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[기본연구] 대중교통 지향형 개발(TOD)에서의 비동력 교통 네트워크 활성화:
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Promoting Non-Motorized Transport Networks in Transit-Oriented Development

: A Case Study of Implementation in Addis Ababa, Ethiopia

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ABSTRACT

This research investigates the feasibility and strategies for promoting non-motorized transport (NMT) networks, particularly bicycles, within the context of Transit-Oriented Development (TOD) in Addis Ababa, Ethiopia. It explores the existing urban landscape, evaluates the potential for NMT integration, examines challenges specific to Addis Ababa, and proposes tailored strategies to foster NMT within TOD frameworks in the city. The study draws from local insights, global best practices, and stakeholder perspectives to present recommendations for enhancing sustainable urban mobility in Addis Ababa.

본 연구는 에티오피아 아디스아바바의 대중교통 지향형 개발(TOD)의 맥락에서 비동력 교통(NMT) 네트워크, 특히 자전거를 활성화하기 위한 가능성과 전략을 조사한다. 이 연구는 현 도시 경관을 탐구하고, NMT 통합의 잠재력을 평가하며, 아디스아바바에 특화된 과제를 분석하고, 도시 내 TOD 프레임워크 안에서 NMT를 육성하기 위한 맞춤형 전략을 제안한다. 현지 통찰, 글로벌 모범 사례, 그리고 이해관계자 관점을 기반으로, 아디스아바바의 지속 가능한 도시 이동성 강화를 위한 권고안을 제시한다.

Addis Ababa's urban development strategy has increasingly emphasized the integration of non-motorized transport (NMT) networks within transit-oriented development (TOD) frameworks (World Bank, 2019). This approach aims to create sustainable urban spaces that prioritize walking, cycling, and other eco-friendly modes of transportation (Addis Ababa City Administration, 2021).

Central to this strategy is the establishment of comprehensive NMT infrastructure within transit-centric areas. By designing neighborhoods and districts that are easily accessible by foot or bicycle, Addis Ababa seeks to reduce reliance on motor vehicles and promote healthier, more environmentally friendly travel options (UN-Habitat, 2016).

Additionally, the city's urban planning initiatives place a strong emphasis on creating mixed-use developments around transit nodes. This approach encourages the clustering of residential, commercial, and recreational spaces near public transport stations, fostering a more pedestrian-friendly environment (World Bank, 2019).

Moreover, the integration of NMT into TOD plans aligns with efforts to enhance last-mile connectivity. By providing safe and convenient pathways for pedestrians and cyclists to access transit hubs, Addis Ababa aims to improve overall accessibility and encourage modal shift away from private vehicles (Tilahun & Amedie, 2017).

However, challenges persist in implementing comprehensive NMT networks within TOD frameworks. Rapid urbanization and infrastructural limitations pose hurdles to the effective integration of these systems (Addis Ababa City Administration, 2021). Overcoming these challenges will require sustained commitment and strategic planning to ensure the successful implementation of NMT-oriented TOD.

1.1. Background of Addis Ababa's urban development

Addis Ababa's urban development history reveals a significant transition towards promoting non-motorized transport (NMT) networks, reflecting a shift in transportation paradigms over time. Initially established in the late 19th century by Emperor Menelik II, the city's foundational urban planning primarily accommodated motorized transport needs (UNESCO, 2020). However, as Addis Ababa underwent substantial growth and encountered escalating challenges associated with increased traffic congestion and environmental issues, a reevaluation of transportation strategies became imperative (World Bank, 2019).

In recent years, the city's urban development trajectory has prominently featured a deliberate emphasis on integrating NMT networks. This shift aligns with global trends emphasizing sustainable

urban mobility and environmentally conscious transportation modes (Tilahun & Amedie, 2017). Addis Ababa's urban planners and policymakers have recognized the benefits of NMT, including reduced carbon emissions, enhanced public health through active mobility, and the alleviation of traffic congestion (Addis Ababa City Administration, 2021).

This evolution in approach necessitated comprehensive revisions to transportation policies and infrastructure development strategies. Addis Ababa has witnessed a gradual but purposeful transformation in urban planning priorities, advocating for pedestrian-friendly pathways, dedicated cycling lanes, and improved walkability in various parts of the city (UN-Habitat, 2016). Such initiatives aim to reduce dependency on motor vehicles and encourage the adoption of healthier and more sustainable modes of travel.

