

UPR508

PROJECT PLANNING AND IMPLEMENTATION



Course video is available on our app

Course code: URP 508

Course title: Project Planning and Implementation

Course credit load: 2 Units

List of Series:

Series 1: Fundamentals of Project Planning and Administration

Series 2: Rural and Urban Water Demand, Supply, and Sanitation

Series 3: Urbanisation Impacts and Strategies for Water Management

Series 4: Policies, MDGs, and SDGs in Nigerian Water and Sanitation

Series 5: Urban Physical Planning, Land Policy, and Implementation

Series 1: Fundamentals of Project Planning and Administration

Series 1 Outline

Part 1 (1.1): Introduction to Project Planning

Sub-Part 1.1.1: Concepts and definitions in project planning

Sub-Part 1.1.2: Phases and time scheduling in project planning

Part 2 (1.2): Project Financing, Budgeting, and Manpower Assessment

Sub-Part 1.2.1: Financing and budgeting for projects

Sub-Part 1.2.2: Manpower assessment and resource planning

Part 3 (1.3): Techniques of Project Appraisal and Evaluation

Sub-Part 1.3.1: Techniques of project appraisal

Sub-Part 1.3.2: Project evaluation methods

Part 4 (1.4): Project Plan Administration and Decision-Making

Sub-Part 1.4.1: Administration of project plans

Sub-Part 1.4.2: Management and decision-making in project implementation

Introduction

Project planning and administration are at the heart of every successful development initiative. Whether in public or private sector contexts, the ability to plan, finance, evaluate, and administer projects determines the extent to which set goals are achieved within time, cost, and quality constraints. This Series introduces you to the fundamental concepts and processes that underpin effective project planning and administration, providing you with a solid foundation for the more applied topics that follow in subsequent Series.

The aim of this Series is to equip you with the knowledge and understanding required to describe the project planning process, apply financing and budgeting techniques, conduct project



appraisals and evaluations, and appreciate the principles of project plan administration and decision-making.

We shall commence this Series by exploring the concepts and phases of project planning, including time scheduling and the stages that guide projects from conception to completion. Next, we will examine the financial dimensions of project management, focusing on financing, budgeting, and manpower assessment. Following that, we will move on to techniques of project appraisal and evaluation, which are critical for determining the viability and effectiveness of projects. Finally, we will conclude with the administration of project plans, discussing management structures, inter-regional planning, and decision-making at various levels.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- SLO 1.1 define the key concepts, phases, and time-scheduling techniques in project planning,
- SLO 1.2 explain the principles of project financing, budgeting, and manpower assessment,
- SLO 1.3 apply techniques of project appraisal and evaluation to assess project viability,
- SLO 1.4 describe the administration of project plans and the management of decision-making at various levels.

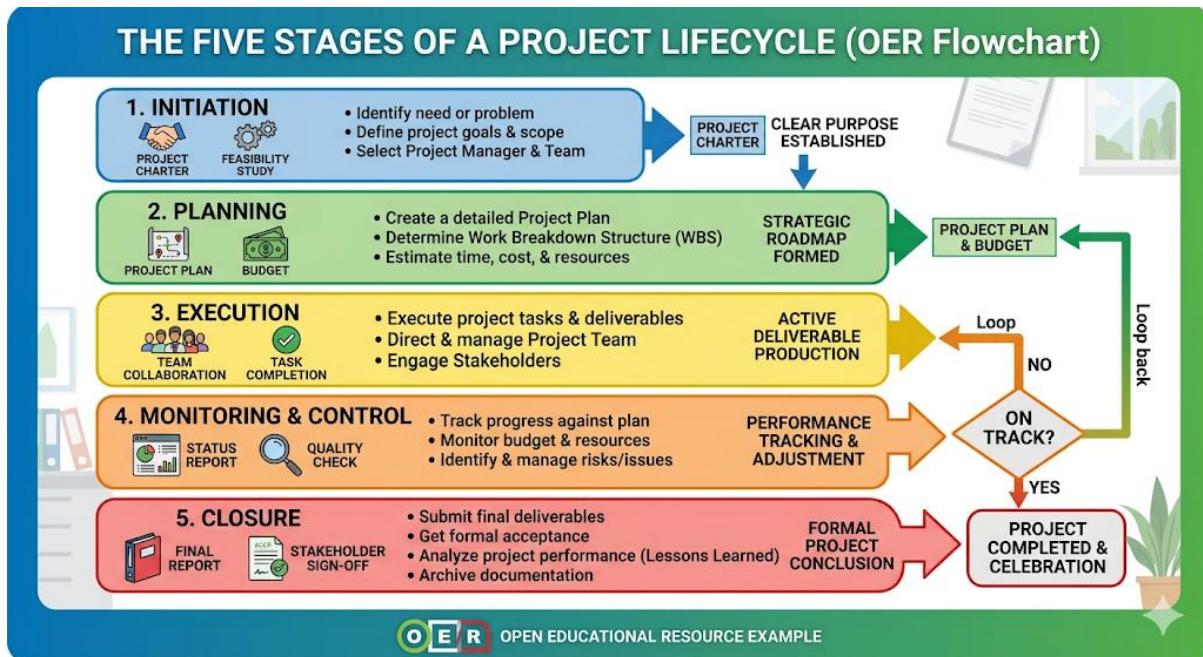
1.1 Introduction to Project Planning

1.1.1 Concepts and definitions in project planning

A **project** is a time-bound set of activities designed to achieve a specific objective within defined constraints of cost, quality, and scope. **Project planning** refers to the process of defining project goals, identifying tasks, allocating resources, and establishing a framework for monitoring and control. Central to this process is the recognition that every project passes through distinct stages from initiation and planning through execution, monitoring, and closure. Understanding these stages equips you with a structured approach to managing development activities, whether at the local, regional, or national level.

Fill in the blank: A project is described as time-bound because it has a defined _____ and end date.





Short description: A diagram illustrating the stages of a typical project lifecycle, from initiation to closure.

Figure 1.1 The project planning lifecycle

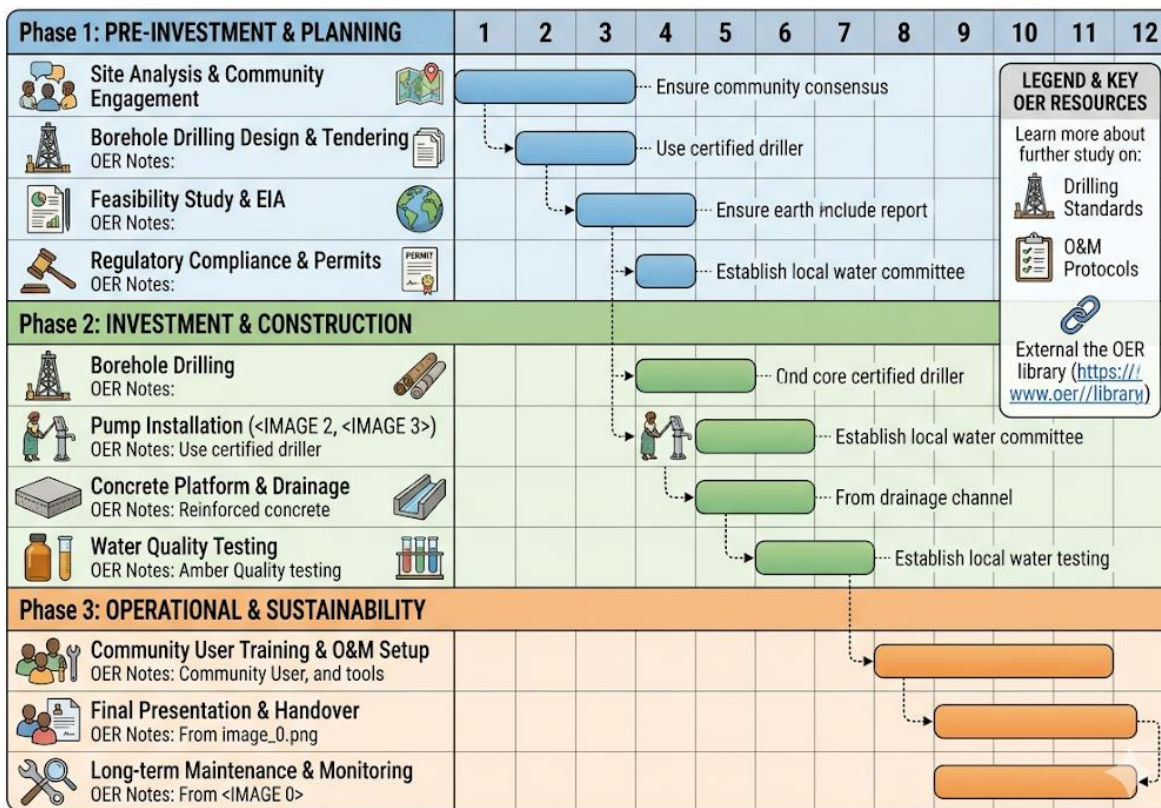
1.1.2 Phases and time scheduling in project planning

The **phases of project planning** refer to the sequential stages through which a project progresses. These typically include the pre-investment phase (feasibility studies and appraisal), the investment phase (design and implementation), and the operational phase (use and evaluation). **Time scheduling** is the process of assigning start and end dates to each project activity, ensuring that work proceeds in a logical, coordinated manner. Tools such as the Gantt chart and the Critical Path Method (CPM) are commonly used to visualise and manage project timelines.

Fill in the blank: The Critical Path Method (CPM) is a time scheduling tool used to identify activities that directly affect the project's _____ date.



GANTT CHART: PROJECT PLANNING PHASES FOR RURAL BOREHOLE HAND PUMP PROJECT



Short description: A Gantt chart template showing project phases and activities mapped across a timeline.

Figure 1.2 A sample Gantt chart for project time scheduling

Pilot Questions 1.1

What is the meaning of a project in the context of project planning?

List three constraints within which a project must be delivered.

Name the three broad phases of project planning.

What does time scheduling seek to achieve in project management?

Fill in the blank: A Gantt chart is used to visualise project _____ and timelines.



1.2 Project Financing, Budgeting, and Manpower Assessment

1.2.1 Financing and budgeting for projects

Project **financing** refers to the process of sourcing and securing funds required for project implementation. Sources may include government appropriations, donor funding, loans, public-private partnerships, and community contributions. **Budgeting**, on the other hand, is the process of estimating the total cost of a project and allocating funds to specific activities, components, or phases. A well-prepared budget serves as a financial roadmap, guiding expenditure and preventing cost overruns. Effective budgeting requires an understanding of cost items such as personnel, materials, equipment, consultancy, and contingency provisions.

Fill in the blank: A project budget serves as a financial _____, guiding the allocation and expenditure of funds throughout the project lifecycle.

Financing Source	Definition	Advantages	Limitations
Government Grants	Non-repayable funds provided by government agencies at local, national, or international levels.	* No Repayment: Funds do not need to be paid back, reducing financial burden. * Credibility: Winning a grant can enhance a project's legitimacy and attract other funders. * Alignment with Public Goals: Often targeted at specific social, environmental, or innovative objectives.	* High Competition: The application process is often rigorous and highly competitive. * Strict Compliance: Requires meticulous record-keeping and adherence to specific, often complex, reporting requirements. * Uncertainty: Funding is typically for a fixed term and is subject to changing political priorities and budget cuts.



Financing Source	Definition	Advantages	Limitations
Donor Funds / Philanthropic Grants	Non-repayable funds from individuals, foundations, or corporations, often with a charitable or mission-driven focus.	* Flexibility: Can be more flexible than government grants, sometimes allowing for innovation and risk-taking. * Mission Alignment: Donors are often deeply invested in the project's success and may provide non-financial support (e.g., expertise, networks). * Faster Access: Can sometimes be secured more quickly than other types of funding.	* Limited Scale: May not be suitable for large-scale, long-term infrastructure projects. * Donor Dependent: The project's direction can be influenced by the donor's changing priorities or specific interests. * Reporting Burden: Donors still require reporting, which can be time-consuming and resource-intensive.
Loans (Debt Financing)	Funds borrowed from financial institutions (banks, microfinance, development banks) that must be repaid over time, with interest.	* Retain Control: The project owner maintains full ownership and control over the project. * Build Credit History: Successful repayment can improve the project's creditworthiness for future financing.	* Repayment Obligation: Regular principal and interest payments must be made, regardless of project performance. * Interest Costs: The cost of borrowing can be substantial, especially for high-risk



Financing Source	Definition	Advantages	Limitations
		* Scalability: Can provide significant capital for large projects with predictable cash flows.	projects or in high-interest rate environments. * Collateral Requirement: Lenders typically require assets as collateral, putting them at risk if the loan cannot be repaid.
Public-Private Partnerships (PPPs)	A long-term contract between a private party and a government entity, for providing a public asset or service.	* Risk Sharing: Risks are allocated to the party best able to manage them (e.g., the private sector manages construction risk, the public sector manages regulatory risk). * Private Sector Expertise: Leverages the efficiency, innovation, and expertise of the private sector. * Off-Balance Sheet: Can sometimes allow governments to finance projects without	* Complex Contracts: Developing and negotiating PPP contracts is complex, time-consuming, and costly. * High Transaction Costs: The legal, financial, and technical advisory fees associated with PPPs are high. * Long-Term Commitment: Requires a long-term (20-30 year)



Financing Source	Definition	Advantages	Limitations
		significantly increasing public debt.	commitment from both parties, with limited flexibility. * Higher Cost of Capital: The cost of private capital is generally higher than public sector borrowing costs.

Table 1.1 Common sources of project financing and their characteristics

Short description: A table comparing sources of financing (e.g. government grants, donor funds, PPP) with their advantages and limitations.

1.2.2 Manpower assessment and resource planning

Manpower assessment or **human resource planning** involves identifying the types and quantities of personnel required to execute a project successfully. This process considers the skills, qualifications, and experience needed at each stage, as well as the duration for which personnel will be engaged. Alongside manpower, **resource planning** encompasses the identification and scheduling of materials, equipment, and facilities. Together, these processes ensure that the right people and resources are available at the right time, reducing delays and cost escalations.

Fill in the blank: Manpower assessment ensures that the right _____ are assigned to project tasks based on their qualifications and the duration of engagement.

Pilot Questions 1.2

What is the difference between project financing and project budgeting?

Name two sources of project financing available to government agencies.

What cost items are typically included in a project budget?

Why is manpower assessment important in project planning?

Fill in the blank: Resource planning ensures that the right materials and equipment are available at the _____ time.



1.3 Techniques of Project Appraisal and Evaluation

1.3.1 Techniques of project appraisal

Project appraisal is the systematic assessment of a proposed project to determine its viability, feasibility, and likely impact before implementation. Appraisal examines a project from multiple dimensions: **technical appraisal** assesses whether the project is technically sound; **economic appraisal** evaluates its contribution to broader development goals; **financial appraisal** examines costs and returns; and **social and environmental appraisal** considers impact on communities and the natural environment. Common appraisal techniques include Cost-Benefit Analysis (CBA), Net Present Value (NPV), and Internal Rate of Return (IRR).

Fill in the blank: Cost-Benefit Analysis (CBA) is a project appraisal technique that compares the total _____ of a project against its total costs.

Dimension	Brief Description	Key Focus Questions
Technical Appraisal	Evaluates the "doability" of the project. It reviews the engineering design, choice of technology, site suitability, and availability of required inputs (raw materials, power, labor).	Is the technology proven? Is the site accessible? Can we physically build and maintain this?
Economic Appraisal	Assesses the project's contribution to the national economy . It looks beyond private profit to consider "shadow prices," job creation, and the overall benefit to society.	Does the project increase the country's GDP? What are the opportunity costs of the resources used?
Financial Appraisal	Focuses on the monetary viability of the project from the perspective of the implementing agency. It analyzes cash flows, Return on Investment (ROI), and the ability to repay debts.	Will the project generate enough cash to cover its costs? Is the Net Present Value (NPV) positive?
Social & Environmental Appraisal	Examines the impact on the local community (equity, gender, health) and the natural ecosystem (pollution, biodiversity). It often	Will this displace local residents? How will we mitigate carbon emissions or waste production?



Dimension	Brief Description	Key Focus Questions
	includes an Environmental Impact Assessment (EIA).	

Box 1.1 Key dimensions of project appraisal

Short description: A box summarising the four dimensions of project appraisal technical, economic, financial, and social/environmental.

1.3.2 Project evaluation methods

Project evaluation is the structured assessment of a project's performance during or after implementation. Unlike appraisal, which is prospective, evaluation is both concurrent and retrospective. **Formative evaluation** occurs during project implementation to identify problems and make corrections in real time. **Summative evaluation** is conducted at the end of a project to assess overall performance against set objectives. Evaluation frameworks typically examine effectiveness, efficiency, relevance, sustainability, and impact criteria widely used in development project management.

Fill in the blank: Summative evaluation is carried out _____ the completion of a project to assess its overall performance.

Pilot Questions 1.3

What is project appraisal, and why is it conducted before implementation?

Name two techniques used in economic project appraisal.

What is the difference between formative and summative evaluation?

List three criteria commonly used in project evaluation frameworks.

Fill in the blank: Internal Rate of Return (IRR) is used to assess the _____ of a project investment.

