

Finance and Accounting setting for sustainable water utility

WaQuAc-Net 16th Webinar

20th August 2023

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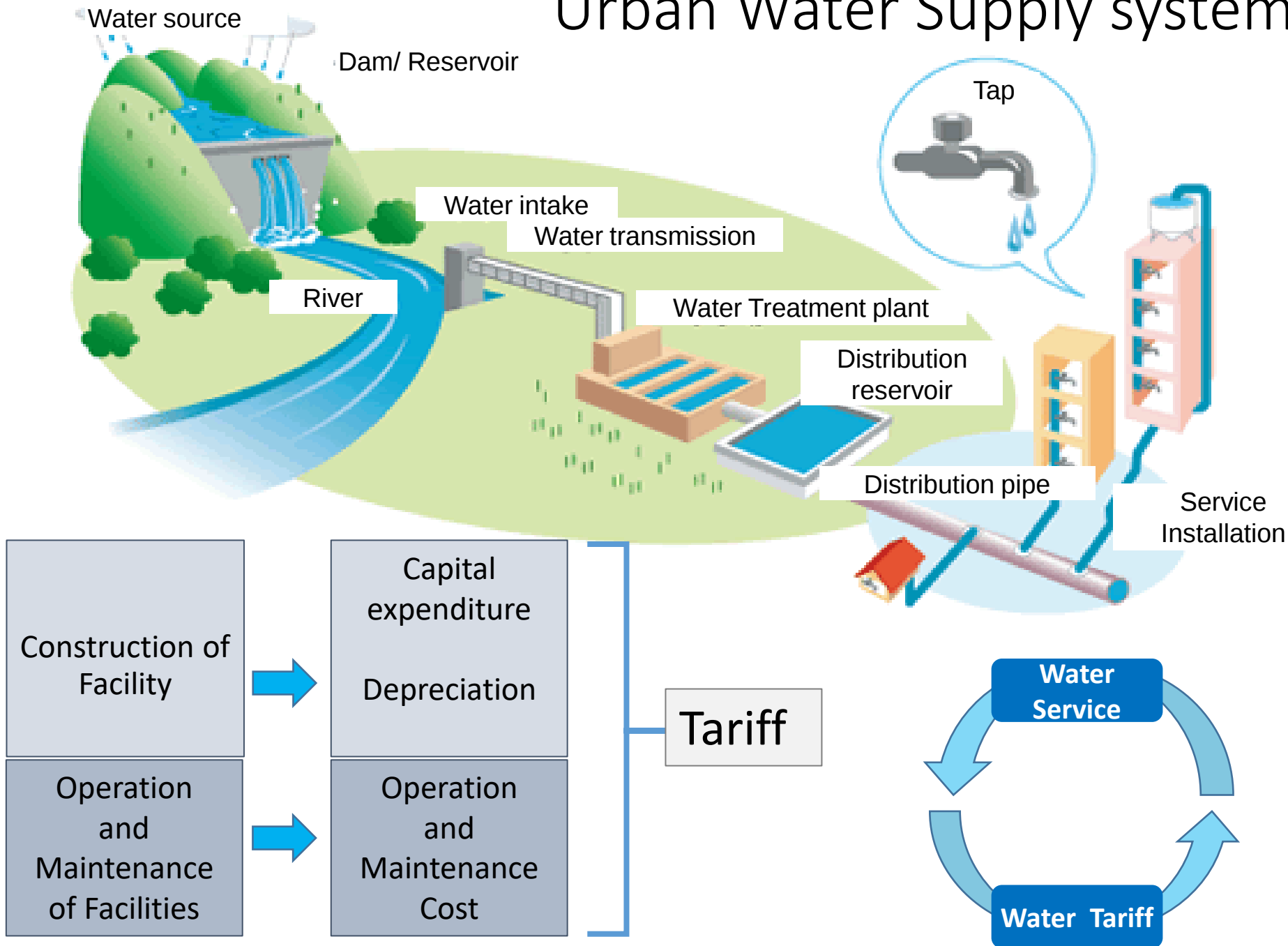
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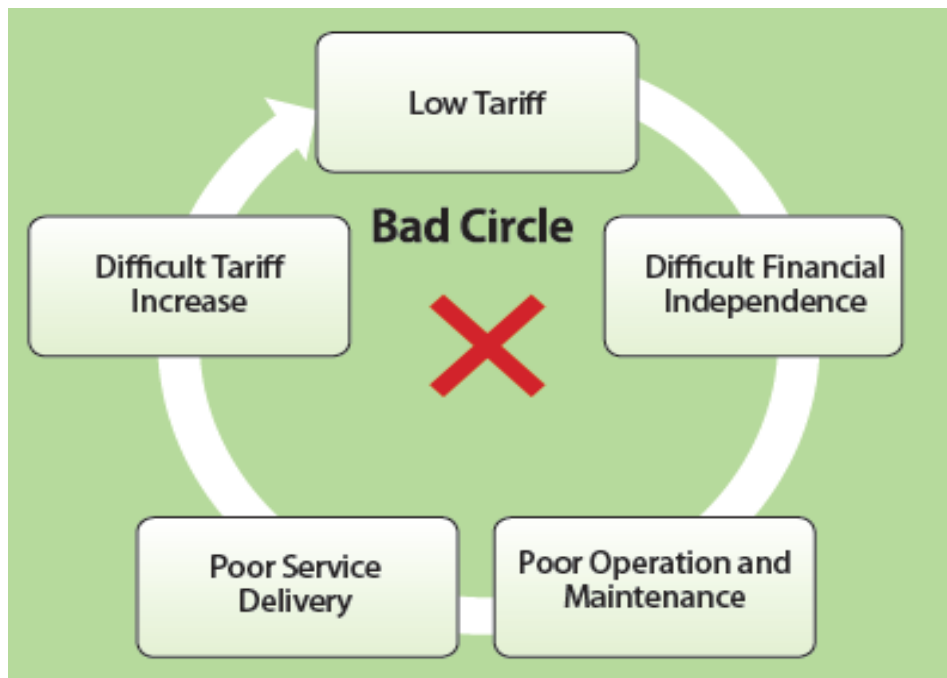
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1. Sustainable water utility