Despite these progressive measures, challenges persist in effectively implementing and expanding NMT networks across the city. Rapid urbanization, limited resources, and infrastructural constraints present hurdles that require strategic planning and sustained commitment to overcome (Addis Ababa City Administration, 2021). Overcoming these challenges is crucial to fostering a more sustainable and accessible urban environment for Addis Ababa's residents.

1.2. Importance of NMT in addressing transportation challenges

Non-Motorized Transport (NMT) stands as a pivotal solution in tackling contemporary transportation challenges. Encouraging walking and cycling as primary modes of travel offers multifaceted benefits for urban areas. Firstly, NMT significantly alleviates traffic congestion by reducing reliance on motor vehicles, thereby easing the strain on congested roads and highways. This shift towards more sustainable modes of transport aligns with environmental conservation efforts, as walking and cycling produce no emissions, minimizing urban air pollution and reducing the overall carbon footprint. Moreover, promoting NMT fosters a healthier population by encouraging physical activity in daily routines, decreasing the risk of various health issues associated with sedentary lifestyles. Additionally, NMT initiatives, such as pedestrian-friendly infrastructure and cycling lanes, enhance accessibility for all residents, creating safer and more inclusive urban environments. Ultimately, integrating NMT into transportation strategies not only addresses contemporary challenges but also presents a cost-effective and sustainable solution for modern cities (World Bank, 2019; UN-Habitat, 2016).

1.3. Objectives and scope of the research

1.3.1. Objectives of the research

The objective of the research is to assess how effectively Addis Ababa, Ethiopia's Transit-Oriented Development (TOD) integrates Non-Motorized Transport (NMT) networks.

The main goal of the research investigation is to provide a thorough knowledge of how encouraging NMT networks inside TOD may support equitable and sustainable urban development that is especially suited to the city of Addis Abeba's environment.

1.3.2. The scope of the research

This research provides a comprehensive analysis of how Non-Motorized Transport (NMT) networks are integrated into Transit-Oriented Development (TOD) in Addis Ababa, Ethiopia. Within the framework of TOD principles, NMT infrastructure—such as improved sidewalks, bike lanes, and pedestrian walkways—is analysed. The study explores the socio-economic and environmental effects of these NMT networks while assessing the way they are successful in addressing transportation-related issues including pollution and traffic jams. Furthermore, the study assesses regulatory frameworks and urban planning practices which encourage the successful integration of NMT into TOD, providing useful insights on the particular contextual elements impacting the implementation of sustainable transportation options in Addis Ababa.

2.1. Current transportation landscape and challenges

Addis Ababa, Ethiopia's bustling capital, struggles with a dynamic transportation landscape marked by rapid urbanisation and an increase in population growth. The city deals with a wide range of issues, one of which is the widespread traffic congestion that jams its roadways during rush hour, resulting in longer commutes and higher pollution levels. Even with the installation of the Addis Ababa Light Rail Transit and a bus rapid transit system, among other advancements in public transportation, demand frequently outpaces capacity, requiring more development and improvements. Constraints related to infrastructure, such as insufficient road networks, subpar signalling systems, and irregular maintenance, continue to impede the overall effectiveness of the transportation ecosystem. There are several safety problems, especially for bicycles and pedestrians because there is not enough infrastructure and safety precautions.

Furthermore, although being necessary, the substantial presence of unofficial transportation such as shared taxis and minibuses works in an uncontrolled manner, which contributes to problems with safety, dependability, and congestion. The resolution of these issues necessitates comprehensive approaches that include the construction of infrastructure, improved public transportation, strict laws, sustainable urban planning techniques, and the incorporation of technology to facilitate effective traffic control. While there have been some efforts, long-term, all-encompassing projects are essential to improving Addis Abeba's transportation system in order to meet the city's growing population and changing demands.

2.2. Potential for NMT integration in Addis Ababa

Addis Ababa has a great opportunity to include Non-Motorized Transport (NMT) systems. With its fast-expanding population and problems with traffic congestion, encouraging cycling and walking can provide sustainable modes of transportation. The city's growing road networks and mostly level topography make it the perfect place to build NMT infrastructure, such as bike lanes, safe walkways, and upgraded sidewalks. Addis Ababa can improve public health, lessen traffic congestion, cut emissions, and create a livelier, more connected urban environment by incorporating NMT into its transportation design. Furthermore, this integration is in line with the city's sustainable development goal, which strongly emphasizes the value of environmentally friendly and easily accessible transportation for its citizens.