1.4 Project Plan Administration and Decision-Making

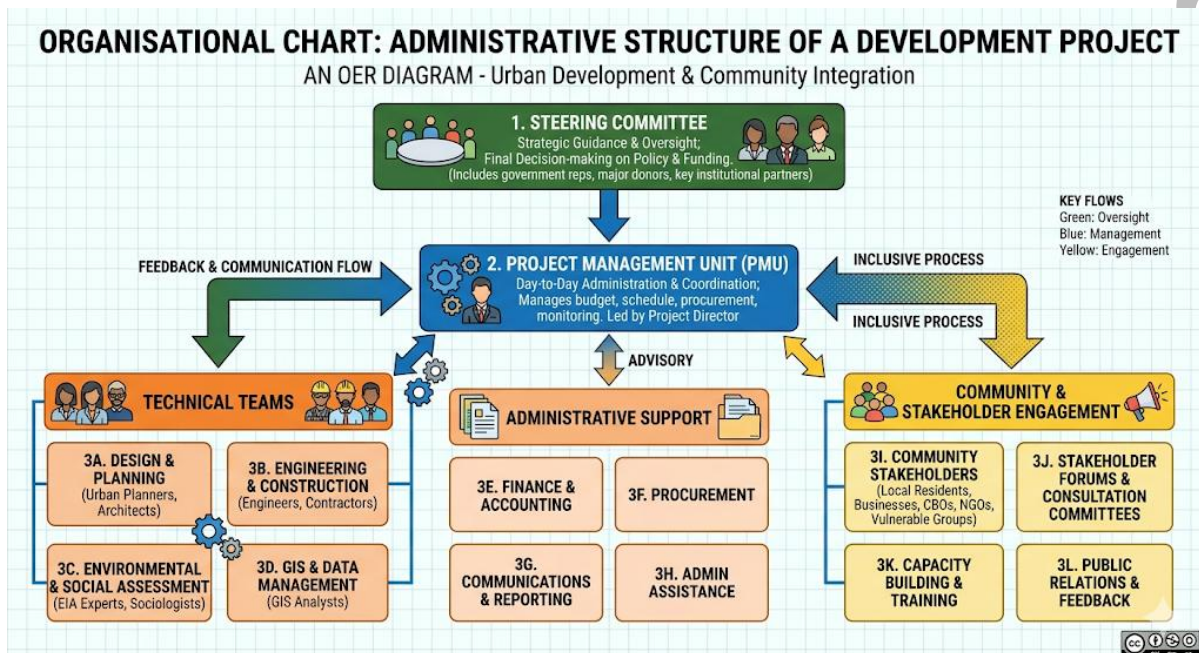
1.4.1 Administration of project plans

Project plan administration refers to the processes, structures, and mechanisms through which a project is directed, monitored, and controlled from initiation to closure. It encompasses the application of **administrative procedures** such as reporting systems, record-keeping, and compliance checks to ensure that the project proceeds according to its approved plan. In contexts involving regional or inter-regional projects, administration becomes more complex, requiring coordination across multiple organisations, jurisdictions, and governance levels.



Effective administration of project plans ensures accountability, transparency, and the achievement of set milestones.

Fill in the blank: Effective project plan administration ensures _____ and transparency throughout the project lifecycle.



Short description: A diagram showing the administrative structure for a multi-level development project, including project steering committee, implementation unit, and stakeholder groups.

Figure 1.3 Administrative structure of a project plan

1.4.2 Management and decision-making in project implementation

Decision-making in project implementation occurs at multiple levels: strategic, tactical, and operational. **Strategic decisions** are made by senior management or steering committees and concern the overall direction and priorities of the project. **Tactical decisions** involve mid-level managers who translate strategic goals into specific work plans. **Operational decisions** are made at the field or implementation level and deal with day-to-day activities. Effective project management requires that decision-making be clearly assigned, well-informed, and responsive to emerging challenges. Within practical settings, this demands regular communication, data-driven assessments, and participatory engagement with project stakeholders.

Fill in the blank: Operational decisions in project management are concerned with _____ activities at the field or implementation level.

Pilot Questions 1.4

What does project plan administration involve?

Why is inter-regional project administration more complex than single-site projects?

Identify the three levels at which decision-making occurs in project implementation.



What are tactical decisions in the context of project management?

Fill in the blank: Strategic decisions in project management are typically made by _____ management or steering committees.

S

Series Summary

This Series has introduced you to the fundamentals of project planning and administration, providing you with the conceptual and practical foundation necessary to engage with the more specialised topics that follow in this course. We began by exploring the concepts and definitions of project planning, identifying the key phases and the time-scheduling tools used to coordinate project activities. We then examined the financial dimensions of project management, covering financing, budgeting, and manpower assessment as essential preconditions for successful project delivery.

Following that, we discussed techniques of project appraisal and evaluation, distinguishing between the prospective nature of appraisal and the retrospective and concurrent roles of evaluation. Finally, we considered the administration of project plans and the management of decision-making at strategic, tactical, and operational levels, with specific attention to the challenges of inter-regional administration.

By engaging with these topics, you should now be able to define the key concepts and phases of project planning, explain financing and budgeting principles, apply appraisal and evaluation techniques, and describe the administration and decision-making structures that govern project implementation. These outcomes directly align with the Series Learning Outcomes and equip you with the knowledge required for the subsequent Series in this course.

Glossary of Terms

Budgeting: The process of estimating the total cost of a project and allocating funds to specific activities, components, or phases.

Cost-Benefit Analysis (CBA): A project appraisal technique that compares the total benefits of a project against its total costs to determine its economic viability.

Critical Path Method (CPM): A time scheduling technique used to identify the sequence of activities that determines the minimum duration for project completion.

Decision-making: The process of selecting a course of action at strategic, tactical, or operational levels to guide project implementation.

Financing: The process of sourcing and securing funds required for project implementation from various public and private sources.

Formative evaluation: Assessment conducted during project implementation to identify problems and enable real-time corrections.



Gantt chart: A visual tool used in project scheduling that represents activities against a timeline, showing start dates, durations, and dependencies.

Internal Rate of Return (IRR): A financial appraisal measure that calculates the rate at which the net present value of a project equals zero.

Manpower assessment: The process of identifying the types and quantities of personnel required to execute a project at each stage.

Net Present Value (NPV): A financial appraisal technique that calculates the current value of a project's expected future cash flows, adjusted for time.

Project: A time-bound set of activities designed to achieve a specific objective within defined constraints of cost, quality, and scope.

Project administration: The processes, structures, and mechanisms through which a project is directed, monitored, and controlled.

Project appraisal: The systematic assessment of a proposed project to determine its viability, feasibility, and likely impact before implementation.

Project evaluation: The structured assessment of a project's performance during or after implementation against its set objectives.

Project planning: The process of defining project goals, identifying tasks, allocating resources, and establishing a framework for monitoring and control.

Resource planning: The identification and scheduling of materials, equipment, facilities, and personnel required for project execution.

Summative evaluation: Assessment conducted at the end of a project to measure overall performance against stated goals.

Time scheduling: The process of assigning start and end dates to project activities to ensure coordinated and timely execution.

Concept Check Questions 1

Objective questions

What is the primary purpose of project planning? (Linked to SLO 1.1)

2. A Gantt chart is used to:
 - a. Assess environmental impact
 - b. Visualise project activities against a timeline
 - c. Calculate the internal rate of return
 - d. Allocate manpower to specific roles (Linked to SLO 1.1)
3. Which of the following is an example of a financial appraisal technique?
 - a. Environmental Impact Assessment
 - b. Community needs survey
 - c. Net Present Value (NPV)



- d. Stakeholder mapping (Linked to SLO 1.3)

Short-answer questions

4. Define the term "project budgeting" and explain its importance in project management. (Linked to SLO 1.2)
5. State one key difference between project appraisal and project evaluation. (Linked to SLO 1.3)

Long-answer questions

6. Analyse the phases of the project planning process and explain how time scheduling contributes to successful project delivery. (Linked to SLO 1.1)

- Basic response: Learners should describe the pre-investment, investment, and operational phases and explain how tools such as Gantt charts and CPM help sequence and monitor activities.

- Value-added response: Outstanding learners may discuss real-world challenges in time scheduling, such as activity dependencies, resource constraints, and delays, and propose mitigation strategies.

7. Evaluate the role of decision-making at different management levels in ensuring effective project plan administration. (Linked to SLO 1.4)

- Basic response: Learners should identify strategic, tactical, and operational decision-making levels and describe their respective roles in project administration.

- Value-added response: Outstanding learners may draw on practical examples of inter-regional project administration in Nigeria or other developing contexts, discussing how governance structures and communication mechanisms influence decision outcomes.

Answers to Concept Check Questions 1

Project planning defines project goals, identifies tasks, allocates resources, and establishes a monitoring framework.

Visualise project activities against a timeline

Net Present Value (NPV)

4. Project budgeting is the process of estimating a project's total cost and allocating funds to specific activities and phases. It is important because it guides expenditure, prevents cost overruns, and ensures that resources are used efficiently.
5. Project appraisal is conducted before implementation to assess viability, while project evaluation is conducted during or after implementation to assess performance.



6. Basic response: The three phases pre-investment, investment, and operational provide a structured progression for project development. Time scheduling tools such as Gantt charts and CPM assign activities to timelines and identify critical dependencies.

Value-added response: Learners may discuss real-world complications such as resource conflicts, overlapping activities, and the use of project management software to dynamically adjust schedules.

7. Basic response: Strategic decisions set the overall project direction; tactical decisions translate goals into work plans; and operational decisions manage day-to-day activities. Clear assignment of responsibilities across these levels supports accountability and performance.

Value-added response: In inter-regional contexts, governance gaps and jurisdictional overlaps can complicate decision-making. Effective administration structures, such as joint steering committees and dedicated project management units, help address these challenges.

Answers to Pilot Questions 1

Answers to Pilot Questions 1.1

A project is a time-bound set of activities designed to achieve a specific objective within defined constraints.

Cost, quality, and scope

Pre-investment, investment, and operational phases

Time scheduling ensures activities are assigned start and end dates, enabling coordinated and timely execution.

Timelines

Answers to Pilot Questions 1.2

Financing is the sourcing of funds, while budgeting is the allocation of those funds to specific activities.

Government appropriations and donor funding

Personnel, materials, equipment, consultancy, and contingency provisions

It ensures that the right skills and experience are available at each stage of the project.

Right

Answers to Pilot Questions 1.3

Project appraisal is the systematic pre-implementation assessment of a project's viability, feasibility, and likely impact.

Cost-Benefit Analysis (CBA) and Net Present Value (NPV)



Formative evaluation occurs during implementation; summative evaluation occurs after completion.

Effectiveness, efficiency, and sustainability (also: relevance and impact)

Financial viability

Answers to Pilot Questions 1.4

Project plan administration involves directing, monitoring, and controlling a project through defined processes and structures.

Inter-regional projects require coordination across multiple organisations, jurisdictions, and governance levels.

Strategic, tactical, and operational

Tactical decisions translate strategic goals into specific work plans.

Senior

References and Attributions 1

This Series has drawn upon a range of scholarly and open educational resources to ensure accuracy and learner-friendliness. Below are the references and attributions for Series 1: Fundamentals of Project Planning and Administration.

Figures, Plates, Tables, and Boxes

Figure 1.1 The project planning lifecycle: AI prompt used "Create a flowchart diagram illustrating the five stages of a project lifecycle: initiation, planning, execution, monitoring, and closure." Suggested OER search string "project lifecycle stages diagram OER."

Figure 1.2 A sample Gantt chart for project time scheduling: AI prompt used "Generate a Gantt chart showing project phases (pre-investment, investment, operational) and associated activities across a twelve-month timeline." Suggested OER search string "Gantt chart project planning phases OER."

Table 1.1 Common sources of project financing and their characteristics: AI prompt used "Generate a table comparing common sources of project financing government grants, donor funds, loans, and public-private partnerships with their advantages and limitations." Suggested OER search string "project financing sources comparison table OER."

Box 1.1 Key dimensions of project appraisal: AI prompt used "Generate a text box summarising the four dimensions of project appraisal: technical, economic, financial, and social/environmental, with a brief description of each." Suggested OER search string "project appraisal dimensions OER."

Figure 1.3 Administrative structure of a project plan: AI prompt used "Create an organisational chart showing the administrative structure of a development project,



including a steering committee, project management unit, technical teams, and community stakeholders." Suggested OER search string "project administrative structure organisational chart OER."

General References

- Cusworth, J. W., & Franks, T. R. (Eds.). (1993). Managing projects in developing countries. Longman.
- Flyvbjerg, B. (2017). The Oxford handbook of megaproject management. Oxford University Press.
- Project Management Institute. (2021). A guide to the project management body of knowledge (PMBOK guide) (7th ed.). PMI.
- United Nations Development Programme. (2009). Handbook on planning, monitoring and evaluating for development results. UNDP.
- World Bank. (2004). Monitoring and evaluation: Some tools, methods and approaches. World Bank Operations Evaluation Department.
- Open Educational Resources (OER Commons). Search strings used: "project planning phases OER," "project financing budgeting OER," "project appraisal techniques OER," "project evaluation methods OER."

Attributions

- All AI-generated illustration prompts were created specifically for this Series using instructional design guidelines.
- Suggested OER search strings are provided to enable sourcing of free-to-use diagrams, tables, and conceptual images for teaching and learning purposes.

Course code: URP 508

Course title: Project Planning and Implementation

Course credit load: 2 Units

List of Series:

- Series 1: Fundamentals of Project Planning and Administration
- Series 2: Rural and Urban Water Demand, Supply, and Sanitation
- Series 3: Urbanisation Impacts and Strategies for Water Management
- Series 4: Policies, MDGs, and SDGs in Nigerian Water and Sanitation
- Series 5: Urban Physical Planning, Land Policy, and Implementation



Series 2: Rural and Urban Water Demand, Supply, and Sanitation

Series 2 Outline

Part 1 (2.1): Concepts of Water Demand and Supply

Sub-Part 2.1.1: Nature and patterns of rural water demand

Sub-Part 2.1.2: Nature and patterns of urban water demand

Part 2 (2.2): Sources and Systems of Water Supply

Sub-Part 2.2.1: Rural water supply sources and systems

Sub-Part 2.2.2: Urban water supply infrastructure and distribution

Part 3 (2.3): Sanitation Systems and Management

Sub-Part 2.3.1: Rural sanitation systems and challenges

Sub-Part 2.3.2: Urban sanitation infrastructure and waste management

Part 4 (2.4): Water Quality, Conservation, and Access

Sub-Part 2.4.1: Water quality standards and treatment

Sub-Part 2.4.2: Water conservation strategies and equitable access

Introduction

Access to clean water and adequate sanitation is one of the most fundamental requirements for human health, dignity, and development. Whether in rural communities or rapidly growing urban centres, the ability to meet water demand through reliable supply systems and maintain effective sanitation facilities directly determines the quality of life and the sustainability of settlements. This Series introduces you to the key concepts, systems, and challenges related to rural and urban water demand, supply, and sanitation, building on the project planning foundations covered in Series 1.

The aim of this Series is to equip you with the knowledge required to describe patterns of water demand, explain the sources and systems of water supply, understand sanitation management, and appreciate the importance of water quality, conservation, and equitable access.

We shall commence this Series by examining the nature and patterns of water demand in both rural and urban settings. Next, we will explore the sources and systems through which water is supplied to these communities. Following that, we will consider sanitation systems and their management, distinguishing between rural and urban contexts. Finally, we will address water quality, conservation strategies, and the challenges of ensuring equitable access to safe water.

Series Learning Outcomes

Upon completing this Series, you should be able to:



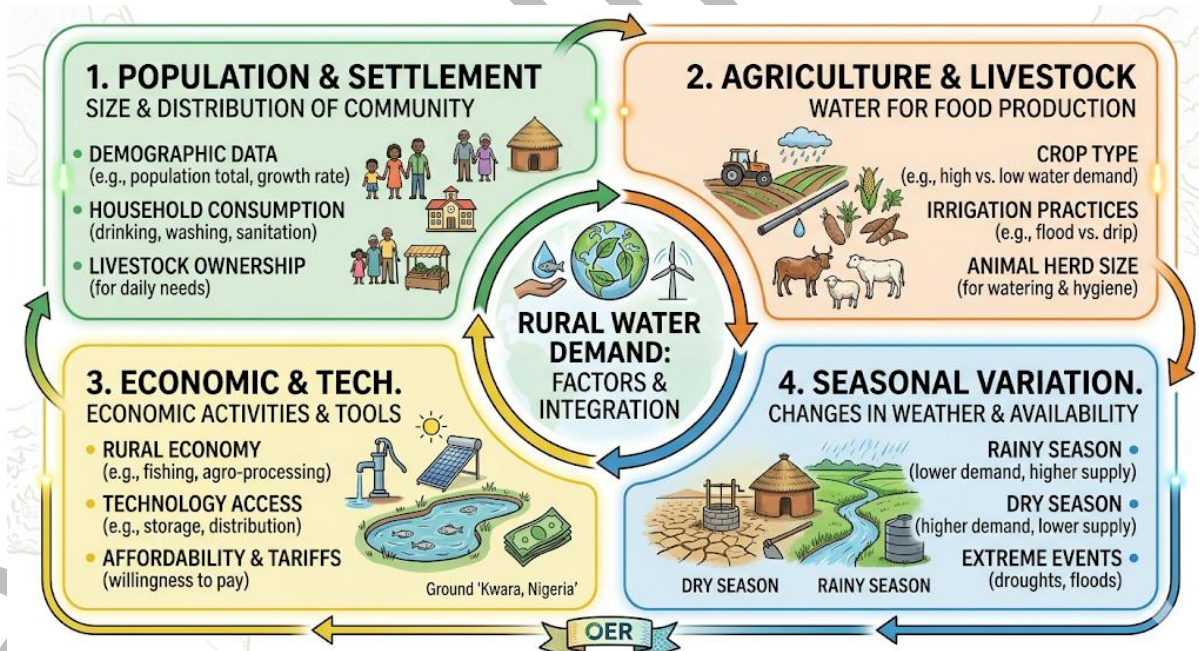
- SLO 2.1 describe the nature and patterns of water demand in rural and urban settings,
- SLO 2.2 explain the sources and systems of rural and urban water supply,
- SLO 2.3 outline the key features and challenges of rural and urban sanitation systems,
- SLO 2.4 evaluate water quality standards, conservation strategies, and issues of equitable access.

