de Saúde (VCS') who provide an integrated package of services in one group of villages / area serving about 1 000 people; and Traditional Birth Attendants (TBAs) who provide maternal health care. All are volunteers, selected from, although not necessarily *by,* their communities. They report monthly to health facilities and support communication between community members and health workers. The programme works with the national APE program with benefits noted in improved trust between communities and services; and improved uptake of common conditions and improved service coverage (MISAU 2012; Machiana 2013; Advancing Partners and Communities 2013). A wider evaluation by DPS of the performance and outcomes of the CHT across districts, and exchange of learning from Angonia with other districts, could support plans for its future in the next 5 years. The ACSs and VCSs could be further trained in prevention and community management of key conditions, expanded to all districts, regularly monitored and linked to other community level programmes. They could be given mobile phones and smart apps to communicate with patients and the public and to monitor and send information on commodity supplies for PHC (USAID 2012; Save the Children 2013; MISAU 2012; WHO 2014a). At the same time, they are not a substitute for health professionals, need higher level support; should not lose focus on promotion and prevention and need time to build social contact and trust (Machiana 2013).

iii. *Participatory mechanisms* – Mozambique has policy provision for district level consultative councils and for Community Health Committees (CHCs), the latter as joint community health-service structures at primary-care level (Loewenson et al 2014). Recent experiences with involuntary resettlement illustrate the need to strengthen these mechanisms for fair and respectful involvement of communities in decisions that affect their livelihoods and health, in both existing and new settlement areas (Kabemba, 2013; HRW 2013; Aaboe and Kring 2013). While the CHCs are formally accepted, they are not established in all health centres, nor fully capacitated. Experience in other countries in the region indicates that they can, however, play an important role in PHC, in improving communication between health services and communities, levering local health action, improving health outcomes and health worker retention (McCoy et al 2011; Loewenson et al 2014). This calls for district health services to establish CHCs at all Level 1 services, and for their members to be trained and given information on health plans, reports and campaigns to discuss with communities, to monitor and communicate on commodity availability and service quality and to support communication on health outreach and on ESIAs, particularly given low levels of literacy (HRW 2013).

There is a high level of social and local community willingness to be involved with health. Community radio and mobile phones may be good current vehicles for communicating on health, while internet media expands over the next 5 years. In 2011, Tete had higher household ownership of both radios and mobile phones than Mozambique as a whole (*Table 4.2a,c*) highest in Cahora Bassa and Tete city and lowest in Magoe and Zumbo (UNDP et al. 2008; InfoAsAid 2012). Community multimedia centres provide a range of resources for health, including a portable radio station, an internet-linked computer, and, in more developed centres, services to link to the local hospital for telemedicine (UNDP et al. 2008; Vannini 2014:97). These resources can support activities that affect SDH and bring incomes to communities, such as promoting markets for local foods or small scale ecotourism, and support process and technology innovations and links between large and small producers, They can be used to disseminate health information, to widen health literacy and to support exchange of community views about social and health impacts of developments and actions taken to improve health. Investment in the infrastructure (ICT and energy) and functioning of these media resources could be levered from the private sector, as was the case in HCB's construction of a community radio and multimedia centre with a computer room, library and conference hall in Zumbo district (HCB 2009).

4.5.2 Corporate contributions to health

The economic growth and diversity of corporate actors in Tete, described in earlier sections, are a potential asset for health and for investments in SDH outlined in earlier sections. This is particularly so if their benefits are more widely distributed, through their employment benefits, linkages with local enterprises, investment in infrastructure, sustainable resource use and through their fiscal contributions to redistributive systems such as health and education.

Companies have made various investments in the development of the province, including:

- In transport infrastructures (by Vale and Thai Moçambique Logística) that could support local markets and communities if they also provide sufficient stops and passenger services within the province (Manning and Marlborough 2012; Besharati 2012);
- In farming of legumes, maize; small livestock cooperatives; local bakery enterprises (by Vale, Rio Tinto and Jindal) that can establish linkages between SMEs and larger companies;
- Support to vocational training on agriculture (Besharati 2012); supplier portals (by HCB) and meetings (by Andarko) described in *Section 3.4,* linking local producers to company tenders.
- Building or refurbishing primary and secondary schools, teachers houses, IT for schools and orphanages; infrastructure for streets, city electricity, water supply systems, parks, police stations, irrigation for agriculture, a sports centre and market facilities (HCB and others);
- Supporting culture, including adult literacy, community radio, cultural conservation of the Boroma ruins and cultural and sporting festivals (Besharati 2012); and
- Rehabilitation or construction of health clinics (by Vale in Moatize village and Jindal in Cahora Bassa), and investment in a night clinic and HIV counselling (by USAID and FICA); malaria prevention (by Jindal), in houses for health professionals; ambulances, food for work programmes, health professional and vocational training, in the water management plan for Tete city; and nationally, in a pharmaceutical factory, including for ARVs (Besharati 2012).

These contributions have been supported by budgets for corporate social responsibility (CSR) that represent significant resource contributions. In 2012, for example, Rio Tinto Tete's combined CSR budget of US$30 mn was reported to exceed the combined multilateral and bilateral aid figure of US$25 mn in Tete (Besharati 2012), although the exact expenditures are not publicly available. The greater share of social spending from the large coal companies has been on resettlement of communities displaced by mining, which with training are costs incurred to conduct their businesses and not CSR. Given their resource potential, there is an argument to move these contributions from ad hoc inputs to more systematic and comprehensive approaches, linked to provincial plans. Some areas of CSR are reported to have been done in an ad hoc manner, with investments not linked to long term development planning or without adequate consultation of communities. The companies have themselves raised concerns over the lack of a coherent government strategy to channel CSR funds (Besharati 2012; HRW 2013). Key informants indicated that government structures in the province were not adequately prepared for the scale of corporate activity in the early 2000s.

By 2014 there has been time to develop these approaches, although the institutional arrangements in Mozambique can make this complicated: Most concessions and contracts are signed in Maputo giving little leverage to the provincial government to embed CSR within provincial plans and creating concerns about local transparency and accountability. The laws clarifying duties are also still being developed. The new resettlement law referred to in *Section 4.2* sets clearer policy frameworks for health and other aspects of community relocations. Corporations also have legal duties to prevent or control environmental and workplace harms to health and tax obligations. While foreign companies do get a range of tax, customs, profit repatriation incentives and state guarantees (See *Section 3.4),* they also have a duty to show that the economic and social benefits of their projects outweigh the environmental impact (Fulbright 2013). In other countries (Europe, the America's, South Africa) laws define these wider socio-economic responsibilities, but Mozambique's law and practice in this respect is still developing, as are its enforcement capacities (Besharati 2012).

Companies can contribute resources, capacities and expertise in selected areas of health and can support infrastructure and equipment for services, particularly if the state provides the infrastructure, personnel and service standards and stewardship to lever these contributions. Various measures have been explored to make these interactions more systematic. A shared reporting framework on performance on economic, environmental and social dimensions can support transparency and communication, such as in the Global Reporting Initiative (GRI). The GRI and sustainability

reporting guidelines sets out the principles and standard disclosures organizations can use to report their economic, environmental, and social performance and impacts (GRI 2014). It is presently being used by Vale. It would be important to review what is being used to motivate for a shared reporting framework between government and large projects on health impacts and performance that addresses key SDH in the province. The funding and co-ordinating mechanisms that may facilitate corporate roles are discussed in *Section 5*.

At various places in the report reference has been made to the contribution of improved employment, incomes and health through SMEs, local producers and community level activities. Local production and marketing of healthy technologies have been raised in *Section 3* for water harvesting, for maintenance and repair of water pumps and improved sanitation, for cooking and lighting and for management and recycling of solid waste. These activities would contribute to environmental health. SME activities on seed production and storage, food storage and food processing, including small scale grain milling, fish farming, rabbit breeding, processing of fruits and vegetables can support nutrition and incomes, especially for women producers and if linked to SME support for irrigation, draught power and other inputs. Community radio, drama, and other cultural activities can be formally contracted to support health literacy and health promotion, especially with youth groups, and to promote community ecotourism. The assessment notes that this can be levered by support from both state and private sector, such as through credit support schemes, awards and business start-up funds for SMEs, training activities, infrastructure and information support for rural trade networks; linking SMEs to supply chains with large projects, using professionally managed warehouses to protect against storage risks and to facilitate loans; implementing local procurement regulations and supporting compliance with food safety and quality in local small scale food producers and processors. Various funds exist that can provide support for such processes, raised in *Section 3,* from public works funding to larger scale financing such as the Innovation and Demonstration Catalytic Fund for food processing, the National Environmental Fund for clean technology, and corporate contributions.

Many potential options for corporate contributions that need to be explored are not resolved at provincial level, including measures such as taxes, earmarked levies and legal duties for social investment. Within Tete, the health sector (DPS and SDSMAS) should be included in the committee for enforcement of the resettlement law, in legal processes on prevention and control of environmental and workplace harms. Companies as a coalition could be brought in by the provincial and district levels to key areas that have public health importance, such as water, sanitation, waste management and disease control, to provide resources, capacities and expertise for health promotion activities, infrastructure and equipment for services and to support local production and marketing activities that are health promoting. There are a range of local production activities that could be fostered through funding, infrastructure, information and training support that would improve employment, income and health. Taking these private sector links forward would imply involving companies and SMEs in intersectoral dialogue. This calls for DPPF co-ordination, but DPS could convene processes with the relevant district health services, companies and local associations on those activities that specifically relate to health promotion and health services, to develop shared goals and reporting frameworks on performance on health and health care.

5. Capacities, resources and co-ordination to deliver strategies

The strategies proposed in *Section 4* propose measures to

i. *Close the gap in improved living conditions* (water, sanitation, waste management and energy) to reach up to 225 000 households over the 5 years.
ii. *Promote and protect health in production activities.*
iii. *Contribute to the co-ordinated multi-sectoral strategies to improve food security and nutrition* set in the PAMRDC, especially in relation to the immediate and underlying causes of chronic undernutrition.
iv. *Expand and improve equity in access to PHC*, and particularly health promotion, prevention, early detection and treatment for common conditions and for engaging and involving companies and communities in these activities.