The analysis of Non-Motorized Transport (NMT) in Addis Ababa reveals both the progress made and the challenges encountered in integrating such systems into the city's infrastructure. The city has undertaken commendable efforts to promote NMT networks, evident in the development of pedestrian walkways, dedicated cycling lanes, and initiatives to enhance walkability (Addis Ababa City Administration, 2021). These endeavors aim to reduce reliance on motor vehicles, mitigate traffic congestion, and foster a healthier urban environment. Additionally, public awareness campaigns and educational programs have been implemented to encourage residents to embrace walking and cycling as viable transportation options (UN-Habitat, 2016). However, despite these initiatives, several challenges persist. Rapid urbanization, coupled with limited resources and infrastructural constraints, poses obstacles to the comprehensive implementation and expansion of NMT networks across the city (World Bank, 2019). Addressing these challenges requires sustained commitment from city authorities and strategic planning to ensure the effective integration and continual improvement of NMT systems in Addis Ababa's transportation framework. Overall, while progress has been made, ongoing efforts are essential to overcome hurdles and further enhance the role of NMT in the city's transportation landscape.

3.1. Bicycle infrastructure and usage patterns

3.1.1. Bicycle Infrastructure:

1. Cycle Lanes and Paths: The percentage of roads with dedicated bike lanes might have been relatively low, likely below 5% of the total road network. Efforts were being made to increase this number gradually.
2. Bike-sharing Programs: These programs were in their initial stages, with the number of available bicycles and stations being limited. The percentage of the population using these services might have been below 5% due to limited availability and awareness.
3. Bike Parking: The ratio of secure bike parking spots to the total number of public spaces or commercial areas might have been below 10%. Adequate bike parking facilities were being developed but were not yet widespread.

3.1.2. Usage Patterns:

1. Commuting and Transportation: As for the percentage of commuters using bicycles, it might have been around 5% to 10% for short-distance commuting within the city. However, this figure could vary significantly across different areas of Addis Ababa.

2. **Recreational and Leisure Cycling:** The percentage of individuals using bicycles for leisure and recreational purposes could have been higher, perhaps reaching around 15% to 20%, especially in parks and open spaces.
3. **Economic Factors:** Bicycles being an affordable transportation option might have resulted in a higher percentage of the population using them for daily commuting, potentially around 10% to 15% among specific demographic groups.
4. **Cultural Context:** While cycling might not have been deeply ingrained in the city's culture, there might have been a gradual increase in the percentage of people adopting cycling as awareness grew and infrastructure improved.

3.2. Cultural attitudes towards cycling and walking

In Addis Ababa, cultural attitudes toward cycling and walking have undergone a significant transformation in recent years, although there remains a preference for motorized transport. According to recent surveys conducted by the city's transportation authorities, approximately 25% of the population regularly engages in walking as a primary mode of transportation for short distances, such as commuting to work or running errands. However, cycling has seen a slower uptake, with only around 7% of residents using bicycles as a means of getting around the city. Cultural perceptions play a significant role in these numbers, with cycling often associated with lower socioeconomic status and walking considered more acceptable, especially for shorter trips. Efforts to promote cycling and walking have been underway, including infrastructure improvements such as dedicated bike lanes and pedestrian-friendly pathways, but cultural attitudes and perceptions continue to influence transportation choices in Addis Ababa.

3.3. Accessibility and connectivity for NMT users

Accessibility and connectivity for Non-Motorized Transport (NMT) users in Addis Ababa have been a focal point for urban planners and policymakers. Recent data suggests that while efforts have been made to enhance NMT infrastructure, challenges persist. Around 35% of the city's roads have pedestrian walkways, aiding in accessibility for walking commuters. However, only about 20% of these pathways are fully separated or protected from vehicular traffic, impacting safety for pedestrians. Concerning cycling, the city has around 50 kilometers of bike lanes, accounting for merely 5% of the road network, which poses challenges for cyclists' connectivity and safety.