2.1 Concepts of Water Demand and Supply

2.1.1 Nature and patterns of rural water demand

Water demand refers to the quantity of water required by a population or community for domestic, agricultural, industrial, and other uses within a given period. In rural areas, water demand is shaped by factors such as population size, agricultural activities, livestock keeping, and the availability of alternative water sources. Rural communities typically depend on rivers, boreholes, hand-dug wells, and rainwater harvesting to meet their needs. Seasonal variations significantly affect rural water demand, with consumption rising during dry seasons when other sources diminish.

Fill in the blank: In rural areas, water demand tends to increase during the _____ season when natural water sources are reduced.



Short description: A diagram illustrating the main sources of rural water supply and the factors that influence water demand in rural communities.

Figure 2.1 Factors influencing rural water demand



2.1.2 Nature and patterns of urban water demand

Urban water demand is characterised by higher per capita consumption compared to rural areas, driven by dense populations, industrial activity, commercial establishments, and higher living standards. Urban demand is also more consistent throughout the year due to piped supply systems and storage infrastructure. However, rapid urbanisation often outpaces supply capacity, resulting in water stress. Understanding demand patterns including peak demand periods and distribution across residential, commercial, and industrial users is essential for effective urban water planning.

Fill in the blank: Urban water demand is generally _____ than rural demand per capita due to higher population density and industrial activity.

Pilot Questions 2.1

What is meant by water demand in the context of settlement planning?

Name two factors that influence rural water demand.

Why does rural water demand fluctuate with seasons?

Give two reasons why urban water demand is higher than rural demand.

Fill in the blank: The challenge of rapid urbanisation on water supply is referred to as water _____.

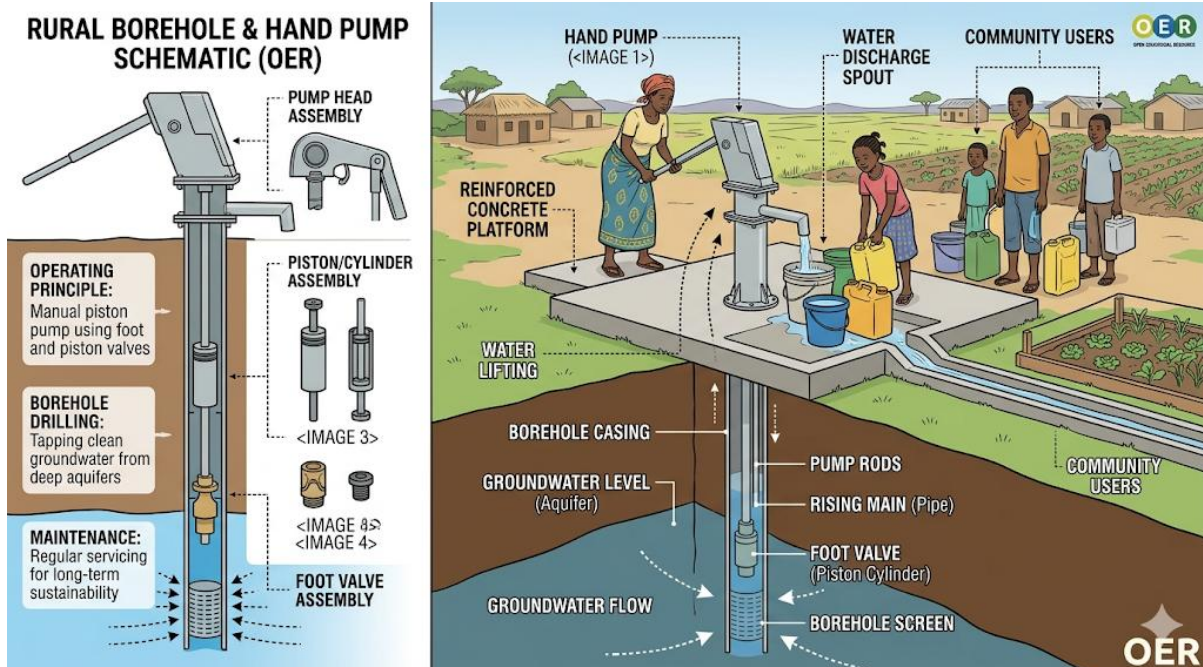
2.2 Sources and Systems of Water Supply

2.2.1 Rural water supply sources and systems

Rural water supply draws from a range of sources, including surface water (rivers, streams, lakes), groundwater (boreholes, hand-dug wells, springs), and harvested rainwater. The choice of source depends on availability, quality, and the cost of extraction and treatment. Common rural water supply systems include gravity-fed schemes, hand pumps, and small-scale piped networks. Community-managed water points are widely used in Nigerian rural settings, though sustainability is often challenged by inadequate maintenance, funding, and technical capacity.

Fill in the blank: A gravity-fed scheme relies on the natural _____ of water from elevated sources to supply communities at lower elevations.





Short description: A photograph or illustration of a rural community water point, such as a borehole with a hand pump.

Plate 2.1 A typical rural water supply point

2.2.2 Urban water supply infrastructure and distribution

Urban water supply is typically organised around a treatment-and-distribution model. Raw water is abstracted from surface or groundwater sources, treated at water treatment plants to meet quality standards, and then distributed through a network of pipes to consumers. Key components include intake structures, treatment facilities, pumping stations, storage reservoirs, and distribution mains. In Nigeria, urban water supply is largely managed by State Water Corporations, though coverage gaps and system inefficiencies remain significant challenges.

Fill in the blank: In Nigerian cities, urban water supply is primarily managed by _____ Water Corporations.

Pilot Questions 2.2

Name three sources of rural water supply.

What factors determine the choice of water source in rural communities?

What is a gravity-fed water scheme?

List four components of an urban water supply system.

Fill in the blank: Raw water is treated at _____ plants before distribution to urban consumers.



2.3 Sanitation Systems and Management

2.3.1 Rural sanitation systems and challenges

Sanitation refers to the provision of facilities and services for the safe disposal of human waste and the maintenance of hygienic conditions. In rural areas, sanitation systems are often basic, ranging from pit latrines and ventilated improved pit (VIP) latrines to pour-flush toilets. Open defecation remains a significant challenge in many rural communities, contributing to waterborne diseases and environmental contamination. Effective rural sanitation requires both infrastructure provision and sustained behaviour change communication to encourage adoption and proper use of sanitation facilities.

Fill in the blank: Open defecation in rural communities contributes to the spread of _____ diseases.

Facility Type	Cost	Hygiene	Suitability for Rural Communities
Pit Latrine	Low: Minimal material and labor costs. Can be constructed using locally sourced materials (wood, mud, thatch).	Low to Moderate: Highly dependent on maintenance. Simple pits can become sources of odor, flies, and contamination if not properly covered or ventilated. Risk of groundwater contamination.	High: Well-suited for very poor or remote communities with limited resources and skills.
VIP Latrine (Ventilated Improved Pit)	Moderate: Higher cost than a simple pit due to the addition of a concrete slab, vent pipe, and fly screen.	Moderate to High: The vent pipe effectively removes odors, and the fly screen prevents flies from entering or leaving, significantly improving hygiene over simple pits.	High: Excellent balance of improved hygiene and relatively low cost. Ideal where water is scarce.
Pour-Flush Toilet	High: Requires significant investment for the toilet bowl/pan (often ceramic or plastic), plumbing, and a reliable water source.	High: Provides the highest level of user hygiene. Water forms a seal that blocks all odors and insects. Effluent is usually directed to a septic tank or soak pit.	Moderate: Best suited for communities with a reliable water supply, higher income levels, and available plumbing skills.



Short description: A table comparing types of rural sanitation facilities, their features, and their suitability for different community contexts.

Table 2.1 Types of rural sanitation facilities and their characteristics

2.3.2 Urban sanitation infrastructure and waste management

Urban sanitation involves more complex infrastructure, including sewerage systems, wastewater treatment plants, and solid waste management facilities. Sewerage networks collect wastewater from households and industries and convey it to treatment plants before discharge or reuse. In many Nigerian cities, however, formal sewerage coverage is limited, and on-site sanitation systems such as septic tanks and soakaways are widely used. Solid waste management including collection, transportation, and disposal is a critical component of urban sanitation, with landfills and composting among the common disposal methods.

Fill in the blank: In Nigerian cities where sewerage networks are absent, _____ tanks and soakaways are commonly used for on-site sanitation.

Pilot Questions 2.3

What is sanitation, and why is it important for community health?

Name two types of rural sanitation facilities.

What is open defecation and why is it a public health concern?

Describe the role of wastewater treatment plants in urban sanitation.

Fill in the blank: Solid waste _____ involves the collection, transportation, and disposal of refuse in urban areas.

2.4 Water Quality, Conservation, and Access

2.4.1 Water quality standards and treatment

Water quality refers to the chemical, physical, and biological characteristics of water that determine its suitability for a particular use. Drinking water must meet established quality standards to protect public health. In Nigeria, the Standard Organisation of Nigeria (SON) and the World Health Organization (WHO) provide guidelines for acceptable levels of contaminants in potable water. Treatment processes including coagulation, sedimentation, filtration, and chlorination are used to remove impurities and pathogens. Regular water quality monitoring is essential to ensure that treated water remains safe from source to consumer.

Fill in the blank: The process of adding _____ to treated water helps kill pathogens and prevent waterborne diseases.



Stage	Process Description	Primary Goal
1. Coagulation & Flocculation	Chemicals (coagulants like alum) are added to the water to neutralize the charge of dirt and other dissolved particles. These particles then stick together to form larger, heavier clumps called floc .	To bind small, suspended particles into larger masses.
2. Sedimentation	The water moves into a quiet basin where the heavy floc particles settle to the bottom due to gravity. The clear water on top moves on to the next stage.	To remove the majority of solid "floc" from the water column.
3. Filtration	The clear water passes through layers of sand, gravel, and charcoal (activated carbon). These layers vary in pore size to trap smaller remaining particles, such as dust, parasites, and bacteria.	To remove fine particulate matter and improve clarity and taste.
4. Chlorination (Disinfection)	A small amount of chlorine or other disinfectant (like ozone or UV light) is added to the water. This kills any remaining microorganisms, including bacteria and viruses.	To ensure the water is biologically safe and prevent re-contamination in pipes.

Short description: A box summarising the key stages of water treatment: coagulation, sedimentation, filtration, and chlorination.

Box 2.1 Key stages of the water treatment process

2.4.2 Water conservation strategies and equitable access

Water conservation involves the efficient use and management of water resources to reduce waste, minimise losses, and ensure long-term availability. Strategies include leak detection and repair, demand management, rainwater harvesting, and wastewater reuse. **Equitable access** to water means ensuring that all people regardless of income, location, or social status have reliable access to safe and affordable water. In Nigeria, disparities between urban and rural water access, as well as between high-income and low-income urban residents, remain key challenges that demand targeted policy and investment responses.



Fill in the blank: Ensuring that all people have reliable access to safe and affordable water, regardless of their income or location, is referred to as _____ access.

Pilot Questions 2.4

What is water quality, and what dimensions does it cover?

Name the four main stages of water treatment.

Why is regular water quality monitoring important?

Give two examples of water conservation strategies.

Fill in the blank: Disparities in water access between rural and urban areas reflect challenges in achieving _____ access.

Series Summary

This Series has introduced you to the fundamental concepts, systems, and challenges associated with rural and urban water demand, supply, and sanitation. We began by examining the nature and patterns of water demand, distinguishing between the seasonal and activity-driven characteristics of rural demand and the consistently high per capita demand of urban areas. We then explored the sources and systems of water supply, covering rural options such as boreholes and gravity-fed schemes, as well as urban infrastructure including treatment plants and distribution networks.

Following that, we discussed sanitation systems and their management, highlighting the range of rural sanitation technologies and the more complex infrastructure required in urban settings, including sewerage and solid waste management. Finally, we considered water quality standards and treatment processes, and examined strategies for water conservation and equitable access.

By engaging with these topics, you should now be able to describe patterns of water demand, explain rural and urban supply systems, outline the key features of sanitation management, and evaluate water quality and conservation strategies. These outcomes directly align with the Series Learning Outcomes and prepare you for the discussions on urbanisation and water management in Series 3.

Glossary of Terms

Chlorination: The addition of chlorine to treated water to kill pathogens and prevent waterborne disease.

Equitable access: The principle that all people, regardless of income, location, or social status, should have reliable access to safe and affordable water.

Gravity-fed scheme: A water supply system that uses the natural elevation of a water source to deliver water to communities at lower altitudes without pumping.

Open defecation: The practice of defecating in the open environment rather than in a toilet or latrine, posing significant public health risks.



Pit latrine: A basic sanitation facility in which waste falls into a pit dug in the ground.

Rural water supply: The provision of water from sources such as boreholes, wells, rivers, and rainwater harvesting systems to serve rural communities.

Sanitation: The provision of facilities and services for the safe disposal of human waste and maintenance of hygienic conditions.

Septic tank: An on-site sewage treatment system in which solid waste settles and liquid effluent drains into the surrounding soil.

Sewerage system: A network of pipes and structures that collects and conveys wastewater from households and industries to treatment facilities.

Urban water demand: The total quantity of water required by urban populations for domestic, commercial, and industrial uses.

Urban water supply: An organised system of water abstraction, treatment, storage, and distribution serving urban populations, typically managed by water utilities.

VIP latrine: A ventilated improved pit latrine designed to reduce odour and fly nuisance through a ventilation pipe fitted with a fly screen.

Water conservation: The efficient use and management of water resources to reduce waste, minimise losses, and ensure long-term availability.

Water demand: The quantity of water required by a population for domestic, agricultural, industrial, and other purposes within a given period.

Water quality: The chemical, physical, and biological characteristics of water that determine its suitability for a particular use, including human consumption.

Water stress: A condition in which water demand exceeds available supply, or where supply is of insufficient quality to meet needs.

Water treatment: The process of removing impurities and pathogens from raw water through coagulation, sedimentation, filtration, and chlorination.

Concept Check Questions 2

Objective questions

Which of the following best describes water stress? (Linked to SLO 2.1)

- a. An excess of rainfall in urban areas
- b. A condition where water demand exceeds available supply
- c. The seasonal variation in rural water use
- d. The treatment of wastewater before reuse

A gravity-fed water scheme works by: (Linked to SLO 2.2)

- a. Pumping water from underground boreholes
- b. Using natural elevation to deliver water without pumping
- c. Treating raw water with chemicals



- d. Collecting rainwater on rooftops

Which of the following is a stage in the water treatment process? (Linked to SLO 2.4)

- a. Open defecation
- b. Sedimentation
- c. Gravity feeding
- d. Demand management

Short-answer questions

- 4. Define the term "sanitation" and explain its importance to public health. (Linked to SLO 2.3)
- 5. State one water conservation strategy and explain how it contributes to sustainable water management. (Linked to SLO 2.4)

Long-answer questions

- 6. Compare the patterns of water demand in rural and urban settings and explain the key factors that account for the differences. (Linked to SLO 2.1)
 - Basic response: Learners should identify that rural demand is lower, seasonal, and driven by agricultural and domestic uses, while urban demand is higher, consistent, and driven by population density and industrial activity.
 - Value-added response: Outstanding learners may discuss the implications of these differences for infrastructure planning, investment priorities, and policy, with reference to Nigerian contexts.
- 7. Evaluate the challenges of providing adequate sanitation in Nigerian urban areas and suggest strategies for improvement. (Linked to SLO 2.3)
 - Basic response: Learners should describe limited sewerage coverage, reliance on on-site systems, and solid waste management deficiencies.
 - Value-added response: Outstanding learners may recommend solutions such as investment in sewerage infrastructure, community-led sanitation programmes, and integration of sanitation into urban development planning.

Answers to Concept Check Questions 2

A condition where water demand exceeds available supply
Using natural elevation to deliver water without pumping
Sedimentation

- 4. Sanitation refers to the provision of facilities and services for the safe disposal of human waste and the maintenance of hygienic conditions. It is important to public health because it prevents the spread of waterborne diseases and reduces environmental contamination.



5. One conservation strategy is leak detection and repair in water distribution networks. By identifying and fixing leaks, water utilities reduce losses and ensure that treated water reaches consumers efficiently.

6. Basic response: Rural water demand is lower per capita, shaped by seasonal patterns and agricultural use. Urban demand is higher and more consistent, driven by population density, commercial activity, and industrial use.

Value-added response: These differences have direct implications for infrastructure design and investment. Rural systems require low-cost, community-managed solutions, while urban systems demand large-scale treatment and distribution infrastructure. In Nigeria, both settings face significant supply deficits that require targeted policy responses.

7. Basic response: Urban sanitation in Nigeria is challenged by limited sewerage coverage, widespread use of on-site systems such as septic tanks, and inadequate solid waste management.

Value-added response: Strategies for improvement include expanding sewerage infrastructure, enforcing sanitation standards in urban development approvals, promoting community-led total sanitation programmes, and integrating sanitation planning into urban master plans.