These strategies call for resources and for investments in a range of health personnel capacities at provincial and district level to address SDH, both within the health sector and in intersectoral work.

5.1 Capacities to implement strategies on SDH and health equity

The strategies raise a range of roles and capacities for DPS and district health services, to:

i. ***Identify, monitor and communicate health profiles, risks and impacts*** related to living and working conditions, risks of disease outbreaks and health impacts of implementation of improvements in SDH, with participatory review by communities, civil society and CHWs. It is proposed that health impact assessment be integrated within EIA / ESIA with involvement of DPS, and for DPS to build a repository of evidence about health and social impacts from developments that can be used to inform more rapid EIA/ESIA of new projects.

ii. ***Identify and link high risk households and people to health and wider social services*****,** mapping family health needs in a life course approach to ensure continuity in care, such as in SRH from adolescence to post natal care; by simplifying eligibility criteria for social protection and nutrition support and including female headed households, those with young children, with people living with HIV and with malnutrition in nutrition interventions.

iii. Ensure ***infrastructures and laboratory, diagnostic and other capacities to deliver on strategies***, to inspect, monitor and test water and air for risks, for safe management of bio-waste from health services, for management of environmental disease outbreaks, including for cholera, ebola and other formidable epidemics; to enforce regulations on health infrastructures for resettled communities; and to support detection, management and care of NCDs, occupational diseases and implementation of ESIA.

iv. ***Train health workers and organise services*** to carry out annual occupational health surveillance of workers and ESIAs; to support prevention and promotion activities with companies on risks of alcohol consumption, HIV, STIs, and NCDs; to support CHWs to implement family maps, identify family capacities and vulnerabilities and support access and early uptake of relevant prevention and care services, and continuity of follow up.

v. ***Link activities to community health literacy and outreach*** to enforce and raise awareness amongst workers, communities, resettled communities and youth on health, on existing laws and services and on gender and social barriers to improved health; to use social media to disseminate information and integrate heath within adult literacy and school curricula; to liaise with and build capacities of workplace health and safety committees and community health committees; and to involve companies in supporting health promotion / campaign activities for workers and surrounding communities.

vi. ***Work intersectorally and support co-ordination of responses***

a. ***on environments for health and ESIA;*** for management of environmental disease outbreaks, including for cholera, ebola and other formidable epidemics;
b. ***on PHC:*** with companies on health promotion and investment in public health services; to support SME activities promoting healthy food processing, environments and health promotion; with the education sector on health promotion in early child education and school health interventions and gardens; and to identify and train district focal points to plan and support literacy, surveillance and promotion on NCDs,
c. ***on food security:*** within SETSAN Tete on planned activities and with agriculture to support household farming, storage and processing of nutritious foods.

Shortfalls in the availability of skilled, qualified personnel were identified in *Section 3.8* as a critical bottleneck in delivery of programmes and services and in quality of care. There has been an improvement in workforce densities, but the national PESS suggests that shortfalls in doctors and specialists, staff turnover and capacity shortfalls limit the implementation of essential public health functions (INS et al. 2012). In 2012, Tete, with a total of 2 066 health sector employees and all districts having at least one physician (GoM Tete 2014), was identified as one of four provinces with a deficit in all categories of health workers, including skilled graduate personnel. Against national targets of 2.0 MCH workers /1 000 inhabitants by 2015, Tete had 1.40 MCH health workers / 1 000 in 2012 and only 1.1/1000 in 2014 (MISAU NDHR 2008; DPS Tete 2014e).

Key categories of personnel would need to be increased by MISAU for current health programmes (to 2.0/1 000 people), while DPS strengthens existing personnel capacities in new areas, including on ESIA, OHS, community health, social communication, NCDs, and health system management, together with measures to improve their OHS, quality of working life and management skills.

Mozambican health workers are reported to perceive a high occupational risk of TB infection, but report challenges in preventing this risk, including shortages of materials, lack of clear guidelines, insufficient motivation and inadequate training (Brouwer et al. 2014). The decentralisation of resources in Mozambique needs to be accompanied by a strengthening of management capacities, to supervise and support health personnel, including CHWs, to work optimally, strategically and within healthy working conditions.

Effective coverage depends on timely distribution of medicines and diagnostics. High shares of health financing are consumed by medicines, especially for ARVs, which consumed 56% of Mozambique's public drug bill (Russo et al. 2014; Dutta et al. 2014). Yet *Section 3* presented evidence on the wide district variation in availability of medicines for maternal and child health (*Table 8.6*). A range of challenges have been identified in the procurement, storage, cost, wastage, stockouts and delays in the distribution of medicines in Mozambique; including staff skills on regulation and quality assurance, and out of date therapeutic guidelines in many interventions (Dutta et al. 2014). Various actions relate more to MISAU at national level, including:

i. Updating the Essential Medicines List (Dutta et al. 2014) and
ii. Enforcing 15% price markups permitted in retail pharmacies and addressing medicine price variation between private and public sales (Médecins Sans Frontières et al. 2003).

Within the province, district and provincial level intervention is reported to be needed on

iii. Gaps in the cold chain affecting vaccine distribution (Lamble 2013).
iv. Poor coordination across stakeholders and weak procurement capacities in a partially decentralised system for medicine distribution - with Central de Medicamentos e Artigos Médicos (CMAM) responsible for distribution to provinces, DPSD for distribution to districts and delays of up to 6 months in medicines reaching level 1 facilities (Dutta et al. 2014; Lamble 2013). Some work on this is underway in Tete (personal communication DPS Tete 2014).
v. Wastage of medicines due to expiry and damage. Wastage in vaccine delivery was 18% in 2011, higher for individual vaccines. In the PESS, reducing wastage to 5% was estimated to result in savings of US$332 mn in 2014-19 (Dutta et al. 2014).

To address these constraints, the PESS aims to update the essential medicines list, improve training for planning, regulation, inspection and quality assurance of medicines, develop or rehabilitate warehouses and develop or update therapeutic guidelines for interventions (Dutta et al. 2014). Investments have been made in improving the distribution of medicines from the national warehouses, with a barcode system and a perpetual inventory to track medicines, and mobile messaging to liaise with facilities; and corporate 'loan' of trucks and drivers to support distribution (Lamble 2013). The 60% of revenue generated from inspections and quality assurance of medicines that is retained by MISAU funds improvements in this area (Sitoe 2010).

Information and communication capacities are an important contributor to managing SDH and improving health equity. The health information system (Sistema de Informação para a Saúde or SIS) has more than ten systems and applications that are not inter-operable. The data is not all disaggregated, such as by sex and/or age, limiting equity analysis. MISAU has sought to improve the SIS by producing a guide, manual and support text on gathering, analysis, interpretation and publication of data; and has expanded computerisation of data (UNDP et al. 2008). The Tete 2012-2021 Plan calls for actions to develop and implement mechanisms to monitor and evaluate the progress and impact of activities on gender and health. Information managers in health units and at district level could be supported by the province to shift from a current practice that largely focuses on collecting, aggregating and dispatching data to higher levels, towards greater local analysis and use of the SIS in health management decisions, including through tools that bridge community involvement such as social maps and family health maps (GoM Tete 2014).

A range of national measures are thus underway to support improved medicine supplies and distribution in the province and health information systems. It would be useful to implement a periodic (one in three years) vital and essential medicines availability survey to track improvements in supply and address gaps. The province (DPS) could improve skills in use of the SIS for health management and evaluation, including through community tools, and could build a repository of information and experience on health and social impacts from ESIAs, and other health audits.

5.2 Resourcing strategic interventions on social determinants

The evidence in *Section 3.8* and *Section 4.4* highlights trends towards increasing population density per level 1 (clinic) facility in nine of the thirteen districts, a significant range in per capita spending on health across districts, with selected districts below the annual per capita levels costed for the PESS 2014-19 (MISAU 2014) and a variation across districts in infrastructures and quality of equipment. Only in Chiuta and Tete City did all clinics have working communications in 2013, and Macanga, Changara and Angonia had particularly low shares with functional communications (DPS Tete 2014). In terms of equipment, 75% of health facilities reporting on this in the province had functioning cold chain equipment for vaccinations (DPS Tete 2014e) but with data gaps from seven districts. There was no information available on the shares of facilities that have functioning improved water and sanitation, electricity or facilities for incineration of biowaste, information that could usefully be added to what district health services report and DPS compiles annually to support negotiations for health facilities to be prioritised in investment on infrastructure.

As described in *Section 4.4* financing shortfalls were identified on plan requirements in all scenarios for 5 years for the PESS 2014-2019. The three scenarios, conservative (with increased government, current international Prosaude funding, and falling Global Funding); optimistic (with significant growth in government funding, little change in Prosaude and full Global Fund disbursement) and ambitious (with further rise in government spending and Prosaude contributions) are shown in *Table 5.1a*. All three have a resource shortfall to 2016 and only the less likely ambitious scenario shows any surplus thereafter. Further, as discussed in *Section 3.8,* Tete received amongst the lowest per capita allocation in 2014, despite its higher heath need, with highest per capita deficits in Tsangano, Macanga, Chifunde, Changara and Angonia.

Table 5.1a Financing shortfalls for the PESS by scenario, 2014-2019 US$ millions

Scenario	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Conservative	-454	-465	-449	-397	-378	-358	-2,502
Optimistic	-258	-279	-243	-173	-154	-145	-1,252
Ambitious	-214	-149	-40	102*	199*	299*	197*

Source: Reproduced from Dutta et al. 2014. NB: negative values indicate a shortfall; * = surplus

The shortfall in allocation to and within the province is compounded by the fact that the central allocation to provincial level has fallen, and that to the districts has grown substantially, as shown in *Table 5.1b.* With the wide diversity in health coverage and outcomes across districts in Tete province, the reduced capacity of the province to redistribute resources given its reduced budget share makes equity in allocation of central resources to districts even more important.