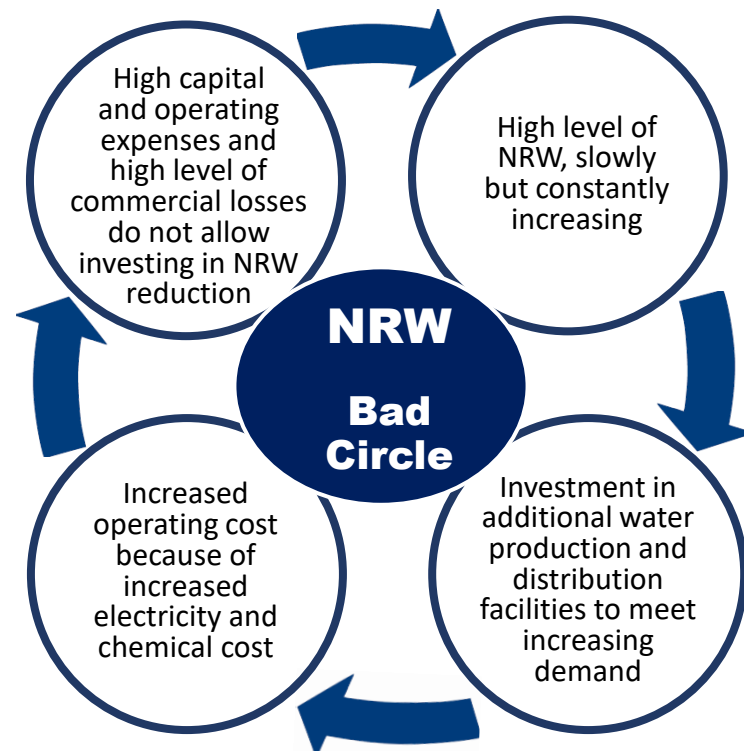
Urban Water Supply system



Bad Circle of water supply management

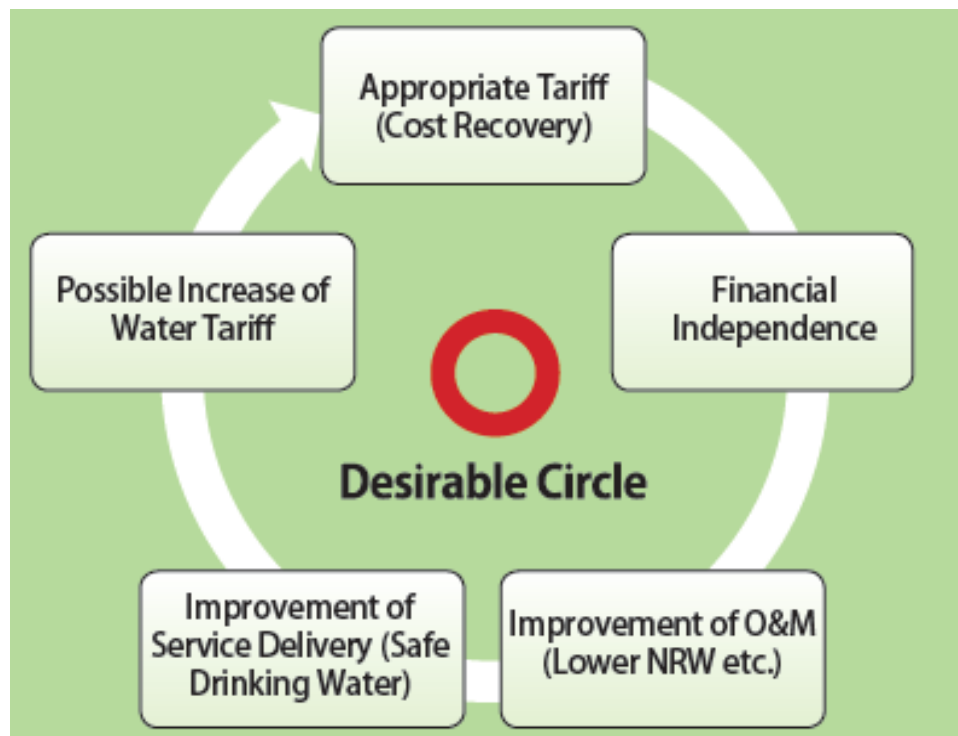


Source: "Facts about YCDC"