Answers to Pilot Questions 2

Answers to Pilot Questions 2.1

Water demand is the quantity of water required by a population for domestic, agricultural, industrial, and other uses.

Population size and agricultural activities

Natural water sources diminish during dry seasons, increasing reliance on stored or extracted water.

Higher population density and industrial activity

Stress

Answers to Pilot Questions 2.2

Rivers, boreholes, and rainwater harvesting

Availability, quality, and cost of extraction and treatment

A water supply system that uses natural elevation to convey water to lower-lying communities without pumping

Intake structures, treatment facilities, pumping stations, and storage reservoirs

Water treatment

Answers to Pilot Questions 2.3

Sanitation is the provision of facilities and services for safe waste disposal and hygienic conditions; it is vital for preventing disease.



Pit latrine and VIP latrine

Open defecation is the practice of defecating in the open environment; it spreads pathogens and contaminates water sources.

Wastewater treatment plants remove impurities and pathogens from sewage before the treated effluent is discharged or reused.

Management

Answers to Pilot Questions 2.4

Water quality covers the chemical, physical, and biological characteristics of water that determine its suitability for use.

Coagulation, sedimentation, filtration, and chlorination

It ensures that treated water remains safe from source to consumer and that standards are consistently maintained.

Leak detection and repair, and rainwater harvesting

Equitable

References and Attributions 2

This Series has drawn upon a range of scholarly and open educational resources to ensure accuracy and learner-friendliness. Below are the references and attributions for Series 2: Rural and Urban Water Demand, Supply, and Sanitation.

Figures, Plates, Tables, and Boxes

Figure 2.1 Factors influencing rural water demand: AI prompt used "Create a diagram showing the key factors that influence rural water demand, including population size, agricultural use, and seasonal variation." Suggested OER search string "rural water demand factors diagram OER."

Plate 2.1 A typical rural water supply point: AI prompt used "Generate an illustration of a rural community borehole with a hand pump serving community members." Suggested OER search string "rural borehole hand pump community water supply OER."

Table 2.1 Types of rural sanitation facilities and their characteristics: AI prompt used "Generate a table comparing pit latrines, VIP latrines, and pour-flush toilets in terms of cost, hygiene, and suitability for rural communities." Suggested OER search string "rural sanitation facilities comparison table OER."

Box 2.1 Key stages of the water treatment process: AI prompt used "Generate a text box summarising the four main stages of water treatment: coagulation, sedimentation, filtration, and chlorination, with a brief description of each." Suggested OER search string "water treatment stages process OER."



General References

- Abaje, I. B., Ati, O. F., & Iguisi, E. O. (2012). Living with drought in the semi-arid zone of Nigeria. *Journal of Geography and Geology*, 4(2), 42–51.
- Federal Republic of Nigeria. (2000). National water supply and sanitation policy. Federal Ministry of Water Resources.
- Teutsch, G., & Scholten, S. (2011). Water quality and water resources management. UNESCO-IHP.
- United Nations Children's Fund & World Health Organization. (2023). Progress on household drinking water, sanitation and hygiene 2000–2022. UNICEF/WHO.
- World Health Organization. (2022). Guidelines for drinking-water quality (4th ed., incorporating the 1st and 2nd addenda). WHO.
- Open Educational Resources (OER Commons). Search strings used: "rural water demand OER," "water supply systems OER," "rural sanitation facilities OER," "water treatment process OER."

Attributions

- All AI-generated illustration prompts were created specifically for this Series using instructional design guidelines.
- Suggested OER search strings are provided to enable sourcing of free-to-use diagrams, tables, and conceptual images for teaching and learning purposes.

Course code: URP 508

Course title: Project Planning and Implementation

Course credit load: 2 Units

List of Series:

- Series 1: Fundamentals of Project Planning and Administration
- Series 2: Rural and Urban Water Demand, Supply, and Sanitation
- Series 3: Urbanisation Impacts and Strategies for Water Management
- Series 4: Policies, MDGs, and SDGs in Nigerian Water and Sanitation
- Series 5: Urban Physical Planning, Land Policy, and Implementation

Series 3: Urbanisation Impacts and Strategies for Water Management

Series 3 Outline



Part 1 (3.1): The Process and Patterns of Urbanisation

Sub-Part 3.1.1: Concepts and drivers of urbanisation

Sub-Part 3.1.2: Urbanisation trends in Nigeria and Africa

Part 2 (3.2): Impacts of Urbanisation on Water Demand and Supply

Sub-Part 3.2.1: Effects of population growth on water demand

Sub-Part 3.2.2: Strain on water supply infrastructure

Part 3 (3.3): Environmental Consequences of Urbanisation on Water Resources

Sub-Part 3.3.1: Pollution of water bodies and groundwater depletion

Sub-Part 3.3.2: Flooding and stormwater management challenges

Part 4 (3.4): Strategies for Sustainable Urban Water Management

Sub-Part 3.4.1: Integrated urban water management approaches

Sub-Part 3.4.2: Institutional and community-based water management strategies

Introduction

Urbanisation is one of the most powerful forces shaping the contemporary world. As cities grow in size and number, they place mounting pressure on natural resources, particularly water. The relationship between urbanisation and water is complex: growing urban populations generate higher demand, while urban land use changes alter the hydrological cycle, degrade water bodies, and increase flood risk. Understanding these impacts is essential for planners, engineers, and policymakers who are responsible for ensuring that cities remain liveable, healthy, and resilient. This Series builds on the water demand and supply concepts covered in Series 2, examining how urbanisation intensifies water management challenges and exploring the strategies available to address them.

The aim of this Series is to equip you with the knowledge required to describe the process and patterns of urbanisation, explain the impacts of urban growth on water demand and supply, identify the environmental consequences of urbanisation on water resources, and evaluate strategies for sustainable urban water management.

We shall commence this Series by examining the concept and drivers of urbanisation, with particular attention to Nigerian and African trends. Next, we will explore the impacts of urbanisation on water demand and supply infrastructure. Following that, we will consider the environmental consequences of urbanisation, including water pollution, groundwater depletion, and flooding. Finally, we will conclude with an evaluation of strategies for sustainable urban water management, covering both integrated approaches and community-based responses.

Series Learning Outcomes



Upon completing this Series, you should be able to:

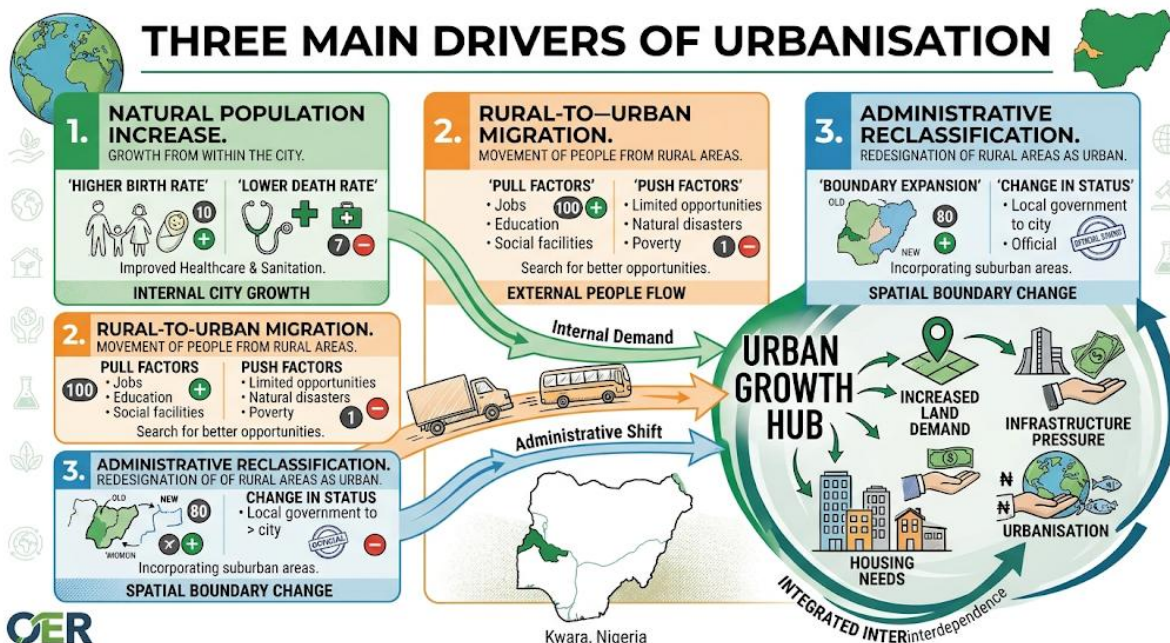
- SLO 3.1 describe the process, drivers, and patterns of urbanisation, with reference to Nigeria and Africa,
- SLO 3.2 explain the impacts of urbanisation on water demand and supply infrastructure,
- SLO 3.3 identify the environmental consequences of urbanisation on water resources, including pollution and flooding,
- SLO 3.4 evaluate strategies for sustainable urban water management at institutional and community levels.

3.1 The Process and Patterns of Urbanisation

3.1.1 Concepts and drivers of urbanisation

Urbanisation refers to the process by which an increasing proportion of a country's population comes to live in urban areas, accompanied by the physical expansion of cities and towns. It is driven by a combination of **natural population increase** (births exceeding deaths in urban areas), **rural-to-urban migration** (movement of people from rural areas in search of employment and better services), and **reclassification** (the administrative upgrading of rural settlements to urban status). Urbanisation brings opportunities for economic development, access to services, and improved living standards, but it also generates significant pressures on infrastructure and natural resources, including water.

Fill in the blank: The movement of people from rural areas to cities in search of employment is referred to as rural-to-urban _____.



Short description: A diagram illustrating the three main drivers of urbanisation: natural population increase, rural-to-urban migration, and reclassification of settlements.



Figure 3.1 Drivers of urbanisation

3.1.2 Urbanisation trends in Nigeria and Africa

Africa is the world's fastest urbanising continent, with Nigeria at the forefront of this transformation. Nigeria's urban population has grown from approximately 10 per cent of the total population at independence in 1960 to over 50 per cent today, with cities such as Lagos, Kano, Ibadan, and Abuja experiencing rapid expansion. This growth has been characterised by the proliferation of informal settlements, inadequate infrastructure, and a widening gap between urban service provision and population needs. Understanding these trends is essential for contextualising the water management challenges explored in the subsequent Parts of this Series.

Fill in the blank: Nigeria's urban population has grown significantly since independence in 1960, making it one of the most rapidly _____ countries in Africa.

Pilot Questions 3.1

Define urbanisation and identify its three main drivers.

What is meant by the reclassification of settlements in the context of urbanisation?

Name two Nigerian cities that have experienced rapid urban growth.

Why does urbanisation create pressure on water resources?

Fill in the blank: Africa is currently the world's fastest _____ continent.

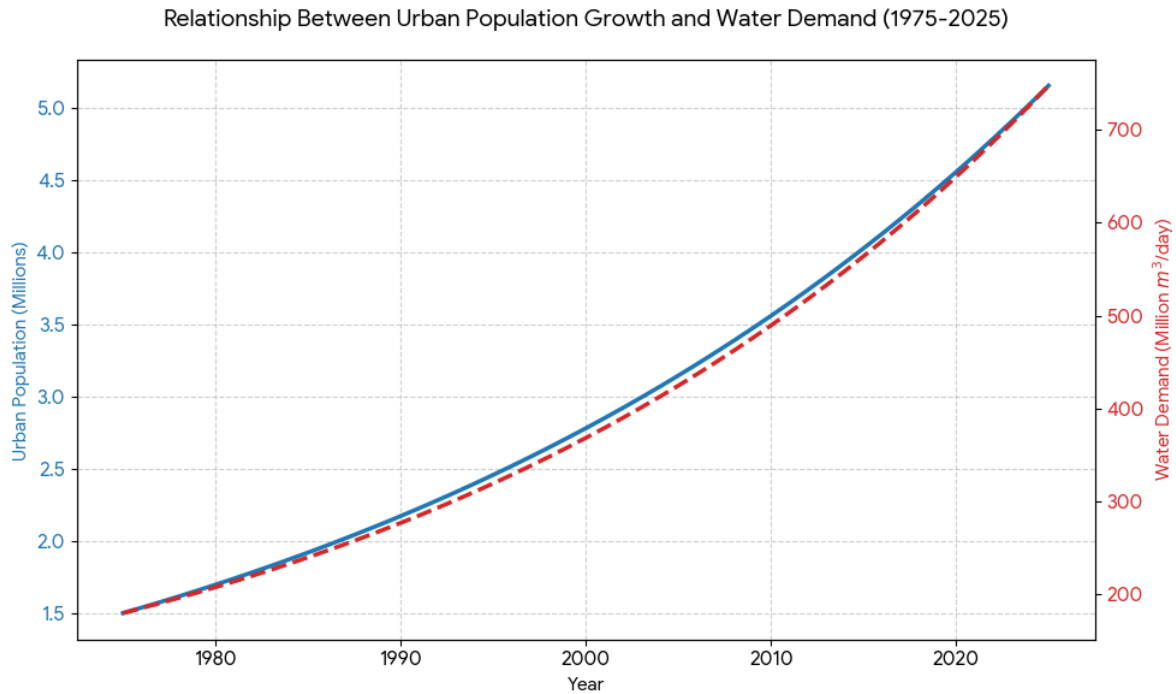
3.2 Impacts of Urbanisation on Water Demand and Supply

3.2.1 Effects of population growth on water demand

As urban populations grow, the aggregate demand for water increases substantially. Each new resident requires water for drinking, cooking, sanitation, and other domestic uses, while expanding commercial and industrial activities further drive up consumption. In rapidly growing cities, **peri-urban areas** the transitional zones between urban and rural land often experience the most acute water shortages, as supply systems have not kept pace with population expansion. The growth of informal settlements, where residents lack piped connections, forces people to rely on expensive and often unsafe alternative sources such as vendors and unprotected wells.

Fill in the blank: Peri-urban areas are transitional zones located between _____ and rural land, and often face the most acute water shortages.





Short description: A line graph showing the relationship between urban population growth and increasing water demand over time.

Figure 3.2 Relationship between urban population growth and water demand

3.2.2 Strain on water supply infrastructure

Rapid urbanisation places enormous strain on water supply infrastructure. Ageing pipes, inadequate treatment capacity, high levels of non-revenue water (water lost through leaks and illegal connections), and insufficient investment in new infrastructure result in unreliable supply and inequitable distribution. In many Nigerian cities, water utilities can only meet a fraction of actual demand, leading to intermittent supply schedules and the proliferation of private boreholes. **Non-revenue water** the difference between water produced and water that is billed to consumers is a particularly significant challenge, often exceeding 40 per cent of total production in Nigerian urban water systems.

Fill in the blank: Water lost through leaks and illegal connections before reaching paying consumers is referred to as _____ water.

Pilot Questions 3.2

How does urban population growth affect the aggregate demand for water?

What are peri-urban areas, and why do they face acute water shortages?

Name two challenges facing urban water supply infrastructure in Nigerian cities.

What is non-revenue water, and why is it a significant concern?



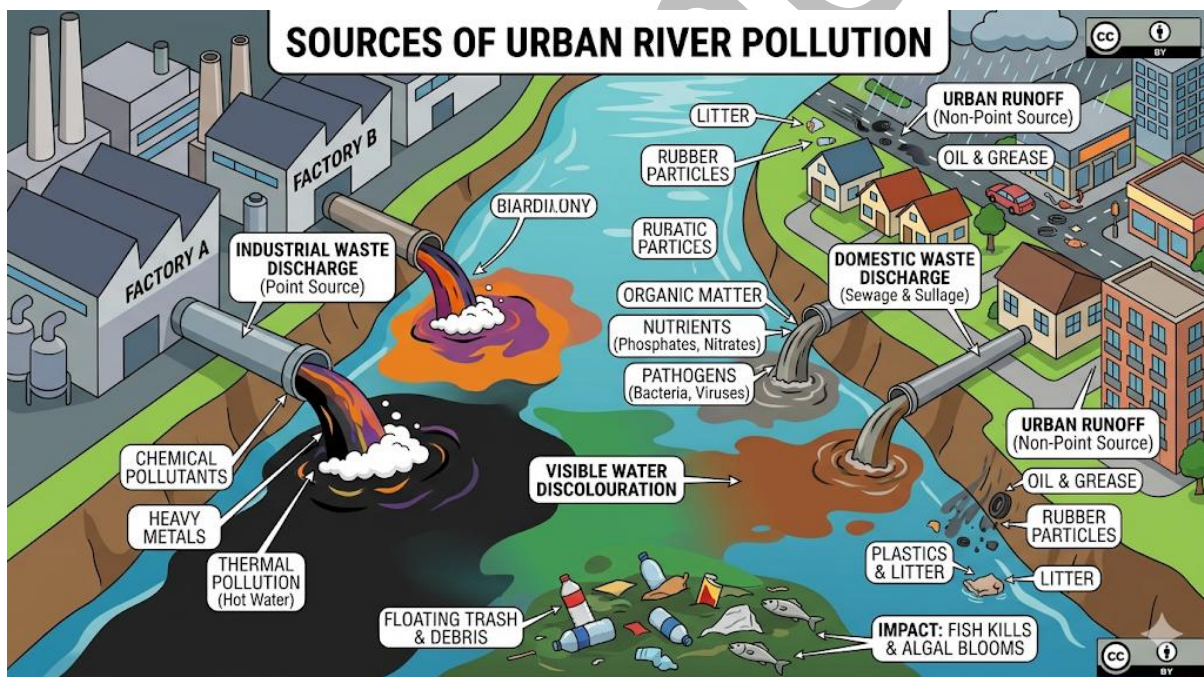
Fill in the blank: Intermittent water supply in Nigerian cities has led to the proliferation of private _____.