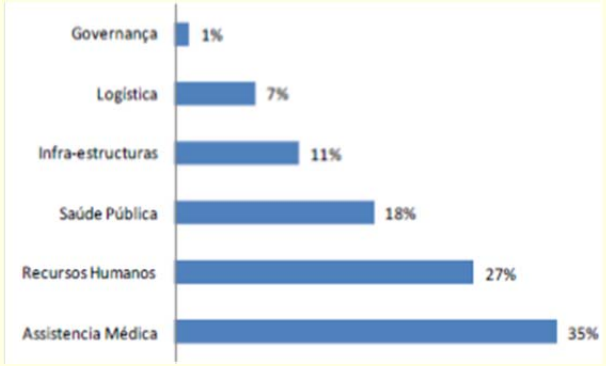
Table 5.1b Trends in resource allocation across central, provincial and district levels, 2010-2014

Indicator	**% in 2010**	**% in 2012**	**% in 2014**	**Trend 2010-2014**
% Central level share of health sector funding (MISAU)	56	65	58	na
% Provincial level share of health sector funding (DPS)	38	24	25	-15%
% District level share of health sector funding (SDSMAS)	5	11	16	+618%

Source: FDC et al. 2014b

The evidence provided suggests that Tete faces a significant deficit on the national 2014-2019 PESS estimate of a total minimum cost for the planned activities of $28/capita for district level and below (MISAU 2014), particularly in Angonia, Changara, Chifunde, Macanga, Mutarara and Tsangano. The actual cost of deficits in coverage would need to be assessed at district level, using gap analysis for capital costs, the one health tool for recurrent spending and with mid-term financial planning in the province. For Macanga and Tsangano particularly high deficits in personnel suggest a need for deployment of personnel to improve capacity to absorb resources. Tete's poorer budget allocation relative to need means that the provincial government and partners would need to use both costings and outcome monitoring to ensure that the province's relative share of recurrent funding improves in a projected rising national health budget, and gap analysis to show the capital deficits. With wide variations across districts and inequities between needs and resources, there is need for strengthened planning by DPS and district health services jointly, and with DPPF on mid term forecasts, fiscal planning and formulae for resource allocation. Improved sharing of finance information can also be used to engage and align private sector contributions to public plans.

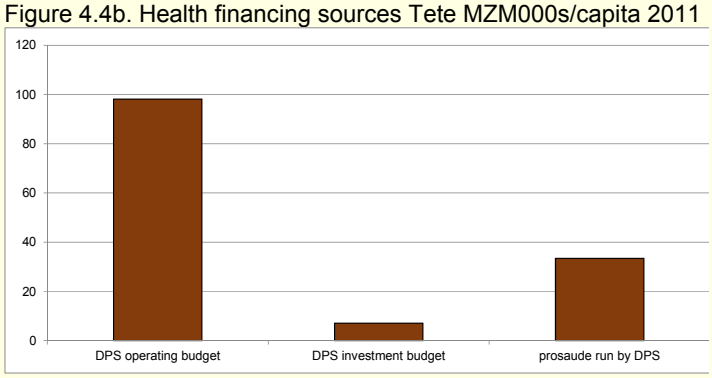
Figure 4.4a. Distribution of national health service costs 2014-2019



Source: MISAU 2014

The expenditure in Tete province in 2012 according to data provided by DPS was 265 599 000 MZM including DPS and hospital recurrent, investment and prosaude spending, but excluding off budget and private spending (DPS 2014f,g). This equates to US$3.58/capita, well below the MISAU plan level. It suggests a need to integrate equity in recurrent resource allocation to districts in the province from central level, to address deficits, noting the distribution of population, health needs and coverage gaps raised earlier. There is a window of opportunity to improve equity in allocation of resources without reducing budgets to any districts, as total national health spending is projected to almost double between 2012 and 2017, with the larger share of this from a significant rise in public spending (5.76bn MZM to 20.13 bn MZM in the period). The greatest cost demand is projected to come from medical care services, followed by costs of health workers and public health, indicating the possibility for improving equity in these areas of delivery (*Figure 4.4a*). Government's role in health funding is projected to rise from 8% in 2012 to 10% in 2017, in part due to improved income from economic activities (MISAU 2014).

Figure 4.4b. Health financing sources Tete MZM000s/capita 2011



Source: DPS Tete undated

Within Tete province, public budgets, international 'Prosaude' funds administered by DPS Government (on-budget support) and off-budget vertical disease funds (such as USAID, GAVI, CHAI and Global Fund) are major sources of health financing (*Figure 4.4b*). It will be important to ensure that public and Prosaude funding is directed towards areas of high need. *Section 3.8*, reported greater inequities between heath needs and health resources in Angonia, Changara, Macanga, Moatize, Mutarara and Tsangano, but also evidence of improved resource allocation in Angonia, Changara, Moatize and Muatarara. Further, as noted in *Section 3.8,* it would be useful to identify why health outcomes are poorer in better resourced Cahora Bassa and Tete city than in less well-resourced Angonia and Tsangano, to strengthen positive practices and address gaps. Such discussions call for strengthened co-ordination of mid-term financial planning in Tete between DPS, districts and provincial and district governments (DPS Tete personal communication 2014).

At the same time there are now opportunities to tap new sources of funding, including from private sector. While various national level earmarked taxes have been proposed on airline travel, alcohol, tobacco and fuel (Dutta et al. 2014), within Tete, the increased demands on the health sector from environmental, occupational, transport risks and NCDs raises attention to:

a. Negotiating a more equitable allocation of resources *to* the province from the national budget, given its higher health need in terms of population growth and health outcomes,
b. *Within* the province, implementing a gap analysis on infrastructure and equipment and integrating health needs, workloads and poverty into a more transparent fornula for recurrent resource allocation, backed by measures to support capacities to absorb resources, to share skills and capacities across districts and for performance reporting on use of funds;
c. Engaging the private sector on contributions to provincial plans, as outlined in *Section 4.5*.

Private contributions should come from improved, fairer taxation, as raised in *Section 3.4*. In the current context of low fiscal contributions, other measures such as development or social impact bonds (DIBs) have also been proposed, where private investors, foreign funders and governments fund shared development goals. Investors pay the costs, in advance, of interventions, and are repaid (with interest) by external funders and / or governments if the interventions meet verifiable results (GAIN, 2013). While work is reported to be underway in Mozambique on developing a DIB

for malaria prevention and care, there are challenges in setting indicators for complex problems and in paying interest on social investments (Sarkisova 2014). Law 1/2013 (whose name was not availed) was raised by key informants in Tete as requiring that 2.75% of production profits are applied to benefit water, community, health centre, road, school and other local projects. The funds are collected by the treasury and allocated to DPPF to be spent in districts where the businesses are located or where people are resettled (KI Tete 2014). Moatize faces numerous coverage gaps that would benefit from such funds. For Cahora Bassa the gap in health outcomes does not appear to be so directly related to resource shortages so adding further funds may not address the causes of poor outcomes. These funds may also be better spent in provincial training, laboratory, and other programmes that benefit districts where businesses are located and other resource poor districts.

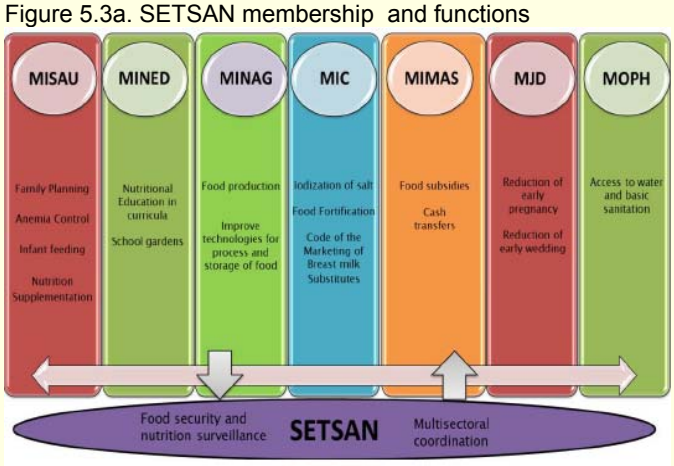
5.3 Planning and co-ordinating social determinants and health equity

The discussions on different SDH repeatedly raise the importance of planning and co-ordination across sectors and actors, given the range of cross cutting issues. Multisectoral plans and mechanisms exist for food security and nutrition, but are also needed for addressing environmental health, for health promotion, preventing and managing NCDs, for epidemic and disaster management and for managing resettlement and urbanisation, amongst other areas. Access to improved water and sanitation is perhaps one of the key areas for coordination across sectors and stakeholders, identified as a priority by DPPF, together with resettlement, environment and decentralisation. Tete Province has established a provincial SETSAN to support multi-sectorial actions on food security and nutrition, established by Decree 24/10 in July 2010 under the Minister of Agriculture. It has administrative autonomy and a membership as shown in *Figure 5.3a* (Ferrao, 2014). Its effectiveness has been enhanced by:

- high level support and leadership giving it visibility and power to intervene;
- shared goals and policy alignment across members;
- diverse skills and funds from members;
- involving civil society and private sector; and
- strong monitoring and evaluation systems and public reporting on results (Ferrao 2014).

As noted in *Section 4.3*, following the 2014 PAMRDC evaluation, in 2014 improved planning led to the health sector reportedly spending over 65-70% of its PAMRDC allocation (*Section 4.3*; Personal communication DPS Tete 2014; Ferrao 2014).