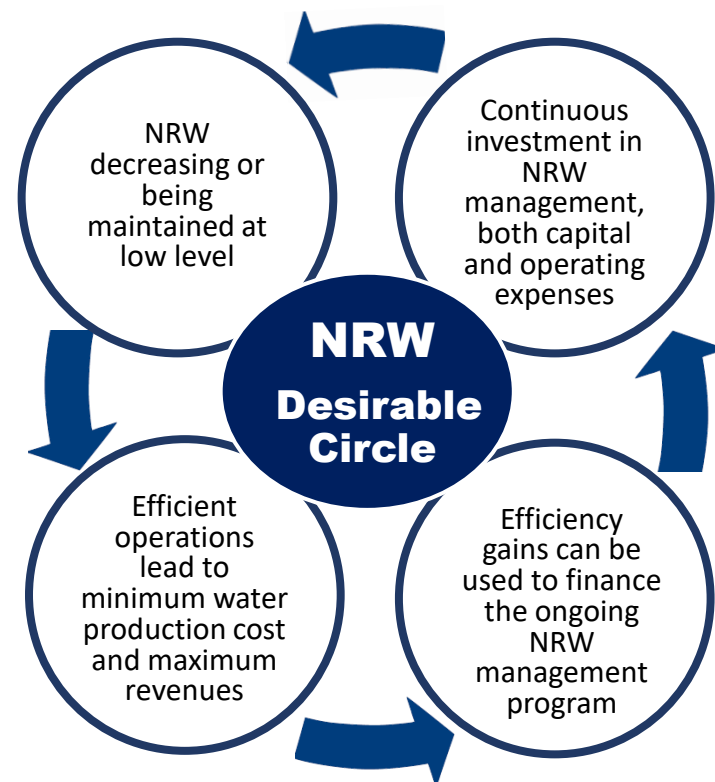


Source: R. Liemberger

Desirable Circle of water supply management



Source: "Facts about YCDC"



Source: R. Liemberger

The first thing is to improve poor water services, but not enough budget for that.



To Improve poor water services

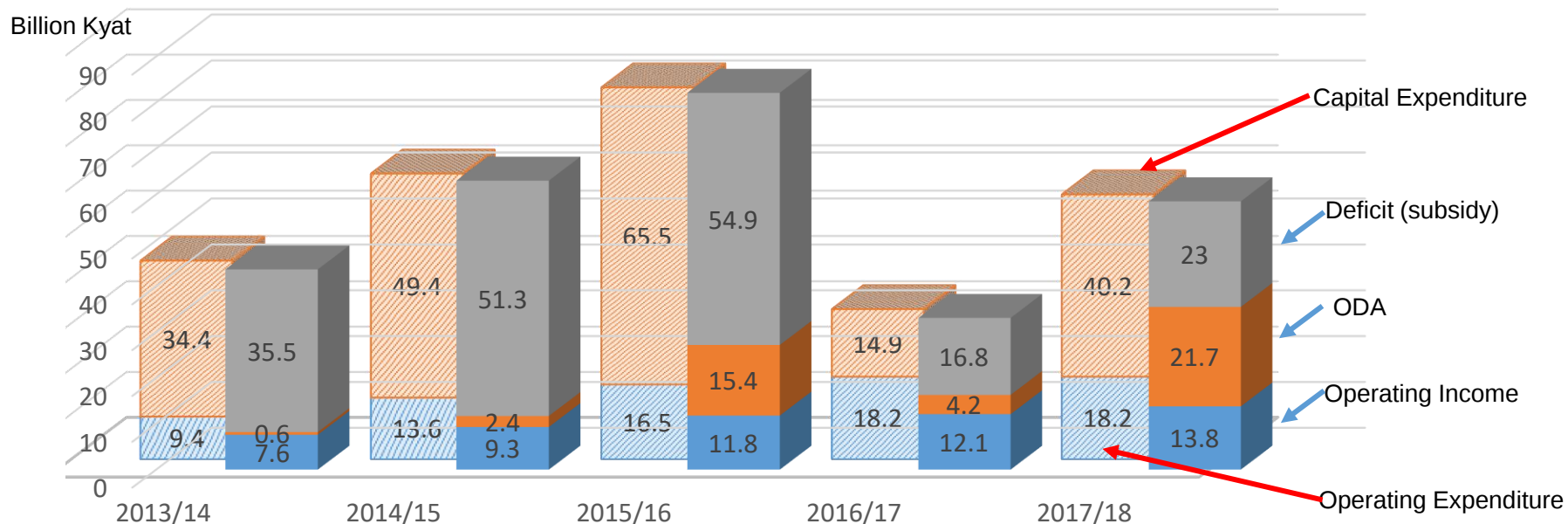
**Good Water
Services**

To raise water tariff

**Enough
Revenues**

2. Government accounting vs. Corporate accounting

Government accounting system in YCDC



Source: YCDC, Engineering Department of Water and Sanitation

YCDC: Yangon City Development Committee (Yangon city government)