3.3 Environmental Consequences of Urbanisation on Water Resources

3.3.1 Pollution of water bodies and groundwater depletion

Urbanisation generates significant volumes of domestic, industrial, and solid waste that, when improperly managed, pollute surface water bodies and groundwater. **Point source pollution** occurs when contaminants are discharged from a single, identifiable source such as a factory or sewage outfall. **Non-point source pollution** results from diffuse sources such as agricultural runoff, urban stormwater, and leachate from waste dumps. Simultaneously, the excessive abstraction of groundwater to meet urban demand combined with reduced recharge caused by impermeable urban surfaces leads to **groundwater depletion**, manifesting as declining water table levels and subsidence in some urban areas.

Fill in the blank: Pollution arising from diffuse sources such as stormwater runoff is referred to as _____ source pollution.



Short description: A photograph or illustration of a polluted urban waterway showing waste discharge from industrial and domestic sources.

Plate 3.1 Urban water body pollution from industrial and domestic waste discharge

3.3.2 Flooding and stormwater management challenges

Urban expansion replaces permeable natural surfaces such as soil, vegetation, and wetlands with impermeable surfaces including roads, rooftops, and pavements. This



transformation reduces infiltration and increases surface runoff, contributing to **urban flooding**. Floods cause loss of life, destruction of property, disruption of services, and contamination of water supplies. **Stormwater management** the planning and engineering of systems to control surface runoff is therefore a critical component of urban water management. Strategies include the construction of drainage channels, retention ponds, and the adoption of sustainable urban drainage systems (SUDS) that mimic natural hydrological processes.

Fill in the blank: The replacement of permeable surfaces with impermeable ones in urban areas increases surface _____, contributing to urban flooding.

Pilot Questions 3.3

What is the difference between point source and non-point source water pollution?

How does urbanisation contribute to groundwater depletion?

Why does urban expansion increase the risk of flooding?

What is stormwater management?

Fill in the blank: Sustainable urban drainage systems (SUDS) are designed to mimic natural _____ processes.

3.4 Strategies for Sustainable Urban Water Management

3.4.1 Integrated urban water management approaches

Integrated Urban Water Management (IUWM) is a holistic approach that considers water supply, wastewater, and stormwater as interconnected components of a single urban water cycle, rather than managing them as separate systems. IUWM seeks to optimise water use, minimise waste, and protect water resources through coordinated planning and investment. Key elements include demand management, wastewater recycling, rainwater harvesting, and the integration of water planning into broader land use and urban development frameworks. IUWM requires collaboration across government agencies, utilities, communities, and the private sector.

Fill in the blank: Integrated Urban Water Management treats water supply, wastewater, and stormwater as components of a single urban water _____.

Principle	Brief Description	Strategic Goal
Demand Management	Using policy, technology, and pricing to reduce water waste. Includes leak detection, efficient appliances, and public awareness campaigns.	To reduce the total volume of water extracted from natural sources, extending the life of existing infrastructure.



Principle	Brief Description	Strategic Goal
Wastewater Recycling	Treating urban wastewater (greywater and blackwater) to a quality suitable for specific non-potable uses like irrigation, industrial cooling, or toilet flushing.	To turn "waste" into a resource, reducing the discharge of pollutants into natural water bodies.
Rainwater Harvesting	Capturing and storing precipitation from rooftops or permeable surfaces for onsite use or to recharge groundwater aquifers.	To mitigate urban flooding and provide a supplementary, decentralized water source during dry seasons.
Cross-Sector Collaboration	Breaking down silos between departments (e.g., water, energy, housing, and land planning) to align goals and share costs.	To ensure that urban development and water infrastructure are planned in tandem for maximum efficiency.

Short description: A box summarising the key principles of IUWM, including demand management, wastewater recycling, rainwater harvesting, and cross-sector collaboration.

Box 3.1 Key principles of Integrated Urban Water Management (IUWM)

3.4.2 Institutional and community-based water management strategies

Effective urban water management requires strong institutional frameworks and active community participation. At the institutional level, this includes clear regulatory frameworks, well-resourced water utilities, inter-agency coordination, and transparent governance.

Community-based water management empowers residents particularly in peri-urban and informal settlements to participate in the planning, operation, and maintenance of local water systems. Examples include water user associations, community-managed boreholes, and neighbourhood sanitation committees. Together, institutional strengthening and community engagement create the enabling conditions for sustainable and equitable urban water management.

Fill in the blank: Water user associations are an example of _____-based water management in urban and peri-urban communities.

Pilot Questions 3.4

What is Integrated Urban Water Management (IUWM)?

Name three key elements of an IUWM approach.



Why is cross-sector collaboration important in IUWM?

Give one example of a community-based water management strategy.

Fill in the blank: Strong institutional frameworks and active _____ participation are both required for effective urban water management.

Series Summary

This Series has examined the relationship between urbanisation and water management, providing you with a comprehensive understanding of how urban growth shapes water demand, supply, and environmental conditions. We began by exploring the concept and drivers of urbanisation, noting that natural population increase, rural-to-urban migration, and reclassification all contribute to urban growth, with Nigeria and Africa experiencing particularly rapid urbanisation.

We then examined the impacts of urbanisation on water demand and supply, highlighting how population growth intensifies aggregate demand, strains ageing infrastructure, and creates acute shortages in peri-urban areas. Following that, we discussed the environmental consequences of urbanisation on water resources, covering point and non-point source pollution, groundwater depletion, and the increased risk of urban flooding resulting from impermeable surfaces.

Finally, we evaluated strategies for sustainable urban water management, distinguishing between integrated management approaches that treat the urban water cycle holistically, and institutional and community-based strategies that build the governance and participatory foundations for long-term sustainability. By engaging with these topics, you should now be able to describe urbanisation patterns, explain their impacts on water, identify environmental consequences, and evaluate management responses – outcomes that align with the Series Learning Outcomes and prepare you for the policy discussions in Series 4.

Glossary of Terms

Community-based water management: An approach that empowers local residents to participate in the planning, operation, and maintenance of water systems in their communities.

Groundwater depletion: The reduction of groundwater levels caused by excessive abstraction and reduced recharge, often associated with urban expansion.

Integrated Urban Water Management (IUWM): A holistic approach that manages water supply, wastewater, and stormwater as interconnected components of the urban water cycle.

Non-point source pollution: Water contamination arising from diffuse sources such as stormwater runoff, agricultural fields, and leachate from waste dumps.

Non-revenue water: Water that has been produced and distributed but does not generate revenue, due to leakage, illegal connections, or metering inaccuracies.



Peri-urban area: A transitional zone located between the built-up urban area and the surrounding rural land, often characterised by rapid growth and inadequate services.

Point source pollution: Water contamination discharged from a single, identifiable source such as a factory outfall or sewage pipe.

Reclassification: The administrative upgrading of a rural settlement to urban status, contributing to statistical increases in urban population.

Rural-to-urban migration: The movement of people from rural areas to cities, typically in search of employment, education, and better living conditions.

Stormwater management: The planning and engineering of systems designed to control surface runoff generated by rainfall in urban areas.

Sustainable Urban Drainage Systems (SUDS): Engineering approaches that manage stormwater by mimicking natural hydrological processes, including retention ponds and permeable surfaces.

Urban flooding: The inundation of urban areas caused by intense rainfall, exacerbated by impermeable surfaces and inadequate drainage infrastructure.

Urbanisation: The process by which an increasing proportion of a population comes to live in urban areas, accompanied by the physical expansion of cities and towns.

Water table: The upper boundary of the saturated zone in the ground, below which all pore spaces are filled with water.

Water user association: A community-based organisation responsible for the collective management and maintenance of a shared water supply system.

Concept Check Questions 3

Objective questions

Which of the following is a driver of urbanisation? (Linked to SLO 3.1)

- a. Groundwater depletion
- b. Rural-to-urban migration
- c. Stormwater runoff
- d. Non-revenue water

Non-revenue water refers to: (Linked to SLO 3.2)

- a. Water that is recycled and reused
- b. Water lost through leaks and illegal connections before reaching paying consumers
- c. Water harvested from rainfall
- d. Water abstracted from groundwater sources

Which of the following best describes Integrated Urban Water Management? (Linked to SLO 3.4)

- a. Managing water supply, wastewater, and stormwater as separate systems



- b. Treating the urban water cycle as a single, interconnected system
- c. Restricting water use to domestic purposes only
- d. Delegating all water management responsibilities to communities

Short-answer questions

- 4. Explain what is meant by non-point source pollution and give one example from an urban context. (Linked to SLO 3.3)
- 5. State one institutional strategy and one community-based strategy for improving urban water management. (Linked to SLO 3.4)

Long-answer questions

- 6. Analyse the impacts of rapid urbanisation on water demand and supply infrastructure, with reference to the Nigerian context. (Linked to SLO 3.2)
 - Basic response: Learners should describe how population growth increases aggregate demand, strains ageing infrastructure, and creates shortages in peri-urban areas, with reference to non-revenue water and intermittent supply.
 - Value-added response: Outstanding learners may discuss specific examples from Nigerian cities, the role of informal settlements, and the economic implications of water insecurity for households and businesses.
- 7. Evaluate the effectiveness of Integrated Urban Water Management (IUWM) as a strategy for addressing the water challenges created by urbanisation. (Linked to SLO 3.4)
 - Basic response: Learners should explain the holistic nature of IUWM, its key elements, and the importance of cross-sector collaboration.
 - Value-added response: Outstanding learners may discuss the practical challenges of implementing IUWM in developing country contexts, such as institutional fragmentation, funding constraints, and limited technical capacity, and propose how these might be overcome.

Answers to Concept Check Questions 3

Rural-to-urban migration

Water lost through leaks and illegal connections before reaching paying consumers

Treating the urban water cycle as a single, interconnected system

- 4. Non-point source pollution is water contamination arising from diffuse sources rather than a single identifiable point. An urban example is stormwater runoff that carries oils, litter, and chemicals from roads and rooftops into nearby rivers.
- 5. An institutional strategy is strengthening the regulatory framework and resourcing water utilities adequately. A community-based strategy is establishing water user associations to manage and maintain local water supply systems.



6. Basic response: Rapid urbanisation increases aggregate water demand, strains ageing infrastructure, and produces intermittent supply and peri-urban shortages. Non-revenue water losses, often exceeding 40 per cent in Nigerian cities, further reduce effective supply.

Value-added response: In cities such as Lagos and Kano, informal settlement growth has outpaced utility coverage, forcing residents to rely on expensive vendors or unprotected wells. This creates health risks and economic burdens, particularly for low-income households, and underscores the need for targeted investment in infrastructure and governance.

7. Basic response: IUWM addresses urban water challenges by treating supply, wastewater, and stormwater as interconnected, enabling more efficient use of resources, reduction of waste, and better environmental protection through coordinated planning.

Value-added response: In developing country contexts, IUWM faces challenges including institutional fragmentation, inadequate funding, and limited technical expertise. Overcoming these requires political commitment, capacity building, multi-stakeholder platforms, and integration of water planning into urban master plans.

Answers to Pilot Questions 3

Answers to Pilot Questions 3.1

Urbanisation is the process by which an increasing proportion of a population comes to live in urban areas. Its three drivers are natural population increase, rural-to-urban migration, and reclassification.

Reclassification is the administrative upgrading of a rural settlement to urban status, which contributes to increases in the recorded urban population.

Lagos and Kano (also acceptable: Ibadan and Abuja)

Urbanisation increases water demand, alters the hydrological cycle, generates pollution, and reduces the capacity of natural systems to replenish water supplies.

Urbanising

Answers to Pilot Questions 3.2

Urban population growth increases the aggregate quantity of water needed for domestic, commercial, and industrial purposes.

Peri-urban areas are transitional zones between urban and rural land. They face acute water shortages because supply infrastructure has not kept pace with rapid population growth.

Ageing pipes and high levels of non-revenue water (also acceptable: inadequate treatment capacity and insufficient investment)



Non-revenue water is water that has been produced and distributed but does not generate revenue due to leakage, illegal connections, or metering errors. It reduces the efficiency of water supply systems and increases costs.

Boreholes

Answers to Pilot Questions 3.3

Point source pollution comes from a single identifiable source such as a factory outlet; non-point source pollution comes from diffuse sources such as stormwater runoff.

Urban expansion reduces permeable surfaces, limiting groundwater recharge. Combined with high abstraction rates, this causes water table levels to decline.

Urban expansion replaces permeable surfaces with impermeable ones, reducing infiltration and increasing surface runoff, which overwhelms drainage systems and causes flooding.

Stormwater management is the planning and engineering of systems designed to control and manage surface runoff generated by rainfall in urban areas.

Hydrological

Answers to Pilot Questions 3.4

IUWM is a holistic approach that manages water supply, wastewater, and stormwater as interconnected components of a single urban water cycle.

Demand management, wastewater recycling, and rainwater harvesting (also acceptable: integration into land use planning)

Urban water systems involve multiple agencies and sectors; coordination ensures that decisions in one area do not create problems in another and that resources are used efficiently.

A water user association that manages and maintains a shared community borehole (also acceptable: neighbourhood sanitation committee)

Community

References and Attributions 3

This Series has drawn upon a range of scholarly and open educational resources to ensure accuracy and learner-friendliness. Below are the references and attributions for Series 3: Urbanisation Impacts and Strategies for Water Management.

Figures, Plates, Tables, and Boxes

Figure 3.1 Drivers of urbanisation: AI prompt used "Create a diagram showing the three main drivers of urbanisation natural population increase, rural-to-urban migration, and reclassification with brief descriptions of each." Suggested OER search string "drivers of urbanisation diagram OER."



Figure 3.2 Relationship between urban population growth and water demand: AI prompt used "Generate a line graph illustrating the relationship between urban population growth and rising water demand over a fifty-year period." Suggested OER search string "urban population growth water demand graph OER."

Plate 3.1 Urban water body pollution from industrial and domestic waste discharge: AI prompt used "Generate an illustration of a polluted urban river showing waste discharge from industrial and domestic sources, with visible water discolouration." Suggested OER search string "urban water pollution river industrial waste OER."

Box 3.1 Key principles of Integrated Urban Water Management (IUWM): AI prompt used "Generate a text box summarising the key principles of Integrated Urban Water Management (IUWM), including demand management, wastewater recycling, rainwater harvesting, and cross-sector collaboration." Suggested OER search string "integrated urban water management principles OER."

General References

- Adelekan, I. O. (2010). Vulnerability of poor urban coastal communities to flooding in Lagos, Nigeria. *Environment and Urbanization*, 22(2), 433–450.
- Jacobsen, M., Webster, M., & Vairavamorthy, K. (Eds.). (2012). *The future of water in African cities: Why waste water?* World Bank.
- Mara, D., & Alabaster, G. (2008). A new paradigm for low-cost urban water supplies and sanitation in developing countries. *Water Policy*, 10(2), 119–129.
- United Nations Human Settlements Programme. (2016). *Urbanization and development: Emerging futures. World Cities Report 2016*. UN-Habitat.
- World Bank. (2021). *Urban water supply and sanitation in Sub-Saharan Africa*. World Bank Group.
- Open Educational Resources (OER Commons). Search strings used: "urbanisation drivers Africa OER," "urban water demand infrastructure OER," "urban water pollution flooding OER," "integrated urban water management OER."

Attributions

All AI-generated illustration prompts were created specifically for this Series using instructional design guidelines.

Suggested OER search strings are provided to enable sourcing of free-to-use diagrams, tables, and conceptual images for teaching and learning purposes.

Course code: URP 508

Course title: Project Planning and Implementation



Course credit load: 2 Units

List of Series:

- Series 1: Fundamentals of Project Planning and Administration
- Series 2: Rural and Urban Water Demand, Supply, and Sanitation
- Series 3: Urbanisation Impacts and Strategies for Water Management
- Series 4: Policies, MDGs, and SDGs in Nigerian Water and Sanitation
- Series 5: Urban Physical Planning, Land Policy, and Implementation

Series 4: Policies, MDGs, and SDGs in Nigerian Water and Sanitation

Series 4 Outline

Part 1 (4.1): Water and Sanitation Policy in Nigeria

- Sub-Part 4.1.1: Overview of national water and sanitation policy
- Sub-Part 4.1.2: Institutional and regulatory frameworks

Part 2 (4.2): The Millennium Development Goals and Water and Sanitation in Nigeria

- Sub-Part 4.2.1: MDG targets for water supply and sanitation
- Sub-Part 4.2.2: Nigeria's performance on water and sanitation MDGs

Part 3 (4.3): The Sustainable Development Goals and Water and Sanitation

- Sub-Part 4.3.1: SDG 6 Clean water and sanitation
- Sub-Part 4.3.2: Nigeria's commitments and progress under SDG 6

Part 4 (4.4): Financing and Implementing Water and Sanitation Policies

- Sub-Part 4.4.1: Financing mechanisms for water and sanitation
- Sub-Part 4.4.2: Implementation challenges and the way forward

Introduction

The provision of safe water and adequate sanitation is not only a technical challenge but also a political, institutional, and financial one. Governments, international organisations, and development partners have long recognised that achieving universal access to water and sanitation requires clear policies, adequate funding, and robust institutional frameworks. At the global level, both the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) have established specific targets for water and sanitation, providing an international framework against which national progress is measured. In Nigeria, these global commitments intersect with national policies and the realities of governance, financing, and implementation capacity. This Series examines the policy landscape for water and sanitation in Nigeria, exploring the role of the MDGs and SDGs and the challenges of translating policy commitments into practice.