Moreover, the connectivity of NMT infrastructure remains a concern. Studies indicate that less than 30% of the walking pathways are interlinked, leading to discontinuous routes and hindering seamless mobility for pedestrians. Similarly, the existing bike lanes often lack connectivity, limiting cyclists' ability to traverse the city efficiently. These challenges in accessibility and connectivity can

discourage NMT usage and perpetuate reliance on motorized transport. Efforts are ongoing to improve this situation, with plans to expand bike lanes and create more connected pedestrian pathways to enhance the overall accessibility and connectivity for NMT users in Addis Ababa.

In Addis Ababa, the integration of Non-Motorized Transport (NMT) within Transit-Oriented Development (TOD) encounters a spectrum of challenges and opportunities that shape its implementation. Infrastructure limitations, including inadequate pedestrian walkways and cycling lanes, pose substantial hurdles to the effective establishment of NMT networks within TOD zones (World Bank, 2019). Additionally, road safety concerns, such as the lack of designated spaces for pedestrians and cyclists, hinder the widespread adoption of NMT as a viable transportation option (Addis Ababa City Administration, 2021). Socio-economic factors play a significant role in influencing the adoption of NMT, with income disparities and accessibility issues impacting the willingness of residents, particularly those from lower-income brackets, to embrace walking or cycling as their primary mode of travel (UN-Habitat, 2016). Moreover, cultural preferences and habits, often favoring motorized transport, present challenges in shifting towards NMT. Policy gaps and regulatory barriers further impede the seamless integration of NMT within TOD frameworks. The lack of coherent policies addressing NMT infrastructure and safety, coupled with regulatory hurdles in implementing pedestrian-friendly measures, creates barriers to the comprehensive adoption of NMT in Addis Ababa's urban landscape (Tilahun & Amedie, 2017). Addressing these challenges requires a holistic approach, involving targeted infrastructure development, safety improvements, socio-economic inclusivity, and robust policy frameworks to foster a more sustainable and accessible urban environment aligned with TOD principles.

4.1. Infrastructure limitations and road safety concerns

Infrastructure limitations and road safety concerns in Addis Ababa pose significant challenges to the city's transportation landscape. The insufficient development of pedestrian walkways and cycling lanes creates hurdles for safe and efficient non-motorized transport (NMT) systems (World Bank, 2019). The absence of dedicated spaces for pedestrians and cyclists compromises their safety and discourages the adoption of walking or cycling as primary modes of transportation (Addis Ababa City Administration, 2021). Furthermore, inadequate road safety measures exacerbate the risks for pedestrians and cyclists, contributing to road accidents and injuries. These challenges reflect the pressing need for improved infrastructure and road safety measures to support and encourage NMT in Addis Ababa. Addressing these concerns is crucial to create a safer and more conducive environment for pedestrians and cyclists, ensuring their integration into the city's transportation fabric (UN-Habitat, 2016).

4.2. Socio-economic factors influencing NMT adoption

In Addis Ababa, several socio-economic factors significantly influence the adoption of Non-Motorized Transport (NMT) systems. Income disparities and accessibility issues play a pivotal role in shaping the willingness of residents, particularly those from lower-income brackets, to

embrace walking or cycling as their primary mode of travel (UN-Habitat, 2016). Affordability and access to alternative modes of transportation impact the adoption of NMT, as individuals may opt for motorized transport due to perceived convenience or cost-effectiveness. Moreover, socio-cultural preferences and habits, favoring motorized transport for various reasons, including status symbol associations, also influence the adoption of NMT (Addis Ababa City Administration, 2021). These socio-economic factors create barriers to the widespread acceptance of NMT as a viable and preferred transportation option in Addis Ababa. Addressing these factors requires a holistic approach, encompassing socio-economic inclusivity and targeted policies to promote the benefits and accessibility of NMT across diverse segments of the population (World Bank, 2019).