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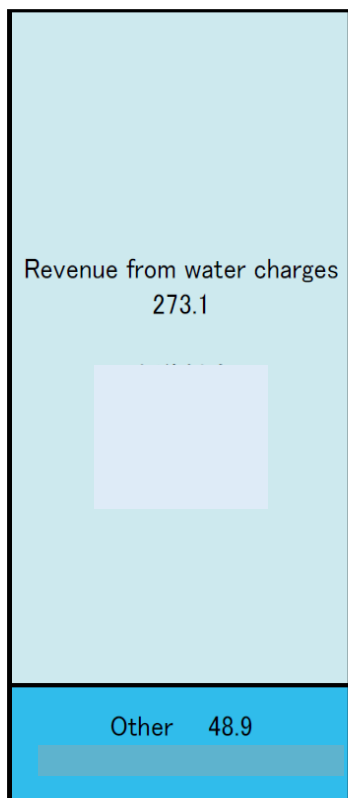
Corporate accounting system for Japan's utility

Tokyo's Financial Statement FY2020 (April 2020 to March 2021)

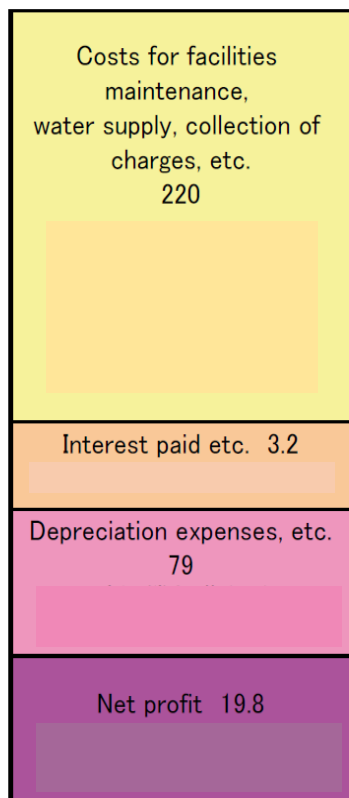
Accounting system and budget system is regulated by the special law for local public utilities