Figure 5.3a. SETSAN membership and functions



Source: Ferrao 2014

While the work on nutrition is most developed, the Tete 2012-2021 Plan raises the need for inter-sectoral co-ordination and integrated management plans in towns and district headquarters for other cross cutting issues, including actions on disasters, HIV, environments, and cultural and technological innovation (GoM Tete 2014). The private sector and community have roles in many of these areas. Facilitated by the Mining Health Initiative (MHI) key stakeholders have, for example, discussed a public-private partnership on health services (MHI 2013). The involvement of companies in a more sustained partnership for health that is integrated within provincial planning calls for a wider policy and legal framework (Besharati 2012). This would not pre-empt a more immediate direct engagement between the health sector and the businesses in the province on health issues, including health promotion, control of health risks and delivery of health services.

Learning from the SETSAN-Tete, it would be useful to strengthen intersectoral co-ordination through cross department working groups through to wider more formal arrangements on:

a. Water, sanitation, waste management and household energy - including in Tete city;
b. Integrating health in and building capacities for ESIAs, particularly with MICOA;
c. Prevention and control of risk factors for NCDs;
d. The organisation of infrastructure and services in resettlement areas;
e. School, youth health programmes; and workplace health in large companies and SMEs; and
f. Networking community level workers, tools and methods to integrate of disadvantaged families/ individuals within social protection, economic programmes and social services.

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7. Acronyms

ADB	African Development Bank
bn	billion
CHW	community health worker
CSR	corporate social responsibility
EIA	environmental impact assessment
EITI	Extractive Industries Transparency Initiative
EMP	environmental management plan
ESIA	environmental and social impact assessment
FDI	foreign direct investment
GDP	gross domestic product
GoM	Government of Mozambique
HDI	Human Development Index
IFC	International Finance Corporation
IMF	International Monetary Fund
IMR	infant mortality rate
INE	Instituto Nacional de Estatística – National Statistics Institute
MDG	Millennium Development Goals
MICOA	Ministério para Coordenação da Acção Ambiental – Ministry for the Environment
MICS	Multiple indicator cluster survey
MPD	Ministério de Planificação e Desenvolvimento – Ministry for Planning and Development
MISAU	Ministério da Saúde – Ministry of Health
MMR	maternal mortality rate
Mn	million
MT	meticais (Mozambican currency)
MW	megawatt (unit of power)
NCD	non communicable disease
PARP	Plano de Acção de Redução da Pobreza – Poverty Reduction Strategy Paper
PEDSA	Plano Estratégico para o Desenvolvimento do Sector Agrário
SADC	Southern African Development Community
SDH	social determinants of health
SIA	social impact assessment
SDSMAS	Serviços Distritais de Saúde, Mulher e Acção Social
SME	small and medium enterprises
SRH	sexual and reproductive health
STIs	sexually transmittable infections
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFPA	United Nations Family Planning Association
WHO	World Health Organization
ACS	agentes comunitários de saúde
CMAM	Central de Medicamentos e Artigos Médicos
DPS	Direcçõe Provinciais de Saúde
HIV	human immunodeficiency vorus, vírus de imunodeficiência adquirida
INS	Instituto Nacional de Saúde
PESS	Plano Estratégico do Sector Saúde
SIS	sistema de informação para a saúde
SMI	saúde materno infantil
SNS	Serviço Nacional de Saúde
TARV	terapia antiretroviral/ ante-retroviral therpay
U5MR	under 5 mortality rate

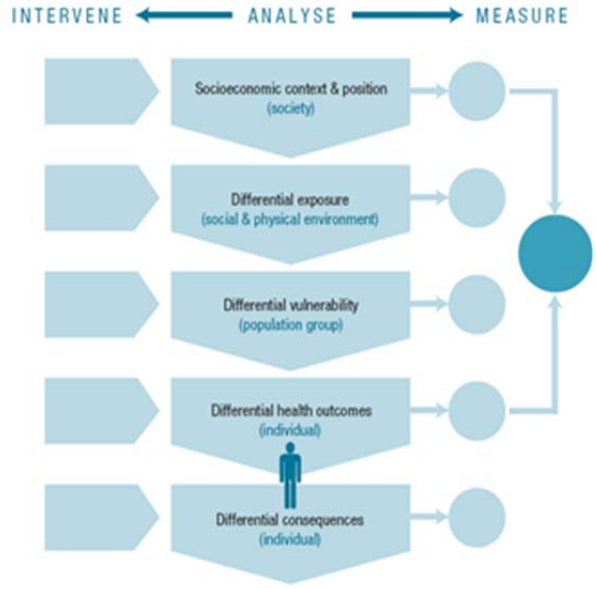
8. Appendices

Appendix 8.1: Framework for analysis of SDH and health equity

The rainbow model provided a broad framework for the areas of evidence gathered for the situation mapping. The analysis sought to

1. Identify and focus on the SDH that have the greatest impact on population health, that are also projected to increase in the next 5 years
2. Identify feasible interventions at different levels of determinants that address the differences in exposure to, in vulnerability to, in the health outcomes of or the consequences of the prioritised SDH (See Figure A1)
3. Identify whether interventions / actions can be done (i) by DPS Tete directly, (ii) by DPS Tete jointly with other specified sectors, (iii) by DPS Tete engaging other sectors to act or (iv) by all sectors within general government policy.
4. For health service interventions, identify whether they are aimed at improving availability; accessibility (geographic and financial), acceptability and/ quality to strengthen effective coverage
5. Identify whether interventions/ actions are short, medium or long term

Figure A1: Analytic framework for interventions on priority public health conditions



Reproduced from Blas and Sivasankara Kurup 2010:7

The assessment gathered evidence on those SDH that influence the distribution of wellbeing and ill health, including the availability, access and coverage of health services as a social determinant itself. Evidence was gathered on the current situation, and documented social differentials, trends and projections (where available) for Tete province, on the within province district variations, on time trends 1995-2013 and on Tete province in relation to Mozambique national data for:

THE POPULATION
Demography
Population health
PEOPLE'S LIVING, WORKING AND SOCIAL CONDITIONS
Food security, diets and nutrition
Living conditions
Employment and working conditions and incomes
Community environments and social networks-
SOCIO-ECONOMIC, ENVIRONMENTAL CONDITIONS AND SERVICES
Geography, resources and environments
Economic infrastructure and activities
Social services- Population and public health services; Education and Social protection and security
POLICY AND INSTITUTIONAL ENVIRONMENT
Political and administrative
Community and stakeholder participation
Cross sectoral interaction and co-ordination

The analytic framework and key areas of data collection were agreed with DPS Tete and Danida. Templates were provided for inclusion of evidence from routine data and published statistical documents and surveys, and an interview structure provided for key informant interviews in line with the framework.

Appendix 8.2: Key informant interview list

Key informant	Interviewed by
Tete province	
Directorate of Public Works and Habitation	TARSC and DPS Tete
Directorate of Agriculture	TARSC and DPS Tete
Planning and Budget Division, Directorate for Planning and Finance	TARSC and DPS Tete
Directorate of Minerals, Energy and Environment	TARSC and DPS Tete
Human Resources Division, Directorate of Education and Culture	TARSC and DPS Tete
Planning Division, Directorate of Education and Culture	DPS Tete
Directorate of Labor	DPS Tete
Vale Foundation in Tete	DPS Tete
National level	
IMPACTO	TARSC
Public Health, MISAU	TARSC
Finance and Planning, MISAU	TARSC
Mechanism for Civil Society Support (MASC)	TARSC
Gender, DANIDA	TARSC
Growth and employment program, DANIDA	TARSC

Appendix 8.3: Economic developments in Tete Province, post 2005

Company	Origin	Activity	Date started	Other
COAL MINING				
Vale do Rio Doce Mozambique Co. for Mining and Exploration (state) holds a 15% share of Vale's operation in Tete	Brazil Mozam-bique (10% held for national investors	Coal mining US$123 mn for the mining rights $1.3 bn coal mine built in Moatize	Feasibility work 2005/6. Awarded a 5 year license in 2008 Production start date phase 1 2011, phase 2 2015	By the end of the 5 years, Vale is expected to produce 12mn tonnes of coking and thermo-coal, mainly for Asian exports and 8.5 mn tonnes of metallurgical coal, for steel.
40% share by Tata Steel, 10% China's Wuhan Iron& Steel Company in 2010, 65% stake acquired by ICVL India from Rio Tinto operating as Riversdale	Was UK/ Australia, sold in 2014 to Indian co China	Coal mining Mining concessions of 290 000 ha for Benga, Zambeze and Tete East in coal mining	Concession acquired 2011 from Riversdale. 25 year mining lease granted. production start date Benga-2012, Zambeze – 2014	Benga: first exports scheduled end 2011 Zambeze: first exports scheduled late 2014 ICVL paid US$ 50mn for 65% stake in July 2014
Midwest Africa; 5% stake in Empresa Moçambicana de Exploração Mineira 5% to Moz public	India Mozam-bique	Coal Mining US$1.416 billion 50kn from Tete, 158.4 square km	License granted in 2011; Start date March 2014 25 years license held	480 million tons of coal, of which 363 million tons are coking coal and the remainder is thermal coal.
Jindal Steel	India	$200 million coal mine in Marara, Cahora Bassa. Also intends to build power plants in the country.	Explorations 2008, license 2011/2 for 10 mn tonnes high grade coal/year Start date 2013	Peak yearly production of 3 mn tonnes coking coal.
Beacon Hill Resources Plc subsidiary BHR Mining Limited,	Australia	Minas Moatize open pit coal mine. 2011 acquisition of coal license in Moatize	Production start date 2011	180,000 tonnes mined in over 2012; (See later coal handling and preparation plant)
African Coal India Coal India subsidiary	India	Granted license for 2 blocks in Tete	Production start date 2015	Export to India to support coal power plants
Eurasian Natural Resources Corp	Kazakh-Stan; UK	Coal mining Cahora-Bassa	Start of production 2013	6mn tonnes coking coal; 4mn thermal coal
Mozambi Coal 70% with Camal & Companhia Lda.	Mozam-bique	Two licenses i. Zambeze Coal Basin 2011; 80% in Songo	Not available	Total area 609km2. Also in Tete W, Mututara
Ncondezi Coal Co With Rio Tinto Coal and Moz Minas de Revuboe	UK Japan, Korea, Australia	Coal mining 38 700 ha in the Zambezi Basinto export up to 100 mn tonnes of coal per year	Production start date 2014	Open pittable 10 million tonne per annum export thermal coal operation (See later in 'power')
Minas do Revuboé	UK EUA	Revuboè coking and thermal coal mine. Potential of 17Mtpa.	2014 March 25 yrs license . Production start date 2015	http://www.revuboe.com/home
TRANSPORT				
Northern Corridor Development Company (SDCN) 51% shares owned by Vale do Rio Doce and 49% by a Moz. consortium, headed by Insitec.	Brazil Mozam-bique	Northern railway in Moz and Nacala port. $4.5 bn Investment to connect Moatize to new coal terminal in Nacala port. Existing line by Central East African Railways.	Vale bought its share in SDCN in 2010. Aimed to build the line in 27 months- completed in 2014.	For coal transport; Line tested December 2014. Will offer service to all coal producers to reach 18 million tonnes by 2017, linked to development of Nacala port
Eurasian Natural Resources Corp	Kazakh-Stan; UK	Moatize-Nacala Rail line	Proposed investment	1070 km line, cost $4bn
Thai Moçambique Logística -Italthai Eng Codiza and SOE CFM).	Thailand Mozam-bique	US$ 3.5 billion. Railway construction; Macuse port terminal	525 k railway line Moatize to Macuse (Zambezia)	For coal transport Completion expected by end 2015
INDUSTRY / PROCESSING				
Beacon Hill Resources Plc subsidiary BHR Mining Limited,	Australia	Commissioning a coal handling and preparation plant ('the Washplant'),	Not available	Linked to mine in Moatize; enabling Minas Moatize to produce Moz first export grade washed coal.