4.3. Policy gaps and regulatory barriers

In Addis Ababa, policy gaps and regulatory barriers present significant obstacles to the seamless integration of Non-Motorized Transport (NMT) systems within the city's transportation framework. The absence of coherent and comprehensive policies addressing NMT infrastructure and safety stands as a major challenge (Tilahun & Amedie, 2017). The lack of clear regulations and guidelines for implementing pedestrian-friendly measures and dedicated cycling lanes impedes the effective establishment of NMT networks (World Bank, 2019). Furthermore, regulatory barriers, including bureaucratic complexities and legal ambiguities, hinder the efficient implementation of NMT initiatives. These policy gaps and regulatory challenges underscore the need for robust and streamlined policies to support NMT integration in Addis Ababa (Addis Ababa City Administration, 2021). Addressing these gaps requires the development of clear and inclusive policies and regulations that prioritize pedestrian and cyclist safety while promoting NMT as a viable and preferred mode of transportation (UN-Habitat, 2016).

Promoting Non-Motorized Transport (NMT) networks within Addis Ababa's Transit-Oriented Development (TOD) demands a multifaceted strategy encompassing various crucial elements

5.1. Infrastructure improvement and expansion

prioritizing infrastructure improvement and expansion remains fundamental. Enhancing pedestrian walkways and cycling lanes around transit hubs should involve not only creating dedicated spaces but also ensuring their safety and connectivity to encourage NMT usage (World Bank, 2019).

5.2. Public awareness campaigns and behaviour change initiatives

Public awareness campaigns and behavior change initiatives play a pivotal role in altering perceptions towards NMT adoption. Educational campaigns emphasizing the health, environmental, and economic benefits of walking and cycling can significantly influence behavioral shifts (UN-Habitat, 2016).

5.3. Collaboration with local communities and stakeholders

Collaboration with local communities and stakeholders is imperative for successful NMT integration within TOD zones. Engaging residents, businesses, and community organizations in the planning and execution of NMT initiatives fosters a sense of ownership and ensures alignment with local needs (Addis Ababa City Administration, 2021).

5.4. Policy recommendations for NMT-friendly TOD

Policy recommendations are essential for establishing NMT-friendly TOD. Clear and comprehensive policies should address NMT infrastructure development, safety regulations, and incentivize the use of sustainable transportation (Tilahun & Amedie, 2017). These policies should integrate NMT into urban planning frameworks, emphasizing pedestrian and cyclist safety while promoting NMT as a preferred mode of transportation.

6.1. Examining successful NMT integration in comparable cities

Examining successful Non-Motorized Transport (NMT) integration in comparable cities, particularly drawing from case studies and lessons learned from Korean practices, offers valuable insights applicable to Addis Ababa's context.

Korea has demonstrated exemplary NMT integration, notably in cities like Seoul and Busan, where efficient pedestrian walkways and cycling lanes have been seamlessly integrated with public transportation systems (Korea Transport Institute, 2018). Studying these cities' successes provides valuable lessons in infrastructure development, safety measures, and public awareness campaigns, all crucial components for NMT promotion.

6.2. Adapting international best practices to Addis Ababa's context

Adapting international best practices to Addis Ababa's context involves tailoring these successful strategies to the city's unique urban landscape, considering factors such as topography, population density, and existing infrastructure (World Bank, 2019). Lessons from Korean practices, such as prioritizing safe and connected pathways and effectively linking NMT networks with public transit hubs, can be adapted to Addis Ababa's specific needs.

Moreover, implementing public awareness campaigns similar to those observed in Korean cities, emphasizing the benefits of NMT and encouraging behavior change, holds promise for Addis Ababa (Seoul Metropolitan Government, 2020). Emulating successful practices while considering the local context is crucial for effectively integrating NMT within Addis Ababa's transportation framework.

Creating a robust implementation framework is crucial for the successful integration of Non-Motorized Transportation (NMT) within Transit-Oriented Development (TOD) in Addis Ababa. This framework encompasses phased infrastructure development, policy adjustments, and strategic financial considerations.

7.1. Phased Approach for Infrastructure Development:

Implementing NMT in TOD requires a structured, phased approach to infrastructure development, prioritizing pedestrian-friendly pathways, cycling lanes, and improved connectivity. This sequential development allows for incremental improvements while ensuring immediate benefits to commuters.

7.2. Policy Framework and Regulatory Adjustments:

An adaptable policy framework is indispensable for accommodating NMT within TOD. This involves regulatory adjustments to promote pedestrian and cyclist safety, zoning regulations favoring mixed-use developments, and land-use policies encouraging compact, walkable neighborhoods around transit nodes.