The aim of this Series is to equip you with the knowledge required to describe Nigeria's national water and sanitation policy framework, explain the MDG targets and Nigeria's performance against them, outline the SDG 6 commitments and their implications for Nigeria, and evaluate the financing and implementation challenges associated with water and sanitation policy.

We shall commence this Series by examining Nigeria's national water and sanitation policy and institutional framework. Next, we will explore the MDG targets for water and sanitation and assess Nigeria's performance. Following that, we will consider SDG 6 and Nigeria's commitments and progress under this goal. Finally, we will address the financing mechanisms and implementation challenges that determine the extent to which policy goals are realised on the ground.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- SLO 4.1 describe Nigeria's national water and sanitation policy framework and institutional arrangements,
- SLO 4.2 explain the MDG targets for water and sanitation and evaluate Nigeria's performance against them,
- SLO 4.3 outline the targets and implications of SDG 6 for water and sanitation in Nigeria,
- SLO 4.4 evaluate the financing mechanisms and implementation challenges associated with water and sanitation policy in Nigeria.

4.1 Water and Sanitation Policy in Nigeria

4.1.1 Overview of national water and sanitation policy

Nigeria's principal policy document guiding water and sanitation is the **National Water Supply and Sanitation Policy (NWSSP)**, first issued in 2000 and subsequently revised to align with evolving development priorities. The policy establishes the goals of providing safe, adequate, and affordable water supply and sanitation services to all Nigerians, with emphasis on sustainability, cost recovery, and community participation. It recognises the roles of the federal, state, and local governments, as well as the private sector and communities, in the planning, financing, and management of water and sanitation services. The policy also affirms Nigeria's commitment to international frameworks, including the MDGs and SDGs, as benchmarks for tracking national progress.

Fill in the blank: Nigeria's National Water Supply and Sanitation Policy was first issued in the year _____.





Short description: A diagram illustrating the key pillars of Nigeria's NWSSP, including affordability, sustainability, community participation, and cost recovery.

Figure 4.1 Key pillars of Nigeria's National Water Supply and Sanitation Policy

4.1.2 Institutional and regulatory frameworks

The institutional framework for water and sanitation in Nigeria is structured across three tiers of government. At the federal level, the **Federal Ministry of Water Resources** is responsible for policy formulation, regulation, and oversight of national water resources. **River Basin Development Authorities (RBDAs)** manage water resources within specific hydrological basins. At the state level, **State Water Agencies** or **State Water Corporations** are responsible for urban water supply. At the local government level, **Local Government Authorities (LGAs)** are expected to oversee rural water supply and sanitation. Regulatory bodies such as the **National Water Resources Regulatory Commission** have been established to ensure compliance with standards and to protect consumers. In practice, however, coordination across these tiers remains a significant governance challenge.

Fill in the blank: At the federal level in Nigeria, the _____ Ministry of Water Resources is responsible for policy formulation and oversight of water resources.

Pilot Questions 4.1

What is the primary objective of Nigeria's National Water Supply and Sanitation Policy?

In what year was Nigeria's NWSSP first issued?

Name the federal body responsible for managing water resources within Nigeria's hydrological basins.



Which tier of government is primarily responsible for rural water supply and sanitation in Nigeria?

Fill in the blank: State Water Corporations in Nigeria are responsible for _____ water supply.

4.2 The Millennium Development Goals and Water and Sanitation in Nigeria

4.2.1 MDG targets for water supply and sanitation

The **Millennium Development Goals (MDGs)** were eight international development goals adopted by United Nations member states in 2000, with a target date of 2015. **MDG 7C** specifically addressed water and sanitation, with the global target of halving, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. This target was to be measured against a 1990 baseline, requiring countries to demonstrate significant improvements in water supply coverage and sanitation access over the fifteen-year period. The MDGs represented the first systematic global effort to set quantified targets for water and sanitation as development priorities and to track progress across nations.

Fill in the blank: MDG 7C set a target to halve the proportion of people without access to safe water and basic sanitation by the year _____.

Feature	Details
Goal 7	Ensure Environmental Sustainability
Target 7C	Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.
Baseline Year	1990
Target Year	2015



Indicator Number	Indicator Description	Examples of "Improved" Facilities
Indicator 7.8	Proportion of population using an improved drinking water source .	Piped water (into dwelling/yard), Public tap/standpipe, Borehole, Protected dug well, Protected spring, Rainwater collection.
Indicator 7.9	Proportion of population using an improved sanitation facility .	Flush or pour-flush to piped sewer/septic tank/pit latrine, Ventilated Improved Pit (VIP) latrine, Pit latrine with slab.

Short description: A table summarising the MDG 7C targets, their indicators, and baseline and target values for water and sanitation access.

Table 4.1 MDG 7C targets and indicators for water supply and sanitation

"

4.2.2 Nigeria's performance on water and sanitation MDGs

Nigeria's performance against the MDG water and sanitation targets was mixed. On water supply, Nigeria made notable progress in urban areas, where piped water access expanded through investments in treatment and distribution infrastructure. However, rural areas lagged significantly, with many communities still relying on unprotected sources. On sanitation, Nigeria fell short of the MDG 7C target, with open defecation rates remaining high, particularly in rural areas. By 2015, when the MDG period closed, Nigeria had not fully achieved the water and sanitation targets, underscoring the need for continued investment and stronger policy implementation. Lessons from the MDG experience informed the design of the subsequent Sustainable Development Goals.

Fill in the blank: Nigeria made more progress on the MDG water target in _____ areas than in rural communities.

Pilot Questions 4.2

What were the Millennium Development Goals, and when were they adopted?

What specific water and sanitation target was set under MDG 7C?

Against which baseline year were MDG water and sanitation targets measured?

Why did Nigeria fall short of the MDG sanitation target?

Fill in the blank: The MDG period ran from 2000 to _____.



4.3 The Sustainable Development Goals and Water and Sanitation

4.3.1 SDG 6 Clean water and sanitation

The **Sustainable Development Goals (SDGs)** are seventeen universal goals adopted by United Nations member states in 2015, with a target date of 2030. **SDG 6** is dedicated entirely to water and sanitation, with the overarching goal of ensuring availability and sustainable management of water and sanitation for all. SDG 6 contains eight targets and eleven indicators, covering a broader scope than the MDGs. Key targets include achieving universal and equitable access to safe and affordable drinking water (Target 6.1), achieving access to adequate and equitable sanitation and hygiene and ending open defecation (Target 6.2), improving water quality and reducing pollution (Target 6.3), and substantially increasing water-use efficiency (Target 6.4). SDG 6 thus addresses not only access but also water quality, ecosystems, and governance.

Fill in the blank: SDG 6 Target 6.2 specifically seeks to end the practice of _____ defecation by 2030.

Key Targets of SDG 6: Clean Water and Sanitation
Target 6.1: Safe and Affordable Drinking Water
Description: By 2030, achieve universal and equitable access to safe and affordable drinking water for all. This focuses on "safely managed" services, meaning water should be available on-premises, available when needed, and free from contamination.
Target 6.2: Ending Open Defecation and Providing Sanitation
Description: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation. Special attention is paid to the needs of women and girls and those in vulnerable situations (e.g., menstrual hygiene management).
Target 6.3: Improving Water Quality and Wastewater Treatment
Description: By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals. This target aims to halve the proportion of untreated wastewater and substantially increase recycling and safe reuse globally.
Target 6.4: Increasing Water-Use Efficiency
Description: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity. This aims to significantly reduce the number of people suffering from water stress.

Short description: A box listing the key targets of SDG 6, including universal access to safe drinking water, ending open defecation, improving water quality, and increasing water-use efficiency.

Box 4.1 Key targets of SDG 6 Clean water and sanitation



4.3.2 Nigeria's commitments and progress under SDG 6

Nigeria has formally committed to the SDG 6 agenda through its national development frameworks, including the **Economic Recovery and Growth Plan (ERGP)** and the **Nigeria Agenda 2050**. Progress tracking is coordinated through the **National Bureau of Statistics** and sector ministries. While some improvements have been recorded including expanded borehole provision and sanitation campaigns in some states, Nigeria's overall SDG 6 progress remains insufficient to meet the 2030 targets. Open defecation is still practised by tens of millions of Nigerians, and access to safely managed water services remains low outside major urban centres. Accelerating progress will require increased domestic financing, stronger accountability mechanisms, and coordinated implementation across federal, state, and local levels.

Fill in the blank: Nigeria's national development framework that incorporates SDG commitments includes the Economic Recovery and Growth Plan and Nigeria Agenda _____.

Pilot Questions 4.3

How many goals are contained in the Sustainable Development Goals framework?

What is the overarching objective of SDG 6?

Name two specific targets under SDG 6.

How does SDG 6 differ from the water and sanitation focus of the MDGs?

Fill in the blank: Nigeria's SDG 6 progress tracking is coordinated partly through the National Bureau of _____.

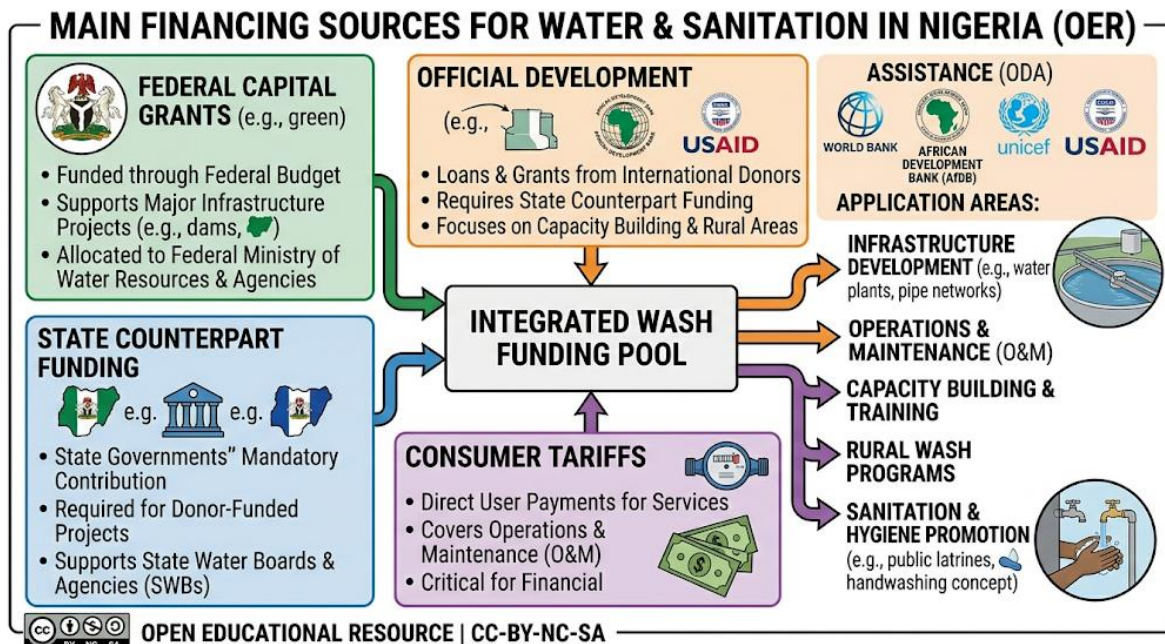
4.4 Financing and Implementing Water and Sanitation Policies

4.4.1 Financing mechanisms for water and sanitation

Financing water and sanitation services requires a mix of public, private, and external resources. The **three-tier financing model** commonly used in Nigeria involves federal government capital grants, state government counterpart funding, and local government contributions, supplemented by tariff revenues from water consumers. **Official Development Assistance (ODA)** from bilateral and multilateral donors including the World Bank, African Development Bank, UNICEF, and the European Union provides additional investment, particularly for rural water supply and sanitation projects. **Public-private partnerships (PPPs)** have been explored as a means of attracting private capital for urban water infrastructure, though their uptake in Nigeria has been limited. Effective financing requires not only adequate funding but also transparent financial management and accountability at all levels of government.

Fill in the blank: Official Development Assistance (ODA) for water and sanitation in Nigeria is provided by multilateral donors such as the World Bank and the _____ Development Bank.





Short description: A diagram showing the main financing sources for water and sanitation in Nigeria, including federal grants, state counterpart funding, ODA, and tariff revenues.

Figure 4.2 Financing sources for water and sanitation in Nigeria

4.4.2 Implementation challenges and the way forward

Despite the existence of policies, frameworks, and funding sources, the implementation of water and sanitation programmes in Nigeria faces persistent challenges. These include **institutional fragmentation** the lack of effective coordination among federal, state, and local agencies as well as **inadequate budgetary allocation**, where water and sanitation consistently receive less than the recommended proportion of national and state budgets. **Weak project management capacity**, poor maintenance culture, and corruption further undermine the delivery and sustainability of infrastructure. **The way forward** requires political commitment at the highest levels, increased and better-targeted public investment, strengthened accountability systems, community ownership of facilities, and a greater integration of water and sanitation planning into urban and rural development frameworks.

Fill in the blank: The lack of effective coordination among federal, state, and local water agencies in Nigeria is referred to as institutional _____.

Pilot Questions 4.4

Name three sources of financing for water and sanitation in Nigeria.

What is the role of Official Development Assistance in Nigeria's water sector?

Why have public-private partnerships had limited uptake in Nigerian water supply?

Name two implementation challenges facing water and sanitation programmes in Nigeria.



Fill in the blank: Community _____ of water facilities is essential for their long-term maintenance and sustainability.

Series Summary

This Series has examined the policy, institutional, and international development frameworks that shape water and sanitation provision in Nigeria. We began by reviewing Nigeria's national water and sanitation policy and the institutional arrangements across federal, state, and local government tiers that are responsible for service delivery. We then explored the Millennium Development Goals, focusing on MDG 7C and its water and sanitation targets, and assessed Nigeria's mixed performance against these targets by 2015.

Following that, we considered the Sustainable Development Goals, with particular attention to SDG 6 and its broader scope of targets covering access, quality, efficiency, and governance. We reviewed Nigeria's formal commitments under SDG 6 and the significant gaps that remain in achieving the 2030 targets. Finally, we examined the financing mechanisms available for water and sanitation investment in Nigeria and identified the institutional, budgetary, and managerial challenges that hinder effective implementation.

By engaging with these topics, you should now be able to describe Nigeria's policy and institutional framework, explain the MDG targets and Nigeria's performance, outline SDG 6 and its implications for Nigeria, and evaluate financing and implementation challenges. These outcomes align with the Series Learning Outcomes and provide the policy context for the urban planning and land use discussions in Series 5.

Glossary of Terms

Budgetary allocation: The proportion of a government's budget assigned to a specific sector, such as water and sanitation, for a given fiscal year.

Cost recovery: The principle that the revenues generated from water tariffs should cover the costs of providing and maintaining water services.

Federal Ministry of Water Resources: The federal government body in Nigeria responsible for water resources policy formulation, regulation, and oversight.

Institutional fragmentation: A governance challenge characterised by the lack of effective coordination and communication among the multiple agencies responsible for water and sanitation.

Local Government Authority (LGA): The third tier of government in Nigeria, with responsibilities including rural water supply and sanitation.

Millennium Development Goals (MDGs): Eight international development goals adopted by United Nations member states in 2000, with a target date of 2015, including MDG 7C on water and sanitation.



National Water Supply and Sanitation Policy (NWSSP): Nigeria's principal policy document guiding the provision of water supply and sanitation services, first issued in 2000.

Official Development Assistance (ODA): Grants and concessional loans provided by bilateral and multilateral donors to support development activities, including water and sanitation.

Public-private partnership (PPP): An arrangement in which private entities collaborate with government to finance, build, or operate public infrastructure such as water treatment plants.

River Basin Development Authority (RBDA): A federal agency in Nigeria responsible for the integrated development and management of water resources within a defined hydrological basin.

SDG 6: The sixth Sustainable Development Goal, which aims to ensure availability and sustainable management of water and sanitation for all by 2030.

State Water Corporation: A state-level agency in Nigeria responsible for the provision and management of urban water supply services.

Sustainable Development Goals (SDGs): Seventeen universal development goals adopted by United Nations member states in 2015, with a target date of 2030.

Tariff revenue: Income generated by water utilities from charges paid by consumers for water supply services, used to fund operations and maintenance.

Three-tier financing model: A financing arrangement in Nigeria involving federal capital grants, state counterpart funding, and local government contributions for water and sanitation investment.

Concept Check Questions 4

Objective questions

Which MDG target specifically addressed water supply and sanitation? (Linked to SLO 4.2)

- a. MDG 1A
- b. MDG 4B
- c. MDG 7C
- d. MDG 8D

SDG 6 Target 6.2 specifically aims to: (Linked to SLO 4.3)

- a. Reduce industrial water use by half
- b. Achieve universal access to safely managed drinking water
- c. Achieve access to adequate sanitation and end open defecation
- d. Protect and restore water-related ecosystems

Which of the following best describes institutional fragmentation in Nigeria's water sector? (Linked to SLO 4.1)



- a. The privatisation of water utilities
- b. The lack of effective coordination among multiple water agencies
- c. The absence of a national water policy
- d. The reliance on donor funding for water projects

Short-answer questions

4. Describe the three-tier financing model for water and sanitation in Nigeria. (Linked to SLO 4.4)
5. State two ways in which SDG 6 goes beyond the scope of the MDG water and sanitation targets. (Linked to SLO 4.3)

Long-answer questions

6. Assess Nigeria's performance on the MDG water and sanitation targets and explain the key factors that contributed to the outcomes recorded by 2015. (Linked to SLO 4.2)
 - Basic response: Learners should describe progress in urban water supply, the shortfall in rural water access, and the failure to achieve the sanitation target, noting high open defecation rates.
 - Value-added response: Outstanding learners may analyse the underlying governance, financing, and capacity factors that explain these outcomes, and draw lessons relevant to the SDG 6 implementation agenda.
7. Evaluate the main challenges facing the implementation of water and sanitation policies in Nigeria and propose strategies for addressing them. (Linked to SLO 4.4)
 - Basic response: Learners should identify institutional fragmentation, inadequate budgetary allocation, weak project management, and poor maintenance culture as key challenges.
 - Value-added response: Outstanding learners may propose specific remedies such as inter-agency coordination mechanisms, performance-based budgeting, community ownership models, and integration of water planning into national development planning frameworks.