Profit and loss account

Income:322 Billion yen

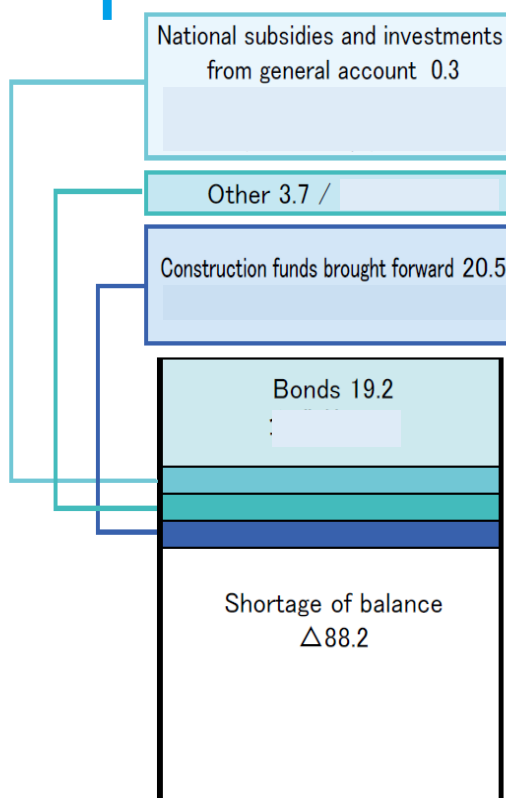


Expenditure:302.2 Billion yen

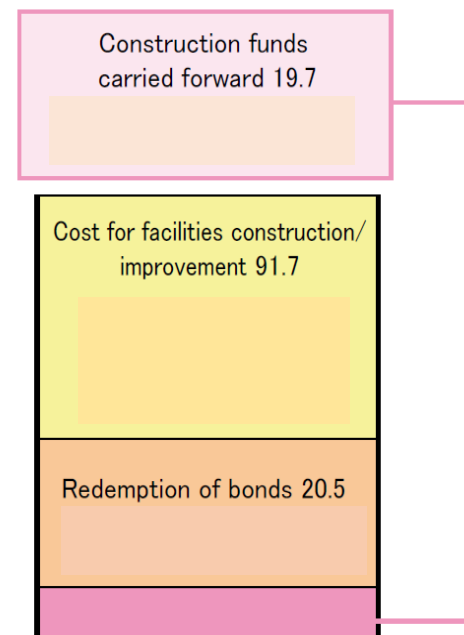


Capital income and expenditures

Income:43.7 Billion yen



Expenditure:131.9 Billion yen



Source: Tokyo Waterworks Bureau, Water Supply Tokyo 2021

WASAC's consolidated Budget

2021/2022 Consolidated Budget (revised)

Type	Category	Subcategory	Amount (Frw)
WASAC Total Budget			77,896,126,410
DEVELOPMENT BUDGET	Revenues		42,867,003,745
		Domestic	10,502,113,344
		Grant	9,238,440,459
		Loan	23,126,449,942
	Expenses		42,867,003,745
		Administrative And Support Services	5,331,863,344
		Drinking Water Access	32,387,479,951
		Sanitation Access	5,147,660,450
UTILITY BUDGET	Revenues		35,029,122,665
		Water sales	28,847,599,147
		Other source of finance	6,181,523,518
	Expenses		35,029,122,665
		Operating Cost	29,352,327,197