Company	Origin	Activity	Date started	Other
Capitol Resources, Subsidiary of Boabab Resources	Australia Mozam-bique	Iron ore smelting US$1bn; 85 % owned by Baobab, 15 % share held by IFC	Iron ore smelter in Moatize for vanadium, titanium by product refining by 2016	Reserves of 750 mn tonnes iron and capacity to produce one mn tonnes pig iron per year and employ 500 workers (currently 66)
Biworld International	China	Cement production	Cement factory in Changara district	Capacity for 500 000 tons of cement per year
GoM 90%; other 10% divided equally between state firms (INSS; EMOSE; EDM and TDM.	Mozam-bique	Grain processing	Ulongue, Tete, started in 2012	Able to mill 100 tonnes of grain a day
ENERGY and WATER				
Sonipal Moz GoMoz electricity company EDM Rutland Holding and Hydroparts Holding, Cazembe Holding	Mozam-bique Mauritius	Two dams,one at Boroma (200 MW $572 mn). One at Lupata Gorge (600 MW, $1 bn)	contracts signed on 22 August 2014	Boroma dam down-stream from Cahora Bassa, 24km up-stream from Tete city. Lupata Gorge 100 km downstream from Tete city
INSITEC 40% in partnership with Camargo Correa 40% and EDM 20%	Mozam-bique	Mpanda Nkuwa dam and building / rehabilitating the Lúrio, Massingir, Alto Malema and Mavúzi and Chicamba hydroelectric power stations.	Power purchase agreement with Eskom for the investment after an ESIA; Government approved a centre-south transmission line (CESUL)	US$2.8 billion for a hydroelectric power plant with a 1,500 MW capacity and transmission infrastructure to Maputo; will also benefit Malawi, Zimbabwe, Swaziland, South Africa and Botswana
Ncondezi Coal Company Partnership with Minas de Revuboe and Rio Tinto Coal Mozambique, with Nippon Steel, POSCO, Talbot Gp	UK Japan, Korea, Australia	Announced intention to build thermoelectric powerstations to supply electricity to their mine and supplement electricity in Mozambique and South Africa.	Not available	Also involved in coal mining in Zambeze
Consortium led by ACWA Power, with Vale, Mitsui Co. Ltd, State owned Electricity de Mozambique (EDM) and local Whatana Investment Gp	US Brazil, Japan Mozam-bique	Power production US$ 1bn investment, creating > 2 800 jobs during construction and 160 permanent skilled jobs during operations.	Moatize coal fired power project in Tete; Construction of the 300 MW first phase project, 250 MW to Vale, 50 MW to the Moz grid.	Pulverised fuel, subcritical coal fired power station Coal supplied by Vale Sponsors committed to a comprehensive community development programme, including training of 1 000 locals
India ICVL Consortium	India Moz	Power production Cahora bassa	Projected	Awaiting sale of electricity conformation
AGRICULTURE				
Beira Agricultural Growth Corridor (BAGC) Gov of Moz with ODA	Mozam-bique UK Norway Nether-lands	Promotes increased investments in agriculture and agribusiness in the Beira Corridor (Tete, Sofala and Manica).	Launched in 2010	Rio Tinto and BAGC Initiate working to ensure that vegetables in Tete mining canteens grown in Moz; http://www.beiracorridor.com/?__target__=home
Govt Mozambique, British Government, Rio Tinto AgDevCo	Mozam-bique UK	Private investment for small farmers near mines in Moatize, to boost yields for local markets	Agreement signed July 2012	initial investments of up to US$500 000 for irrigation, new crops to link local farmers and businesses into the mine's supply chain
HEALTH				
Africa Medical Investments	UK	New clinic in Tete		

Sources: Besharati 2012; Kabemba 2012; AMDCM 2011; World Bank 2010b, 2014b; Macauhub 2014a,b,c; Hanlon 2012; 2014; Banco Espirito Sancto 2012; MHI 2013; Manning and Marlbrough 2012; World Coal 2014; TMSA 2013; Cichava et al 2013

Appendix 8.4: Environmental laws and plans

Area	Approach
Land – involuntary resettlement	Decree 31/2012, the new "Regulation on the Resettlement Process Resulting from Economic Activities; and Resettlement Committee.
Water	National Water Resource Plans in Mozambique and other SADC countries; Revised Protocol on Shared Watercourses and the Regional water Policy, including principles for water allocation and early warning systems.
Urban development	Territorial planning instruments to manage the growth and development of urban settlements to manage impact of unplanned urban development on natural resources such as water and land. Tete has an Urban Structural Plan in place since 2012 (MICOA 2012).
Disaster management	Local disaster management committees throughout Mozambique to protect and manage the impact of natural disaster
Environmental Inspection	Environmental Inspection Regulations approved by Decree no. 11/2006,
Emission of Effluents	Regulations on Environmental Quality Standards and the Emission of Effluent, approved by Decree no. 18/2004, of 2 June, with the alterations introduced by Decree no. 67/2010, of 31 December
Environmental Audits	Regulations on Environmental Audits, approved by Decree no. 25/2011,
Marine and Coastal Environment	Regulations for the Prevention of Pollution and the Protection of the Marine and Coastal Environment, approved by Decree no. 45/2006
Waste Management	Regulations on Waste Management, approved by Decree no. 13/2006
Petroleum	Environmental Regulations for Petroleum Operations, approved by decree no. 56/2010
Asbestos and derivatives	Regulations on the Banning of Asbestos and its derivatives, approved by Decree no. 55/2010
Traditional Knowledge	Regulations on Access to and Sharing Benefits from Genetic Resources and Associated Traditional Knowledge, approved by Decree no. 19/2007
Ozone layer	Regulations on Managing Substances that Destroy the Ozone Layer, approved by Decree no. 24/2008, of 1 July Resolution no. 78/2009, of 22 December, on the banning of the import, export, production, sale and transit of substances that destroy the ozone layer
Exotic Invasive Species	Regulations for the Control of Exotic Invasive Species, approved by Decree no. 25/2008
Mining	Environmental Regulations for Mining, Decree no. 26/2004; Basic Environmental Management Norms for Mining, Ministerial Diploma no. 189/2006

Sources: MICOA 2012; SARDC et al. 2007; Wingqvist 2011

Appendix 8.5: Tete Provincial government plan 2009 to 2014

Sector initiatives
Mineral resources: Improve knowledge, encourage local value addition, and promote SME development, mining mechanization, and the establishment of associations. ***Agriculture:*** Promote the use of cattle in land cultivation, develop irrigation systems, update the land registry, revive the rural trade network, secure the supply of inputs, and promote local production of improved seeds, improved farming techniques, and agro-processing to ensure food security. ***Fisheries:*** Establish vocational training centers, support artisanal fisheries and fish farming, promote the establishment of fishermen's associations, introduce zoning in the Cahora-Bassa Lake, and develop technologies for fishing, processing, and preservation. ***Tourism:*** Extend the hotel network, promote conservation areas for ecotourism, and develop niche services such as heritage, cultural, community, leisure, and sport fishing tourism
Cross-cutting initiatives
Industry and trade: Improve the operation of the One-Stop Shop, attract medium and large industries, and establish storage capacity for agricultural products. ***Infrastructure support for economic development:*** *Energy*. Expand the distribution network from the Cahora Bassa, assess the feasibility of harnessing hydropower potential, encourage the use of renewable energy and energy imports from neighboring countries to the border districts, implement the M'panda-Uncua dam project. ***Transport and communications*.** Modernize communications systems, improve postal services, expand the network of meteorology and fixed and mobile telephony, establish passenger and cargo terminals, inland waterway transport and road safety, and reinforce existing airfields. ***Border and regional cooperation relationship:*** Promote transnational cooperation, develop cross-border eco-tourism, and enhance access of health services, transport, trade, energy, and water in border regions. ***Modernization of public administration:*** Restructure the provincial government, promote actions to attract qualified personnel, build and rehabilitate public infrastructure, strengthen assistance to district and municipal bodies to improve performance; promote participatory district planning and training advisory councils, consolidate the expansion and implementation of the Local Bodies of State to the City (*Órgãos Locais do Estado até à Localidade*), and modernize public institutions and e-government. ***Environment:*** Establish committees for the management of natural resources, develop and implement plans for integrated management in towns and district headquarters, develop plans for use of land, and control soil erosion. ***Public works and housing:*** Rehabilitate Tete Bridge, expand network of roads and bridges, and improve access from the capital to district headquarters and rural areas. ***Basic social services:*** *Education and culture*. Build new high schools in a number of districts, train more teachers, strengthen technical and vocational schools, advance measures of literacy and adult education, build an Institute of Primary Teaching in the city of Tete and a campus of the Polytechnic Institute, and expand public and private higher education.; *Health*. Hire doctors in seven districts and qualified staff in other districts, build a hospital in the city of Tete, construct, rehabilitate and expand health centers in densely populated areas, and promote measures to prevent and combat communicable diseases; *Water*. Provide safe water to rural areas and promote education on sanitation.