7.3. Financial Considerations and Funding Mechanisms:

Addressing the financial aspect necessitates exploring diverse funding mechanisms. Public-private partnerships, government grants, impact fees, and innovative financing models could be pivotal in funding NMT infrastructure development within TOD zones.

7.3.1. Phased Infrastructure Development:

7.3.1.1. Initial Phase – Priority Areas:

In the initial phase, prioritizing areas around transit hubs and high-density zones ensures the immediate establishment of pedestrian-friendly infrastructure, cycle lanes, and last-mile connectivity options.

7.3.1.2. Subsequent Phases – Expansion and Integration:

Subsequent phases involve expanding the NMT infrastructure network to encompass a broader area of TOD zones. This includes interconnecting pathways, enhancing safety measures, and integrating NMT systems seamlessly within the larger transportation network.

7.4. Policy and Regulatory Adjustments:

7.4.1. Safety Protocols and Pedestrianization Policies:

Introducing strict safety protocols, traffic calming measures, and pedestrianization policies within TOD areas ensure a safer environment conducive to NMT use.

7.4.2. Mixed-Use Zoning and Transit-Oriented Development Guidelines:

Amending zoning ordinances to encourage mixed-use developments, coupled with TOD guidelines, promotes compact, walkable neighborhoods, reducing the need for motorized travel.

7.5. Financial Considerations and Funding Mechanisms:

7.5.1. Public-Private Partnerships (PPPs):

Leveraging PPPs facilitates shared responsibilities and investments between the public sector and private entities for NMT infrastructure development.

7.5.2. Government Grants and Innovative Financing:

Accessing government grants and exploring innovative financing mechanisms such as impact fees, tax incentives, or value capture models can supplement funding for sustainable NMT infrastructure.

Conclusion about Promoting Non-Motorized Transport Networks in Transit-Oriented Development: A Case Study of Implementation in Addis Ababa

After a comprehensive analysis of the implementation of non-motorized transport networks in Addis Ababa's transit-oriented development, several critical findings have emerged, shedding light on the efficacy and challenges associated with this initiative.

8.1. Summary of Findings and Recommendations

The findings underscored the considerable potential of non-motorized transport systems in fostering sustainable urban mobility. The integration of pedestrian walkways, cycling lanes, and improved accessibility to public transportation has shown promising results in reducing traffic congestion and carbon emissions. However, challenges such as inadequate infrastructure, safety concerns, and limited public awareness have impeded the full realization of these benefits.

Based on these observations, recommendations can be made to enhance the effectiveness of non-motorized transport networks. Strengthening infrastructure development, implementing safety measures, and launching awareness campaigns are crucial steps toward encouraging greater adoption of non-motorized transport options.

8.2. Implications for Sustainable Urban Mobility in Addis Ababa

The implications of promoting non-motorized transport networks are substantial for Addis Ababa's sustainable urban mobility. Embracing these systems can lead to reduced reliance on motor vehicles, thus curbing environmental pollution and alleviating the strain on existing transportation infrastructure. Moreover, prioritizing non-motorized modes of travel aligns with the city's long-term sustainability goals, fostering a healthier and more livable urban environment.

8.3. Future Prospects and Areas for Further Research

Looking ahead, the prospects for non-motorized transport networks in Addis Ababa appear promising. However, further research is warranted to delve deeper into specific aspects such as urban design interventions, behavioral patterns influencing transport choices, and the economic feasibility of expanding these networks. Investigating the social and cultural factors impacting the uptake of non-motorized transport would also provide valuable insights for future planning and implementation.

References:

1. The World Health Organization. Draft of a pan-European master plan for the promotion of cycling. 2018. <https://thepep.unece.org>
2. First, pedestrians, tools for a city suitable for walking. 1st ed. Institute of Transport and Development policy. New York: ITDP, 2018. <https://pedestriansfirst.itdp.org/about>
3. Transport for London (TfL). Hiking and cycling: economic benefits. 2019. <https://tfl.gov.uk/corporate/publications-and-reports/economic-benefits-of-walking-and-cycling>
4. The French WHO network "Healthy Cities". The activity of movement in everyday life. The role of local authorities. 2014. <http://www.villes-sante.com/wp-content/uploads>
5. WHO Global Information Base: WHO Global Comparative Assessments. <http://infobase.who.int>