		Capital Expenditures	5,676,795,468

2022-2023 Consolidated Budget

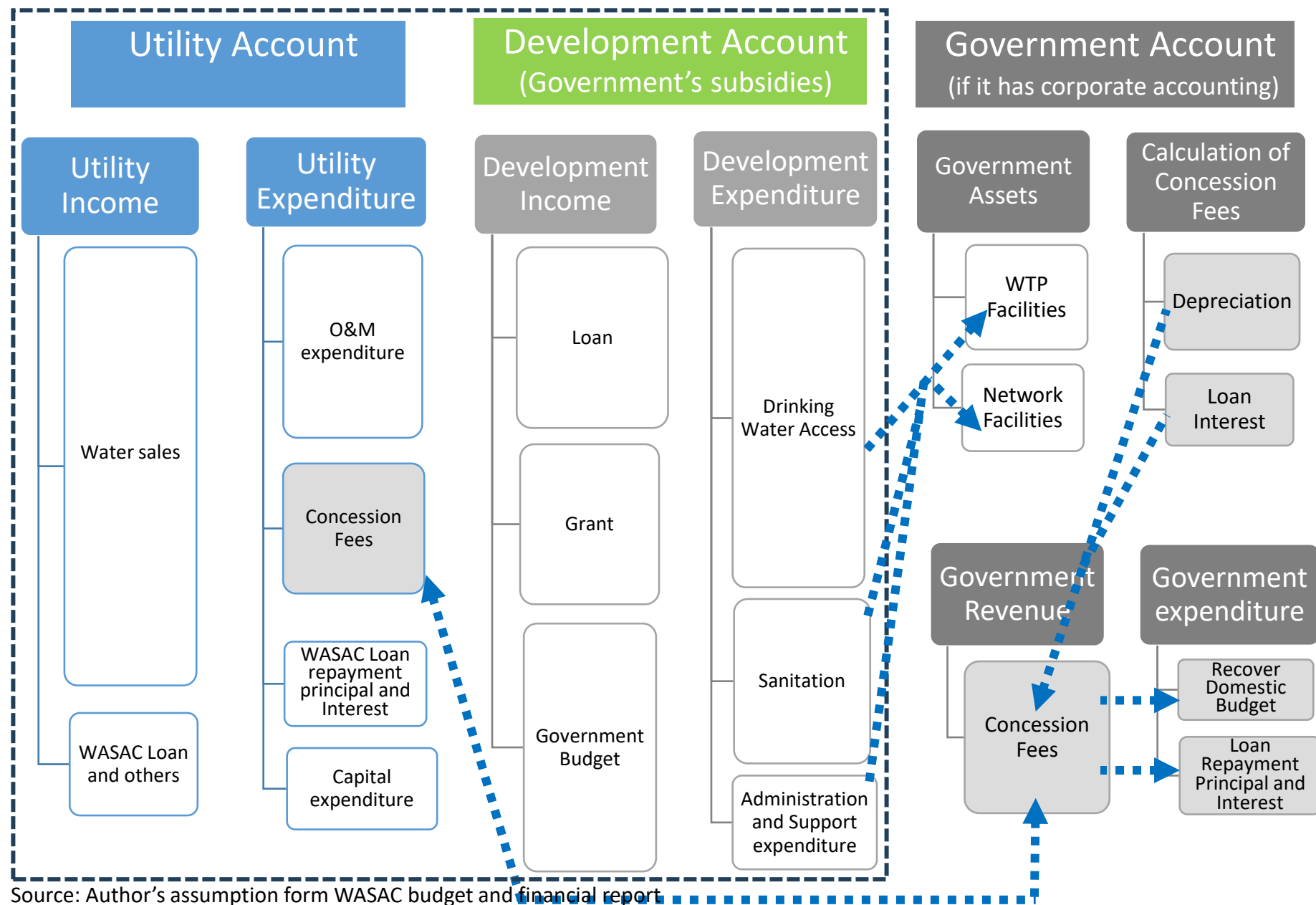
Type	Category	Subcategory	Amount (Frw)
Consolidated WASAC Budget for the Year 2022-2023			93,569,682,826
DEVELOPMENT BUDGET	Revenues		31,389,497,786
		Domestic	27,480,822,636
		Grant	3,908,675,150
	Expenses		31,389,497,786
		Administrative And Support Services	2,094,521,261
		Drinking Water Access	26,418,776,526
		Sanitation Access	2,876,200,000
UTILITY BUDGET	Revenues		35,301,425,755
		Water sales	29,614,136,519
		Other source of finance	5,687,289,236
	Expenses		35,301,425,755
		Operating Cost	29,859,097,489
		Capital Expenditures	5,442,328,265
RSWSSP BUDGET	Revenues		26,878,759,285
			3,371,230,837
		Domestic	
		Grant	200,000,000
		Loan	23,307,528,448
	Expenses		26,878,759,285
		Administrative And Support Services	90,000,000
		Drinking Water Access	20,975,049,238
		Sanitation Access	5,813,710,047