Answers to Concept Check Questions 4

MDG 7C

Achieve access to adequate sanitation and end open defecation

The lack of effective coordination among multiple water agencies

4. The three-tier financing model involves federal government capital grants, state government counterpart funding, and local government contributions. These are supplemented by tariff revenues from water consumers to fund operations and maintenance.



5. SDG 6 goes beyond the MDGs by addressing water quality and pollution reduction (not just access), and by including targets on water-use efficiency, ecosystem protection, and transboundary water cooperation.

6. Basic response: Nigeria made progress in urban water supply but fell short in rural areas and failed to achieve the sanitation target. Open defecation remained widespread, particularly in rural communities, by the 2015 deadline.

Value-added response: Underlying factors include inadequate and poorly targeted public investment, weak institutional coordination, limited community engagement, and the disproportionate growth of peri-urban and rural populations relative to infrastructure expansion. These lessons highlight the importance of governance reform, community participation, and sustained financing for the SDG 6 agenda.

7. Basic response: Key challenges include institutional fragmentation, inadequate budgets, weak project management capacity, and a poor maintenance culture that leads to rapid deterioration of completed infrastructure.

Value-added response: Proposed strategies include establishing inter-ministerial water coordination committees, adopting performance-based financing mechanisms, building local government capacity for water management, promoting community-managed water schemes, and embedding water and sanitation targets within subnational development plans.

Answers to Pilot Questions 4

Answers to Pilot Questions 4.1

The primary objective is to provide safe, adequate, and affordable water supply and sanitation services to all Nigerians in a sustainable manner.

2000

River Basin Development Authorities (RBDAs)

Local Government Authorities (LGAs)

Urban

Answers to Pilot Questions 4.2

The MDGs were eight international development goals adopted by UN member states in 2000, with a target date of 2015.

MDG 7C set a target to halve the proportion of people without access to safe drinking water and basic sanitation by 2015.

1990

High open defecation rates, especially in rural areas, limited investment in sanitation infrastructure, and weak community behaviour change programmes.

2015



Answers to Pilot Questions 4.3

Seventeen goals

To ensure availability and sustainable management of water and sanitation for all by 2030.

Target 6.1 (universal access to safe drinking water) and Target 6.2 (access to adequate sanitation and ending open defecation) (also acceptable: Targets 6.3 and 6.4)

SDG 6 covers a broader scope, including water quality, efficiency, ecosystem protection, and governance, beyond the access focus of MDG 7C.

Statistics

Answers to Pilot Questions 4.4

Federal capital grants, state counterpart funding, and Official Development Assistance from donors (also acceptable: tariff revenues)

ODA provides supplementary investment, particularly for rural water supply and sanitation projects, from bilateral and multilateral donors.

Limited private sector confidence due to governance risks, low tariff revenues, and the perceived inability of consumers to pay cost-reflective prices.

Institutional fragmentation and inadequate budgetary allocation (also acceptable: weak project management capacity and poor maintenance culture)

Ownership

References and Attributions 4

This Series has drawn upon a range of scholarly and open educational resources to ensure accuracy and learner-friendliness. Below are the references and attributions for Series 4: Policies, MDGs, and SDGs in Nigerian Water and Sanitation.

Figures, Plates, Tables, and Boxes

Figure 4.1 Key pillars of Nigeria's National Water Supply and Sanitation Policy: AI prompt used "Create a diagram showing the key pillars of Nigeria's National Water Supply and Sanitation Policy: affordability, sustainability, community participation, and cost recovery." Suggested OER search string "Nigeria water sanitation policy pillars diagram OER."

Table 4.1 MDG 7C targets and indicators for water supply and sanitation: AI prompt used "Generate a table summarising the MDG 7C targets and indicators for water supply and sanitation, including baseline year, target year, and key indicators." Suggested OER search string "MDG 7C water sanitation targets indicators table OER."

Box 4.1 Key targets of SDG 6 Clean water and sanitation: AI prompt used "Generate a text box listing the key targets of SDG 6 on clean water and sanitation, including Targets 6.1



to 6.4 with brief descriptions." Suggested OER search string "SDG 6 targets clean water sanitation OER."

Figure 4.2 Financing sources for water and sanitation in Nigeria: AI prompt used "Create a diagram illustrating the main financing sources for water and sanitation in Nigeria, including federal capital grants, state counterpart funding, official development assistance, and consumer tariffs." Suggested OER search string "Nigeria water sanitation financing sources diagram OER."

General References

- Federal Republic of Nigeria. (2000). National water supply and sanitation policy. Federal Ministry of Water Resources.
- Nwilo, P. C., Badejo, O. T., & Adzandeh, E. A. (2012). Water supply and sanitation in Nigeria. *Journal of Sustainable Development*, 5(3), 41–52.
- United Nations. (2015). The Millennium Development Goals report 2015. United Nations.
- United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. United Nations General Assembly Resolution A/RES/70/1.
- UNICEF & World Health Organization. (2023). Progress on household drinking water, sanitation and hygiene 2000–2022. UNICEF/WHO Joint Monitoring Programme.
- World Bank. (2017). Nigeria Water supply and sanitation: Turning finance into services for 2015 and beyond. World Bank Group.
- Open Educational Resources (OER Commons). Search strings used: "Nigeria water sanitation policy OER," "MDG water sanitation targets OER," "SDG 6 clean water OER," "water sanitation financing Nigeria OER."

Attributions

- All AI-generated illustration prompts were created specifically for this Series using instructional design guidelines.
- Suggested OER search strings are provided to enable sourcing of free-to-use diagrams, tables, and conceptual images for teaching and learning purposes.

Series 5: Urban Physical Planning, Land Policy, and Implementation

Series 5 Outline

Part 1 (5.1): Urban Physical Planning Concepts and Process

Sub-Part 5.1.1: Concepts, purpose, and types of urban physical plans

Sub-Part 5.1.2: The urban physical planning process



Part 2 (5.2): Administration and Implementation of Urban Physical Plans

Sub-Part 5.2.1: Legal provisions and administrative structures for plan implementation

Sub-Part 5.2.2: Financing the implementation of urban physical plans

Part 3 (5.3): Information Systems, Reporting, and Plan Review

Sub-Part 5.3.1: Urban physical planning information systems and techniques

Sub-Part 5.3.2: Evaluation, reporting, and review of urban physical plans

Part 4 (5.4): Urban Land Policy and Management

Sub-Part 5.4.1: Urban land policy principles and frameworks

Sub-Part 5.4.2: Land management, tenure, and urban development

Introduction

The physical form of cities does not emerge by accident. It is shaped by plans, policies, laws, and decisions about how land is allocated, developed, and managed. Urban physical planning provides the framework within which cities grow, infrastructure is provided, and land uses are organised to serve the needs of residents and businesses. The administration and implementation of urban physical plans, supported by appropriate legal provisions, financing arrangements, and information systems, determine whether planned visions translate into reality on the ground. Alongside planning, land policy and management play a crucial role in regulating access to urban land, preventing speculation, and ensuring that development serves the public interest. This Series brings together these interconnected dimensions of urban physical planning and land management, completing the course's examination of project planning and implementation in the urban context.

The aim of this Series is to equip you with the knowledge required to describe the concepts and process of urban physical planning, explain the legal and administrative arrangements for plan implementation, understand the role of information systems and plan review, and evaluate principles and challenges of urban land policy and management.

We shall commence this Series by examining the concepts, purpose, and types of urban physical plans, and the process through which they are prepared. Next, we will explore the legal provisions, administrative structures, and financing mechanisms for implementing urban physical plans. Following that, we will consider the information systems, evaluation techniques, and review processes used to monitor and improve plans over time. Finally, we will address urban land policy and management, examining the principles, legal frameworks, tenure systems, and challenges that shape how urban land is allocated and developed in Nigeria.

Series Learning Outcomes

Upon completing this Series, you should be able to:



SLO 5.1 describe the concepts, purpose, types, and preparation process of urban physical plans,

SLO 5.2 explain the legal provisions, administrative structures, and financing mechanisms for implementing urban physical plans,

SLO 5.3 outline the role of information systems, evaluation techniques, and review processes in urban physical planning,

SLO 5.4 evaluate the principles, frameworks, and challenges of urban land policy and management in Nigeria.

5.1 Urban Physical Planning Concepts and Process

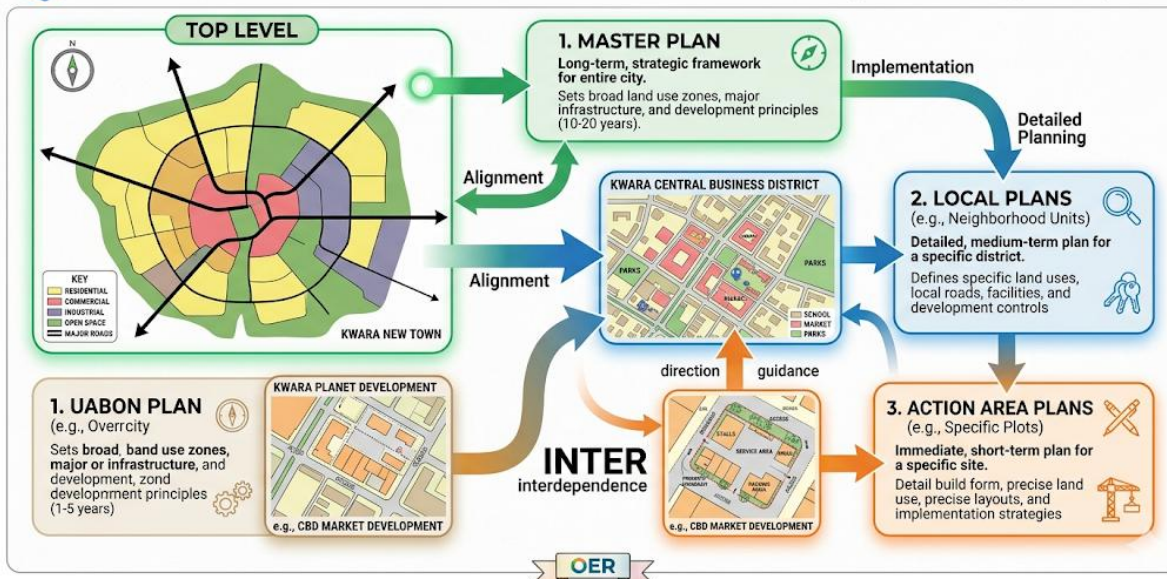
5.1.1 Concepts, purpose, and types of urban physical plans

Urban physical planning is the process of regulating the use, development, and organisation of land and buildings in urban areas to achieve orderly, efficient, and sustainable development. Its central purpose is to reconcile competing demands for land, ensure the provision of infrastructure and services, protect the environment, and promote the social and economic wellbeing of urban residents. Urban physical plans take several forms. The **master plan** (or structure plan) provides a long-term, comprehensive vision for the spatial development of a city or region. The **local plan** translates the master plan into more detailed land use allocations and development controls for specific areas. The **action area plan** focuses on priority zones earmarked for immediate development or redevelopment. Together, these plan types form a hierarchy that guides decisions from the strategic to the site-specific level.

Fill in the blank: A master plan provides a long-term, comprehensive vision for the _____ development of a city or region.



OER HIERARCHY OF URBAN PHYSICAL PLANS (OER Diagram)



Short description: A diagram illustrating the hierarchy of urban physical plans from the master plan at the top, through local plans, to action area plans at the base.

Figure 5.1 The hierarchy of urban physical plans

5.1.2 The urban physical planning process

The preparation of an urban physical plan follows a systematic process. It typically begins with **data collection and analysis** gathering information on population, land use, infrastructure, and environmental conditions. This is followed by the **identification of issues and goals**, which establishes what the plan is intended to achieve. **Plan formulation** involves the preparation of alternative development options and the selection of a preferred strategy. **Public participation** is a critical stage that ensures community views are incorporated into the plan. The **adoption and approval** of the plan by the relevant authority gives it legal force. Finally, **implementation, monitoring, and review** ensure that the plan is carried out and updated as circumstances change. In Nigeria, the planning process is governed by state urban and regional planning laws, which vary across states.

Fill in the blank: The stage of the planning process that ensures community views are incorporated into the plan is known as public _____.

Pilot Questions 5.1

Define urban physical planning and state its central purpose.

Name three types of urban physical plans and distinguish between them.

What is the first stage in the preparation of an urban physical plan?

Why is public participation important in the urban physical planning process?



Fill in the blank: The adoption and approval of a plan by a relevant authority gives it _____ force.

5.2 Administration and Implementation of Urban Physical Plans

5.2.1 Legal provisions and administrative structures for plan implementation

The implementation of urban physical plans in Nigeria is underpinned by a legal framework that includes federal and state legislation. At the federal level, the **Nigerian Urban and Regional Planning Act (Decree No. 88 of 1992)** provides the overarching legal basis for physical planning, establishing the roles of planning authorities and the procedures for plan preparation and approval. Most states have enacted their own urban and regional planning laws that operationalise these provisions at the state level. The **administrative structure** for plan implementation typically includes a **State Ministry of Physical Planning** or its equivalent, **Urban Planning Boards**, and **Local Planning Authorities (LPAs)**. These bodies are responsible for issuing development permits, enforcing planning regulations, and coordinating with other agencies on infrastructure provision.

Fill in the blank: The Nigerian Urban and Regional Planning Act was enacted as Decree No. _____ of 1992.

Tier of Government	Planning Body (Administrative Level)	Key Roles and Responsibilities
Federal	National Urban and Regional Planning Commission	Formulation of national policies, preparation of the National Physical Development Plan, and coordination of interstate planning projects.
State	State Urban and Regional Planning Board	Preparation of State Physical Development Plans, monitoring of state-wide land use, and overseeing the activities of local planning authorities.
Local	Local Planning Authority (LPA)	Preparation of local/subject plans (e.g., residential layouts), development control (granting building permits), and site inspections.

Short description: A table showing the tiers of the administrative structure for plan implementation in Nigeria, including federal, state, and local levels with their respective roles.

Table 5.1 Administrative structure for urban physical plan implementation in Nigeria



5.2.2 Financing the implementation of urban physical plans

Translating urban physical plans into built reality requires substantial financial investment. Sources of financing for plan implementation include **government budgetary allocations** at federal, state, and local levels; **development levies and charges** collected from developers as a condition of planning approval; **land value capture** mechanisms that recover increases in land value attributable to public investment; **private sector investment** attracted through enabling regulatory environments; and **donor funding** for urban development projects. In practice, many Nigerian urban authorities face chronic financing shortfalls, resulting in plans that are prepared but never fully implemented. Addressing this requires strengthening local revenue generation, improving the management of planning fees, and leveraging private investment through transparent and predictable regulatory processes.

Fill in the blank: The recovery of increases in land value attributable to public investment is known as land value _____.

Pilot Questions 5.2

What is the primary federal legislation governing urban physical planning in Nigeria?

Name two bodies in the administrative structure responsible for plan implementation at the state level.

What is the role of a Local Planning Authority in plan implementation?

Name three sources of financing for urban physical plan implementation.

Fill in the blank: Development levies are charges collected from _____ as a condition of planning approval.

5.3 Information Systems, Reporting, and Plan Review

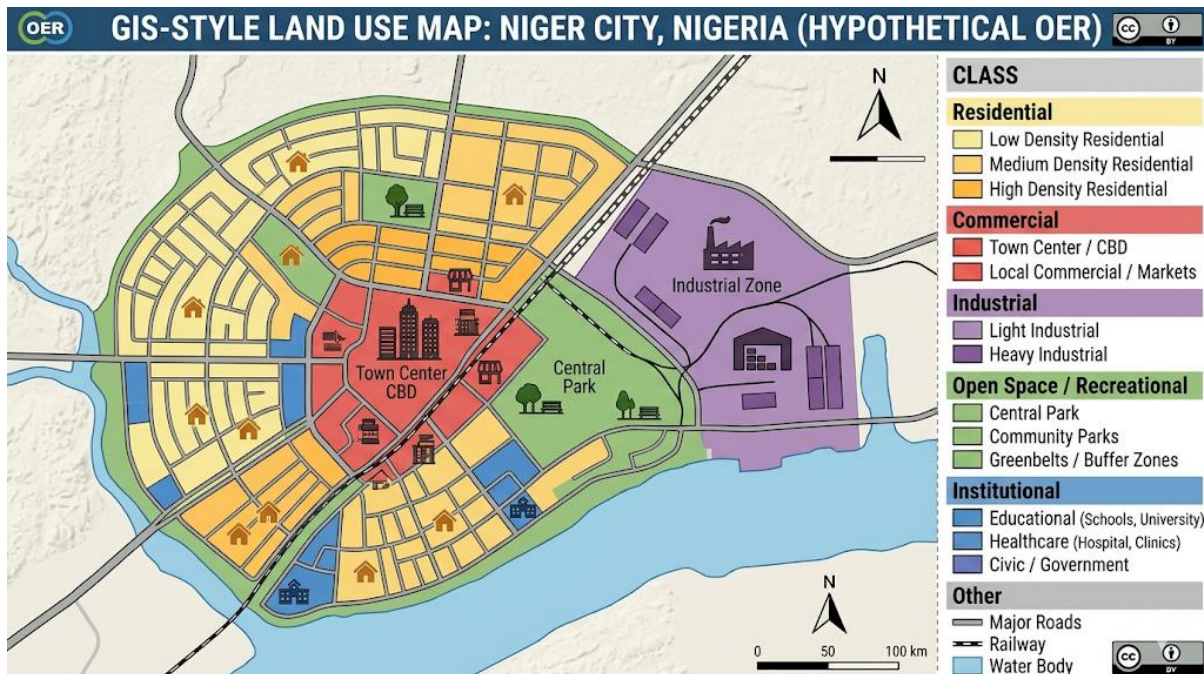
5.3.1 Urban physical planning information systems and techniques

Effective urban physical planning depends on timely, accurate, and accessible information.