Source: Government of Tete 2009 in World Bank 2010b

Appendix 8.6: Strategies in the Tete PESS undated

STRATEGIC OBJECTIVE 1: Improve the quality and provision of services
Reduce rates of low birth weight to below 7%; Increase the coverage of Vit. The children's and Postpartum
Improve the quality of preventive health services; Improve care SMI; Recycling of MCH staff in IMCI
Follow-up visits and evaluation. Construction-home-mom expects to increase deliveries INSTITUTIONAL
Make family planning talks about involving men; Research on low-coverage in INSTITUTIONAL births
Recycling and supervising TBAs; Recilagem the SMI staff COEB and PTV. Increased vaccination coverage
CHAEM: Improving conditions of service; Laboratory Services of water and foods and improved through quality control. Ensure sanemento control the environment in coordination with other institutions.
Disseminate good food hygiene practices through health education, the media and health inpecções estabebelecimentos in handling foodstuffs
Ensuring greater control of occupational health hygiene and work safety
PHARMACY: Raise the quality of provision of pharmacy services in the province
Improving conditions for supply of medicines; Speed the logistic system of distribution of medicines
MENTAL HEALTH: Training of clinicians to diagnose and correct conduct of cases of mental illness
Travel to supervision and consultation; Meeting to exchange experience with AMETRAMO
Promotion and publicity measures to prevent over consumption of psychoactive substances
Supervision and monitoring of activities in the districts. Improve transport; Home visits to patients
EPIDEMIOLOGY: Clinical training of focal points of all sanitárias and district surveillance units based on the case. Laboratory technicians training in the collection and handling of samples and shipping your flowchart.
Acquisition of equipment necessary for collection, storage and shipment of samples
Research situation of VE based on the case in silencers districts and monitoring of activities

STRATEGIC GOAL 2: Improve equity and access to health care.
Expansion of the health network; Build residences for staff. Technical advice in planning for 2 years
Advocate , with the MOH (GACOP) for compliance with the proposed investment made by DPS
Training for work in the field of SIS; Create a system of cross-checking the Social Economic Plan through consultancy; Spread the mission of the DPS at all levels; Monitor the strategic plan; Develop and monitor the annual work plan based on SSEP; Create a system of information flow and communication at various levels; Create in coordination with MOH , a single script for preparation of annual plans and reports
Research on the performance of Insttituição; Supervision of analysis and interpretation of statistical data
Exchange of experience; Complete the Provincial Coordinating Council; Integrated Planning Seminar; Acquisition of Printed SIS; technical training DPPC
NURSING: Dissemination of biosafety regulations; Introduction of standardized to U.S. standards more perféricas; Introduction of PCI standard s in U.S.
RADIOLOGY: Expand Radiology network and building in Marávia; Mount and maintain RX equipment; Acquire contrasts for radiological; Supervise activities;
ASRH 's: Expand the program to all districts of the province; Form new providers for implementing districts; Supervision and technical support; Construction of ASRH 's in all districts; Training of provincial trainers; Encounters with coodernação DPJD and DPE; Dating rocking with the DDSs and head of the district 's ASRH; Placing a Kit for ATV 's in ASRH; Study of the CAP for A / J on methods of preventing pregnancy and HIV / AIDS; Building a ASRH 's reference in the City; Purchase of a vehicle for the program
Through 2011 are covered 100 % of young people with sufficient information in respect of ASRH 's
Sensitize health personnel; Dissemination of biosafety regulations will all levels. Introduction of standardized up to more peripheral health centers standards and PCI standards in health facilities.
MALARIA: Expansion intradomiciliária spraying to 9 more districts; Introduce antilarval fight in Tete, Moatize, Angónia; Distribute mosquito nets for all ages ; Supervision of handling cases of malaria in all districts of the province ; Monitoring and evaluation of intradomiciliária spraying campaign in the districts of Tete, Moatize, Mutarara and Cahora Bassa ; Introduction of using DD for IRS in 4 districts
TB / Leprosy : Regular meetings 3/3 months with district supervisors of the program; Training of nurses in U.S.; Training of community volunteers ; Isoniazid prophylaxis ; Supervisory districts
PRID Expanding the program to 8 more U.S. ; Expansion of the Laboratory for 8 more U.S.

STRATEGIC GOAL 3: Instituitional Development.
Improve the management of human resources.

STRATEGIC GOAL 4: Combat HIV / AIDS and mitigate its impact.
Training on new clinical approach, syndromic STI ; Train 65 community counselors; Meeting to raise awareness about STIs HIV / AIDS (LC PMT , teachers , students and LR); Train 90 technicians on ART ; Train 26 pharmacy technicians in ARV management; Train physicians and nursing staff in HTA and ART and 12 technicians in SIS for ART; Surveillance of HAART expansion; Supervise activities of the integrated network of HIV / AIDS and work training; Hold meetings of an integrated network of HIV / AIDS
Source: DPS Tete (Draft undated)

Appendix 8.7 Overview of public social protection programmes

Programme/intervention	Areas covered	Gaps
Programmes for people who are extremely poor and who are physically unable to work		
Direct social assistance (PSA): unconditional cash transfer and food subsidy programme from MMAS/INAS via cash transfer.Includes exemption for all health services for specific hgh need groups.	Aims to improve health, nutrition and reduce poverty. Regular, predictable cash for small business or access to social services. Supports orphan care by older people.	The subsidy has not been adjusting for inflation, so values were <10% of the minimum salary in 2012, against a target of 33%.
Direct social support (PASD) Support from MMAS/INAS for people needing ad hoc support e.g. food, school materials. Beneficiaries identified case by case.	Assistance during time of acute need and immediate risk.	Support is unpredictable, not sustained or harmonised with other programmes and serving different needs.
Development programmes for people who are extremely poor but physically able to work		
Social Benefit Through Work Programme (PBST) – provides employment for 18 months in exchange for a monthly subsidy.	Most beneficiaries have been women e.g. 80% in case of PBST	Generally low coverage with limited budgets, overlap with other public programmes and management challenges. PGR is unsustainable and may have difficulty with loan repayments. PBST faces constraints to job access due to a weak labour market.
Income Generation Programme (PGR) – provides cash or loans for individual/ household economic activities		
Community Development Programme (PDC) –funds communities to build infrastructure eg. health posts or mills.		
Social services that target vulnerable people		
Social Units that shelter vulnerable, abandoned or marginalised people, mainly run by religious institutions	Not available	The services available are insufficient in relation to need. There is no systematic mapping of services targeting vulnerable people to allow for crosschecking of support vs need or avoid of duplication, A strengthened monitoring system is needed.
Other social services, public or private, managed or coordinated by MMAS e.g. child day care, community preschools		
Services by other sectors such as boarding schools and student hostels and Nutrition Rehabilitation Centres in MISAU		

Source: RoM 2012

Appendix 8.8 Resources for EIA/ESIA/health impact assessment

- **Associação Moçambicana de Avaliação de Impacto Ambiental (AMAIA)** - The Mozambican Association of environmental impact assessment (AMAIA) is an Association of professional, scientific nature, private and public, nonprofit, nationwide, with individual members (technicians and specialists) and collective (public and private). https://sites.google.com/site/amaiacursos2009/

- **International Association for Impact Assessment** (IAIA)– is the leading global network on best practice in the use of impact assessment for informed decision making regarding policies, programs, plans and projects. It has a range of resources (including videos, an IAIA wiki) and publications and specific groups/sections including a focus on resettlements, using participatory approaches and a series of FasTips for practioners with some in Portuguese. For publications including principles of best practice in EA see - http://www.iaia.org/publications-resources/downloadable-publications.aspx and publications translated into Portuguese are available at http://www.iaia.org/publications-resources/downloadable-publications-translated.aspx. It includes a multilingual (English, French or Portuguese glossary of IA terms). There is also a MOU between the IAIA and the Portuguese Language Network for Impact Assessment and the AMAIA is the signatory to the 2014 MOU.

- **International Finance Corporation** (IFC) Environmental and Social Performance Standards and Guidance Notes as at 2012 (updated) - IFC's Environmental and Social Performance Standards define IFC clients' responsibilities for managing their environmental and social risks. It has a detailed guide on the performance standards - http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/performance+standards/environmental+and+social+performance+standards+and+guidance+notes#2012. Also, there are detailed documents for each performance standard plus guidance notes for most performance standards. Of particular relevance will be Performance standard 5 and guidance on Land Acquisition and Involuntary Resettlement. Documents available in English and Portuguese.

- **World Health Organisation Health and Environment Linkages Initiative (HELI) -** http://www.who.int/heli/impacts/en/ - provides a directory of links to web-accessible resources on impact assessment, with reference to environment and health, organized into categories of relevance to policy-making.

- **The Health Impact Assessment** (**HIA) Gateway** - www.apho.org.uk/default.aspx?QN=P_HIA - provides access to resources (including an HIA bibliography regularly updated - http://www.apho.org.uk/resource/item.aspx?RID=72813) and information on for those new to HIA, practitioners of HIA and those wishing to commission HIAs or some other Impact Assessment process (i.e. Integrated Impact Assessment, Mental Well-being Impact Assessment and health-related Strategic Environmental Assessment).