Urban planning information systems are the tools and technologies used to collect, store, analyse, and present data relevant to planning decisions. The **Geographic Information System (GIS)** is among the most powerful of these tools, enabling planners to map land uses, infrastructure, population distribution, and environmental features, and to conduct spatial analyses that support plan preparation and implementation. Remote sensing, census data, building permit records, and socioeconomic surveys are additional information sources. Together, these tools enable planners to monitor urban growth, identify development pressures, and assess the impacts of planning decisions in a systematic and evidence-based manner.

Fill in the blank: A Geographic Information System (GIS) enables planners to conduct _____ analyses that support plan preparation and implementation.





Short description: A GIS-generated land use map of a Nigerian city showing zones for residential, commercial, industrial, and open space uses.

Plate 5.1 A GIS land use map of an urban area

5.3.2 Evaluation, reporting, and review of urban physical plans

Urban physical plans are not static documents. They must be regularly evaluated, reported on, and reviewed to remain relevant and effective. **Plan evaluation** assesses the extent to which plan goals and targets have been achieved, using indicators such as the rate of approved developments, infrastructure provision levels, and compliance with land use allocations.

Reporting involves the preparation of periodic progress reports that communicate achievements, challenges, and deviations to planning authorities, elected officials, and the public. **Plan review** is the formal process of updating or replacing a plan in response to changed circumstances, new data, or emerging development pressures. In Nigeria, planning laws typically require that master plans be reviewed every five to ten years, though in practice reviews are often delayed due to resource constraints.

Fill in the blank: Nigerian planning laws typically require that master plans be reviewed every _____ to ten years.

Pilot Questions 5.3

What is an urban planning information system?

How does GIS support urban physical planning?

What does plan evaluation assess?

What is the purpose of plan reporting?



Fill in the blank: Plan _____ is the formal process of updating or replacing a plan in response to changed circumstances.

5.4 Urban Land Policy and Management

5.4.1 Urban land policy principles and frameworks

Urban land policy refers to the set of rules, regulations, and interventions that govern how land in urban areas is owned, allocated, developed, and transferred. The principles underpinning sound urban land policy include **equity** ensuring that access to land is fair and not skewed towards the wealthy; **efficiency** promoting the productive use of land and reducing speculation; **sustainability** protecting land resources for future generations; and **transparency** ensuring that land transactions and allocations are open and accountable. In Nigeria, the **Land Use Act of 1978** is the cornerstone of urban land policy, vesting all land in each state in the Governor, who holds it in trust for the people. Under this Act, individuals and organisations obtain rights to land through the grant of **certificates of occupancy**, which confer statutory rights of occupancy.

Fill in the blank: Under Nigeria's Land Use Act of 1978, all land in each state is vested in the _____, who holds it in trust for the people.

Principle	Brief Description	Application in Urban Planning
Equity	Ensures fair access to land and its benefits for all social groups. It focuses on secure tenure, affordable housing, and preventing the displacement of vulnerable populations.	Implementing Inclusionary Zoning that requires a percentage of new developments to be reserved for low-income residents.
Efficiency	Promotes the optimal use of land to maximize economic and social returns. It aims to reduce land speculation, minimize urban sprawl, and ensure infrastructure is used effectively.	Encouraging Infill Development on vacant city lots rather than extending costly utilities to the distant urban fringe.
Sustainability	Focuses on meeting current land needs without compromising the ability of future generations to meet theirs. It protects ecological buffers and promotes climate-resilient design.	Designating Greenbelts or "no-build" zones in flood-prone areas to protect biodiversity and manage stormwater.



Principle	Brief Description	Application in Urban Planning
Transparency	Requires clear, accessible, and predictable rules for land allocation and registration. It reduces corruption and builds public trust in the land administration system.	Utilizing Digital Land Registries (Cadastral) where the public can easily verify land ownership and zoning regulations.

Short description: A box listing and briefly describing the four key principles of urban land policy: equity, efficiency, sustainability, and transparency.

Box 5.1 Key principles of urban land policy

5.4.2 Land management, tenure, and urban development

Urban land management encompasses the processes and institutions responsible for administering land rights, maintaining land records, resolving disputes, and regulating land markets. **Land tenure** refers to the terms and conditions under which land is held and used, ranging from statutory rights of occupancy under the Land Use Act, to customary tenure systems recognised in many Nigerian communities, to informal occupation in unplanned settlements. Insecure land tenure discourages investment, impedes infrastructure delivery, and exposes residents particularly the urban poor to forced eviction. Effective urban land management therefore requires accurate and accessible **land registries**, transparent allocation processes, mechanisms for resolving tenure disputes, and policies that regularise tenure in informal settlements. These measures create the conditions for planned, equitable, and sustainable urban development.

Fill in the blank: Insecure land tenure discourages investment and exposes residents to the risk of forced _____.

Pilot Questions 5.4

What is urban land policy and what principles guide it?

What does Nigeria's Land Use Act of 1978 establish regarding ownership of land?

What is a certificate of occupancy under the Land Use Act?

Why is secure land tenure important for urban development?

Fill in the blank: Customary tenure systems are recognised alongside statutory rights in many Nigerian _____ communities.

Series Summary



This Series has examined the dimensions of urban physical planning, plan implementation, information management, and land policy that together determine how cities grow and how urban land is managed. We began by exploring the concepts, purpose, and types of urban physical plans – master plans, local plans, and action area plans – and the systematic process through which they are prepared, from data collection through to adoption and review. We then considered the legal provisions and administrative structures that govern plan implementation in Nigeria, including the Nigerian Urban and Regional Planning Act and the roles of state ministries, planning boards, and local planning authorities.

Following that, we examined the information systems and techniques – particularly GIS – that support planning decisions, and the processes of plan evaluation, reporting, and review that keep plans relevant over time. Finally, we addressed urban land policy and management, exploring the principles of equity, efficiency, sustainability, and transparency, the Land Use Act of 1978, and the challenges of land tenure insecurity and informal settlement regularisation.

By engaging with these topics, you should now be able to describe the urban physical planning process, explain the legal and administrative framework for plan implementation, outline the role of information systems and plan review, and evaluate urban land policy and management principles. These outcomes align with the Series Learning Outcomes and complete the course's examination of project planning and implementation in urban and regional contexts. Together, the five Series of this course have equipped you with a comprehensive understanding of project planning, water demand and supply, urbanisation impacts, policy frameworks, and urban physical planning – all essential competencies for practice in urban and regional planning.

Glossary of Terms

Action area plan: A detailed plan focusing on a priority zone earmarked for immediate development or redevelopment within a broader urban plan.

Certificate of occupancy: A document issued under Nigeria's Land Use Act conferring statutory rights of occupancy over a parcel of land.

Data collection and analysis: The first stage of the urban physical planning process, involving the gathering and interpretation of information on population, land use, infrastructure, and the environment.

Development permit: Formal approval issued by a planning authority authorising a developer to carry out a specified development on a parcel of land.

Geographic Information System (GIS): A technology that enables the collection, storage, analysis, and visualisation of spatially referenced data for planning and decision-making.

Land registry: An official record of land ownership, rights, and transactions maintained by a government authority.

Land tenure: The terms and conditions under which land is held and used, including statutory, customary, and informal forms of tenure.

Land Use Act of 1978: The principal legislation governing land ownership in Nigeria, which vests all land in each state in the Governor to be held in trust for the people.



Land value capture: A financing mechanism that recovers increases in land value resulting from public investment or planning decisions for reinvestment in infrastructure.

Local plan: A plan that translates the master plan into detailed land use allocations and development controls for a specific area.

Local Planning Authority (LPA): A body at the local government level responsible for issuing development permits, enforcing planning regulations, and managing plan implementation.

Master plan: A long-term, comprehensive plan that provides a strategic vision for the spatial development of a city or region.

Nigerian Urban and Regional Planning Act: Federal legislation (Decree No. 88 of 1992) providing the overarching legal basis for urban and regional planning in Nigeria.

Plan evaluation: The assessment of the extent to which a plan's goals and targets have been achieved, using agreed indicators.

Plan review: The formal process of updating or replacing an urban physical plan in response to changed circumstances, new data, or emerging development pressures.

Public participation: The stage of the planning process in which community members and stakeholders are consulted and their views incorporated into the plan.

Urban physical planning: The process of regulating the use, development, and organisation of land and buildings in urban areas to achieve orderly, efficient, and sustainable development.

Urban planning information system: The tools and technologies used to collect, store, analyse, and present data relevant to urban planning decisions.

Concept Check Questions 5

Objective questions

Which of the following best describes a master plan? (Linked to SLO 5.1)

- a. A detailed plan for a specific priority development zone
- b. A long-term, comprehensive plan providing a strategic vision for city development
- c. A record of land ownership and transactions
- d. A financing mechanism for infrastructure provision

Under Nigeria's Land Use Act of 1978, all land in each state is vested in the: (Linked to SLO 5.4)

- a. Local Government Chairman
- b. Federal Government
- c. Governor
- d. Urban Planning Board

Which tool is most commonly used by urban planners to conduct spatial analysis and map land uses? (Linked to SLO 5.3)



- a. Remote sensing only
- b. Census surveys
- c. Geographic Information System (GIS)
- d. Building permit records

Short-answer questions

4. Define land tenure and explain why secure land tenure is important for urban development. (Linked to SLO 5.4)
5. Describe two sources of financing for urban physical plan implementation in Nigeria. (Linked to SLO 5.2)

Long-answer questions

6. Describe the urban physical planning process in Nigeria and explain the importance of each stage in producing an effective and implementable plan. (Linked to SLO 5.1)
 - Basic response: Learners should identify and explain the key stages, data collection, issue identification, plan formulation, public participation, adoption, and implementation and review noting the contribution of each.
 - Value-added response: Outstanding learners may discuss practical challenges at each stage in the Nigerian context, such as data deficiencies, limited public engagement, delayed plan approvals, and resource constraints that impede implementation.
7. Evaluate the role of urban land policy and management in promoting equitable and sustainable urban development in Nigeria. (Linked to SLO 5.4)
 - Basic response: Learners should describe the Land Use Act of 1978, the principles of urban land policy, and the challenges of tenure insecurity and informal settlements.
 - Value-added response: Outstanding learners may critically assess the Land Use Act's strengths and limitations, propose reforms to address tenure insecurity and informal settlement regularisation, and connect land policy to broader goals of equitable urban development and infrastructure financing.

Answers to Concept Check Questions 5

A long-term, comprehensive plan providing a strategic vision for city development
 Governor
 Geographic Information System (GIS)

4. Land tenure refers to the terms and conditions under which land is held and used. Secure land tenure is important because it encourages investment in land and property, protects residents from forced eviction, facilitates access to credit, and enables the orderly delivery of infrastructure and services.



5. Two sources are government budgetary allocations, which provide capital funding for infrastructure linked to plan implementation, and development levies and charges collected from developers as a condition of planning approval, which generate revenue for planning authorities.

6. Basic response: The planning process moves from data collection and issue identification through plan formulation, public participation, and adoption to implementation and review. Each stage contributes to producing a plan that is evidence-based, responsive to community needs, legally valid, and adaptable over time.

Value-added response: In Nigeria, data deficiencies undermine the evidence base; limited public engagement reduces community ownership; delays in plan approval reduce relevance; and inadequate financing constrains implementation. Addressing these challenges requires investment in planning data systems, meaningful consultation processes, streamlined approval procedures, and diversified financing strategies.

7. Basic response: The Land Use Act of 1978 centralises land ownership in the state Governor, enabling orderly allocation through certificates of occupancy. Key principles of land policy equity, efficiency, sustainability, and transparency guide how land should be managed. Tenure insecurity in informal settlements remains a major challenge.

Value-added response: Critics argue the Land Use Act has constrained land markets and complicated tenure regularisation. Reforms could include devolving land administration to local authorities, establishing community land trusts, and introducing systematic regularisation programmes for informal settlements. Connecting land policy to urban finance through land value capture could also fund infrastructure investment equitably.

Answers to Pilot Questions 5

Answers to Pilot Questions 5.1

Urban physical planning is the process of regulating the use and development of land and buildings in urban areas to achieve orderly, efficient, and sustainable development.

Master plan: long-term strategic vision for city development. Local plan: detailed land use allocations for a specific area. Action area plan: focused plan for a priority development zone.

Data collection and analysis

It ensures that community views and needs are incorporated into the plan, increasing legitimacy, ownership, and the likelihood of successful implementation.

Legal

Answers to Pilot Questions 5.2

The Nigerian Urban and Regional Planning Act (Decree No. 88 of 1992)



State Ministry of Physical Planning and Urban Planning Board (also acceptable: Local Planning Authority)

To issue development permits, enforce planning regulations, and coordinate infrastructure provision at the local level.

Government budgetary allocations, development levies, and land value capture (also acceptable: private sector investment and donor funding)

Developers

Answers to Pilot Questions 5.3

An urban planning information system is a set of tools and technologies used to collect, store, analyse, and present data relevant to urban planning decisions.

GIS enables planners to map land uses, infrastructure, population distribution, and environmental features, and to conduct spatial analyses supporting plan preparation and monitoring.

Plan evaluation assesses the extent to which plan goals and targets have been achieved, using indicators such as development approval rates and infrastructure provision levels.

Reporting communicates planning achievements, challenges, and deviations to authorities, elected officials, and the public through periodic progress reports.

Review

Answers to Pilot Questions 5.4

Urban land policy is the set of rules and interventions governing land ownership, allocation, development, and transfer. It is guided by principles of equity, efficiency, sustainability, and transparency.

The Land Use Act vests all land in each state in the Governor, who holds it in trust for the people and grants rights of occupancy.

A certificate of occupancy is a document that confers statutory rights of occupancy over a parcel of land under the Land Use Act.

Secure tenure encourages investment, prevents forced eviction, facilitates access to credit, and enables orderly infrastructure delivery.

Urban and peri-urban

References and Attributions 5

This Series has drawn upon a range of scholarly and open educational resources to ensure accuracy and learner-friendliness. Below are the references and attributions for Series 5: Urban Physical Planning, Land Policy, and Implementation.



Figures, Plates, Tables, and Boxes

Figure 5.1 The hierarchy of urban physical plans: AI prompt used "Create a diagram illustrating the hierarchy of urban physical plans, showing the master plan at the top, local plans in the middle, and action area plans at the base, with brief descriptions of each." Suggested OER search string "urban physical plans hierarchy diagram OER."

Table 5.1 Administrative structure for urban physical plan implementation in Nigeria: AI prompt used "Generate a table showing the administrative structure for urban physical plan implementation in Nigeria, listing the federal, state, and local planning bodies and their respective roles." Suggested OER search string "Nigeria urban planning administrative structure table OER."

Plate 5.1 A GIS land use map of an urban area: AI prompt used "Generate a GIS-style land use map of a Nigerian city showing clearly delineated zones for residential, commercial, industrial, and open space uses with a legend." Suggested OER search string "GIS land use map Nigerian city OER."

Box 5.1 Key principles of urban land policy: AI prompt used "Generate a text box listing and briefly describing the four key principles of urban land policy: equity, efficiency, sustainability, and transparency." Suggested OER search string "urban land policy principles OER."

General References

- Agbola, T., & Agunbiade, E. M. (2007). Urbanisation, slum development and security of tenure: The challenges of meeting Millennium Development Goal 7 in metropolitan Lagos, Nigeria. In *Urban population and environment dynamics in the developing world: Case studies and lessons learned*. CICRED.
- Mabogunje, A. L. (1992). Perspective on urban land and urban management policies in Sub-Saharan Africa. World Bank Technical Paper No. 196. World Bank.
- Federal Republic of Nigeria. (1992). Nigerian Urban and Regional Planning Act (Decree No. 88). Federal Government of Nigeria.
- Federal Republic of Nigeria. (1978). Land Use Act. Federal Government of Nigeria.
- UN-Habitat. (2012). Urban planning for city leaders. United Nations Human Settlements Programme.
- Zoning, S., & Kayode, J. S. (2010). Urban land use planning and management in Nigeria. *Journal of Geography and Regional Planning*, 3(6), 141–150.
- Open Educational Resources (OER Commons). Search strings used: "urban physical planning process OER," "urban planning legislation Nigeria OER," "GIS urban planning OER," "urban land policy management OER."

Attributions

All AI-generated illustration prompts were created specifically for this Series using instructional design guidelines.



Suggested OER search strings are provided to enable sourcing of free-to-use diagrams, tables, and conceptual images for teaching and learning purposes.