- **World Bank Operational Manual and processes for EIA** - setting out guidance for environmental assessment and including on involuntary resettlement for what is required as a minimum to protect against negative health and well-being impacts, using EIA/ESIA as a tool - http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTOPMANUAL/0,,contentMDK:20064724~menuPK:64701637~pagePK:64709096~piPK:64709108~theSitePK:502184,00.html

- **International Council on Mining and Minerals Health Impact Assessment** - http://www.icmm.com/page/84142/our-work/projects/articles/health-impact-assessment-hia - including the ICCM guidance and some related publications.

- **Health impact assessment** resources at the Institute of Public Health in Ireland (IPH) - http://www.publichealth.ie/ireland/hiaresources.

- **Wales Health Impact Assessment Support Unit -** has a range of HIA resources including specific guidance on assessing the impacts of opencast mining - http://www.wales.nhs.uk/sites3/page.cfm?orgid=522&pid=10101

Appendix 8.9: Statistical appendix: national and district data

Table 8.1: Demographic indicators Tete districts, 2005-2013

INDICATOR	Year	Angónia	Cahora Bassa	Changara	Chifunde	Chiúta	Macanga	Mágoè	Maravia	Moatize	Mutarara	Tsangano	Zumbo	Cidade	TETE TOTAL
Population	2005	330 378	74 931	159 344	61 508	67 138	61 998	62 386	70 683	143 663	173 867	142 025	44 347	na	na
	2008 (i)	311 417	95 639	163 384	107 987	79 004	130 537	73 071	87 037	231 113	217 704	178 167	59 615	170 417	1 905 092
	2012	348 989	109 121	183 596	137 860	89 595	163 149	87 465	99 563	292 341	250 549	205 100	70 384	190 815	2 228 527
	2013 (ii)	359 225	114 078	146 238	146 238	93 325	175 417	91 311	102 772	309 535	259 031	212 039	73 227	198 098	2 280 534
Pop growth rate total % for 5 years	2008-2013	15.35	19.28	-10.49	35.42	18.13	34.38	24.96	18.08	33.93	18.98	19.01	22.83	16.24	19.71
Annual pop growth % 2008-13	2008-2013	3.07	3.86	-2.10	7.08	3.63	6.88	4.99	3.62	6.79	3.80	3.80	4.57	3.25	3.94
% Population <5 yrs	2008 (i)	18.32	17.38	14.07	21.28	21.82	21.01	17.43	22.02	19.11	21.11	19.89	22.29	15.98	19.02
	2013	18.50	18.19	16.67	22.19	22.13	22.35	17.90	22.37	19.81	21.42	20.21	22.80	15.68	19.69
% Population <15 yrs	2008 (i)	46.55	44.82	32.79	49.62	51.54	47.71	45.10	24.87	48.99	51.18	48.99	52.27	43.78	45.68
	2013	47.81	47.94	39.47	52.56	53.10	53.70	47.08	52.06	51.55	52.79	50.60	54.30	43.62	49.38
% Population 65 yrs+	2008 (i)	3.38	2.66	2.07	2.43	2.78	2.67	3.51	2.91	2.75	2.86	2.78	2.28	1.95	2.73
	2013	3.34	2.76	1.43	2.46	2.74	2.77	3.48	2.26	2.82	2.81	2.75	2.26	2.04	2.66
Population density /sq km	2005	101.0	9.0	18.0	6.5	9.7	8.9	7.1	4.1	17.0	27.3	37	3.7		
	2013	104.5	10.8	21.7	15.7	13.1	23.6	10.5	6.2	34.9	41.1	61.7	6.1	692.7	
Km district capital to Tete city km	2014	230	149	91	188	110	180	280	280	18	300	191	510	0	
% population that is rural	2007	96	62	100	100	100	100	100	100	96	96	100	100	0	86
Ave household size	2005	4	4.6	4.3	4	4	3.8	4.6	4.3	4.3	4.3	4.2	4.7	na	4.26
% households with female head	2005	16.9	17.6	24.1	18.4	23.5	9.2	15.4	20.2	17.1	17.4	15.7	15.7	na	14.4
Total fertility rate	2002-2007	5.8	7.2	8.4	6.7	8	7.5	6.5	8.9	6.9	7	6.3	8.3	na	7.29
% total adults literate	2005	26.7	45.6	41.3	17.2	20.5	27.6	38.6	17.0	43.0	24.2	28.3	16.4	na	

Sources: Ministério de Administração Estatal (2005). INE (2013).) GoM Tete Province 2014

(i) Macanga and Cidade for 2009 (ii) Tete data totalled from districts. Other INE sources set the Tete population in 2013 at 2 322 000

Table 8.2: Health status indicators Tete districts, 2005-2013

INDICATOR	Year	Angónia	Cahora Bassa	Changara	Chifunde	Chiúta	Macanga	Mágoè	Maravia	Moatize	Mutarara	Tsangano	Zumbo	Cidade	TETE TOTAL
Diarrhoea incidence in <15yr olds (i)	2008	4	30	27	10	19	5	16	3	6	10	4	6	95	16
	2013	6	14	7	8	10	8	15	5	9	3	5	6	28	9
% change in child diarrhoea incidence	2008-2013	50.0	-53.3	-74.1	-20.0	-47.4	60.0	-6.3	66.7	50.0	-70.0	25.0	0.0	-70.5	-43.8
Adult malaria incidence	2008	34	62	36	23	47	14	24	6	20	13	9	4	93	30
	2013	75	141	64	176	153	83	139	127	95	51	49	173	145	99
% change in adult malaria incidence	2008-2013	120.6	127.4	77.8	665.2	225.5	492.9	479.2	2016.7	375.0	292.3	444.4	4225.0	55.9	230.0
Adult TB prevalence	2008	2.2	7.3	3.1	1.5	4.1	1.6	2.7	0.8	6.7	8.5	1.3	2.9	24.6	5.6
	2013	4.4	19.4	18.5	3.2	8.7	3.4	8.1	3	17.6	12.1	2.3	5.2	61.7	13.7
% change in adult TB prevalence	2008-2013	100.0	165.8	496.8	113.3	112.2	112.5	200.0	275.0	162.7	42.4	76.9	79.3	150.8	144.6
% adults 15-49 years with STI	2013	2	19	6	7	10	6	3	12	14	6	6	12	12	8

Sources: Ministério de Administração Estatal (2005). INE (2013).DPS Tete 2008, 2012, 2013 (i) reported cases/ 1000 children <5 years of age

Table 8.3: Economic indicators Tete districts, 2005-2013

INDICATOR	Year	Angónia	Cahora Bassa	Changara	Chifunde	Chiúta	Macanga	Mágoè	Maravia	Moatize	Mutarara	Tsangano	Zumbo	Cidade
% economically active population	2005	39.7	25.3	31.4	43.5	31.3	41.9	36.5	39.4	28.5	40.2	42.3	40.9	
Economic activity		Small-holder farming	Small-holder farming; family/SMEs hydropower	Small-holder farming	Small-holder farming familiar)	Small-holder farming	Small-holder farming	Small-holder farming	Small-holder farming	farming; commerce, transport, mining	Small-holder farming	Small-holder farming	Small-holder farming	Formal, informal SMEs, service
% employed in agriculture	2005	94	77	92	97	95	94	89	97	80	94	97	96	
Monthly expenses per capita in MT	2005	40	40	43	43	43	43	43	43	40	40	43	43	
Calorie adjusted poverty (headcount %)	1997	84	73	81	85	85	85	81	84	75	85	83	83	68
	2007	31	37	35	37	39	31	31	45	39	45	33	47	46
Land ha/ household	2005	1.5	0.9	1.0	2	1	1	1	1	1	1	1	1	

Sources: Ministério de Administração Estatal 2005; Salvucci 2014

Table 8.4: Social development indicators Tete districts, 2005-2013

INDICATOR	Year	Angónia	Cahora Bassa	Changara	Chifunde	Chiúta	Macanga	Mágoè	Maravia	Moatize	Mutarara	Tsangano	Zumbo	Cidade	TETE TOTAL
Girl: boy ratio, primary school	2013/4	49.9%	48.7%	48.1%	48.8%	46.7%	47.9%	48.8%	52.5%	48.2%	39.5%	49.7%	52.9%	50.0%	48.3%
Primary school (i) /1,000 residents	2013/4	0.48	0.49	0.62	0.46	0.67	0.40	0.54	0.63	0.39	0.34	0.41	0.76	0.18	0.45
Primary school (ii) /1,000 residents	2013/4	0.01	0.03	0.01	0.00	0.02	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.05	0.01
Teachers / 1000 pupils	2005	38.0	21.6	20.6	20.4	19.8	13.7	24.1	22.2	20.6	16.7	27.1	39.2		
Pupils / teacher primary school	2008/9	92	52	62	71	64	71	61	60	61	79	87	50	47	
	2012/3	74	43	51	64	55	67	48	53	53	58	56	44	54	

Sources: DPEdC 2014.; Ministério de Administração Estatal 2005; INE 2013 (i) (1-7 years EPI1) (ii) 8-12 years EPI2

Table 8.5: Living environment indicators Tete districts, 2005-2013

INDICATOR	Year	Angónia	Cahora Bassa	Changara	Chifunde	Chiúta	Macanga	Mágoè	Maravia	Moatize	Mutarara	Tsangano	Zumbo	Cidade	TETE TOTAL
% h/holds with improved water	2005	4.0%	21.0%	6.0%	0.0%	4.0%	4.0%	13.0%	1.0%	23.0%	9.0%	2.0%	1.0%		
	2013	68.3%	99.5%	89.7%	36.9%	66.1%	54.0%	80.5%	53.0%	36.4%	58.4%	51.2%	40.7%		60.0%
% change 2005-13	2005-13	16.1%	3.7%	14.0%	3689.0%	15.5%	12.5%	5.2%	52.0%	0.6%	5.5%	24.6%	39.7%		
Percentage of households:															
using protected water	2007	20.4	52.5	41.7	13.6	34.4	32.9	28.3	18.4	28.4	2.4	22.6	16	84.9	43.5
with improved sanitation	2005	70	20	21	30	7	22	11	9	29	8	33	8		
	2007	10	12.4	3.7	7.7	2.2	5.6	3.5	2.9	9.8	4.7	11	1.9	34.5	22.3
Electricity	2007	2	8.8	0.8	0.4	0.2	0.3	0.7	0.3	7.4	0.9	0.5	0.5	35.2	
Generator for power	2007	0.1	0.4	0.1	0.3	0.4	0.3	0.7	0.2	0.1	0	0.1	0	0.1	
Gas for energy	2007	0.1	0.1	0	0	0	0	0.1	0	0	0	0	0	0	
Oil/ paraffin/ kerosene	2007	83.3	30.9	29.6	62.7	22.9	67.2	34.4	35.8	49.2	35.7	84.9	47.3	38.5	
Candle for energy	2007	3	15.3	4	5.1	6.7	4.7	8.8	16.3	4.7	1.3	1.6	21.3	17.7	
Battery power	2007	0	0.3	0.2	0.2	0.1	0.1	0.7	0.5	0.1	0.1	0	0.3	0.1	
Woodfuel	2005	10.7	43.2	64.4	30.2	68.8	25.8	54.2	46.5	38	61.8	12	30	8.1	
Shelter with brick/cement walls	2005	4	11	3	1	0	1	5	1	13	1	5	1		
	2007	14.4	24.2	8.7	7.3	2.8	3.8	22.7	3.3	22.6	7	14.4	2.1	47.9	
A radio	2005	21	29	24	27	19	2	26	19	32	22	22	19		
	2007	49.7	45.1	44	56.4	47.5	50.4	34.9	44.9	52.4	46.7	52.9	41.9	65.9	
A mobile phone	2007	0.3	1.1	0.2	0.3	0.3	0.6	0.1	0.1	0.3	0.2	0.1	0.2	0.5	

Sources: Ministério de Administração Estatal (2005). INE 2013; DPOPH Tete 2014

Table 8.6: Health system indicators Tete districts, 2005-2013

INDICATOR	Year	Angónia	Cahora Bassa	Changara	Chifunde	Chiúta	Macanga	Mágoè	Maravia	Moatize	Mutarara	Tsangano	Zumbo	Cidade	TETE TOTAL
Distance covered by health facility	2012	10.4	20.3	11.2	24.5	29.9	21.8	23.6	37.9	11.9	12.8	17.3	48.6	3.0	21.0
Clinic (Level 1) density 000 pop# /unit	2008	9	8	13	7	4	5	7	5	10	10	5	5	8	
	2012	10	8	13	7	5	5	7	6	12	10	6	4	9	
People/ clinic	2008	34602	11955	12568	15427	19751	26107	10439	17407	23111	21770	35633	11923	21302	
	2012	34899	13640	14123	19694	17919	32630	12495	16594	24362	25055	34183	17596	21202	
% change people/clinic	2008-12	0.86	14.10	12.37	27.66	-9.28	24.98	19.70	-4.67	5.41	15.09	-4.07	47.58	-0.47	
Physicians / 100 000	2005	0.057	0.133	0.000	0.000	0.000	0.000	0.000	0.000	0.160	0.072	0.000	0.000	0.968	0.176
MISAU standard=1.9	2012	0.200	0.500	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	2.300	0.300
MCH personnel / 100 000	2012	0.7	2.5	1.0	0.9	0.6	0.5	1.1	1.1	1.4	0.6	0.5	0.9	6.0	1.4
Nurses / 10 000 (i)	2014	0.8	2.9	1.0	0.5	1.7	0.6	2.3	0.8	1.3	1.2	0.5	1.8	5.6	1.6
Total personnel/ 10 000 (ii)	2014	5.4	16.6	6.5	4.8	8.5	3.3	8.5	7.0	6.4	5.7	3.1	9.2	39.2	10.2
Shortfall on total personnel (%)	2014	-71	-11	-65	-74	-54	-82	-55	-63	-66	-70	-83	-51	+110	-46
% medicine availability for IMCI *	2014	49	63	50	72	86	50	61	63	56	72	73	Na	60	61
% medicine availability for OC **	2014	54	64	48	76	83	67	46	89	59	62	69	na	79	63
% children <1yrs with completed immunisation	2008	49.0	73.4	91.6	58.1	31.6	47.1	60.6	57.4	83.2	50.1	73.1	50.5	86.4	63.5
	2013	94.6	75.6	75.6	81.7	78.0	40.0	62.7	50.6	75.5	74.2	82.9	69.2	101.5	77.2
% Change	2008-13	93.1	3.0	-17.5	40.6	146.8	-15.1	3.5	-11.8	-9.3	48.1	13.4	37.0	17.5	21.6
Pentavalent 1 coverage	2013	103.6	106.5	92.4	104.3	127.6	84.6	88.3	117.3	107.0	88.3	114.7	102.5	148.0	105.9
Pentavalent 3 coverage	2013	102.6	98.2	91.1	96.3	101.2	62.2	78.7	110.9	95.1	85.1	113.4	98.0	131.2	97.7
% decline Pentavalent 1 – 3	2013	-1.0	-8.3	-1.3	-8.0	-26.4	-22.4	-9.6	-6.4	-11.9	-3.2	-1.3	-4.5	-16.8	-8.2
% pregnant women attending 1 ANC visit	2008	109	94	105	69	132	83	79	78	97	89	65	65	145	96
	2013	118	98	76	79	116	106	94	11	116	94	97	77	164	107
% change	2008-13	8.3	4.3	-27.6	14.5	-12.1	27.7	19.0	-85.9	19.6	5.6	49.2	18.5	13.1	11.5
% pregnant women 4 ANC visits	2013	70	21	17	24	27	2	24	15	37	29	8	16	54	33
% dropout 1 -4 visits	2013	40.7	78.6	77.6	69.6	76.7	98.1	74.5	-36.4	68.1	69.1	91.8	79.2	67.1	69.2
% women with assisted delivery by trained health worker	2008	42	73.5	35.6	36.4	42	39.2	35.9	26.9	95.5	60.1	90.8	35.6	102.9	
	2012	49.6	57.7	34.2	28.2	53	27	38.9	89.8	58.5	34.8	31.7	28.2	107.5	
% change in women with assisted deliveries	2008-2012	18.1	-21.5	-3.9	-22.5	26.2	-31.1	8.4	233.8	-38.7	-42.1	-65.1	-20.8	4.5	
% facilities with vertical transmission services	2008	8	78	1	85	1	8	66	5	1	9	1	1	1	79
	2013	1	89	1	1	1	57	1	1	1	91	1	1	7	93
US$ public / capita health spending	2005	10	34	13	31	19	29	37	22	20	12	12	47	na	
Operating budget allocation SDSMAS MZM/capita	2011	46	155	47	38	72	25	62	62	55	47	27	76	na	98
	2014	113	294	103	101	196	86	125	155	160	101	56	168	na	145

Sources: DPS Tete 2007, 2008b; 2012b, 2013c; 2014b,e, f,g; Min de Administração Estatal 2005; INE 2013 (*) operating budget using 2012 population figures (i) MISAU standard 18.7 (i) MISAU standard 2.9 (*) IMCI = Integrated management of childhood illness ** OC = emergency obstetric care; SDSMAS= district services for health and women and social action

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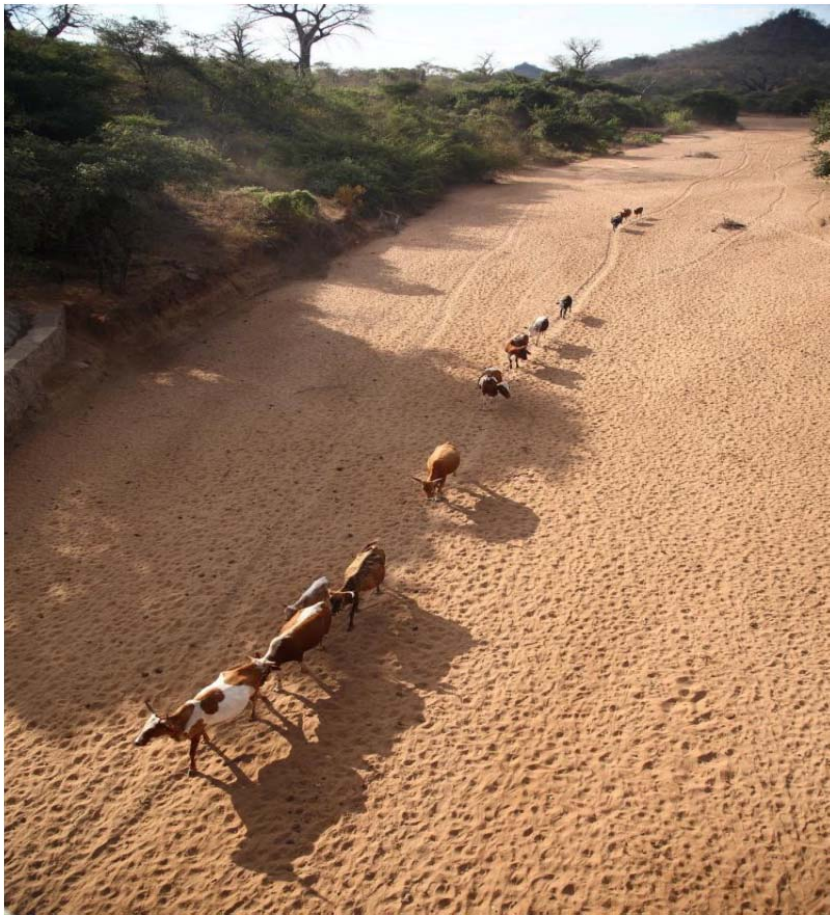

Embaixada Real da Dinamarca

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