Source: WASAC budget report
WASAC: Water and Sanitation Corporation, Rwanda

WASAC Financial Statement (P/L)

Profit and Loss Accounts		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
		Audited	Audited	Audited	Audited	Audited	Audited	Audited
1.Revenue		11,727.8	15,116.8	15,565.9	15,060.0	18,779.3	21,915.5	23,787.2
2.Cost of Sales		7,635.1,	12,671.7	14,372.0	13,964.1	14,702.7	15,013.5	16,807.6
3.Gross Profit		4,092.7	2,445.1	1,193.9	1,095.9	4,076.6	6,902.0	6,979.6
4.Other Income		7,373.8	10,989.8	11,016.8	26,737.1	11,920.0	695.7	1,047.3
5.Other expenses	Support to district networks	3,868.9	9,975.6	9,566.9	24,768.5	8,555.3	---	---
	Administrative expenses	5,323.0	3,163.4	3,532.6	7,059.3	6,001.6	3,123.1	3,524.4
	Total	9,191.9	13,139.0	13,099.5	31,827.8	14,556.9	3,123.1	3,524.4
6.Operating Profit before depreciation		2,274.6	296.0	-888.8	-3,994.8	1,439.7	4,474.5	4,502.5
7.Depreciation/amortization		3,129.4	3,404.0	3,424.4	3,277.5	3,357.6	3,128.4	3,191.0
8.Operating Profit		-854.8	-3,108.0	-4,313.2	-7,272.3	-1,917.9	1,346.1	1,311.5
9.Financial	Income	848.8	1,205.1	1,217.8	13.1	25.3	19.9	35.9
	Expenses	1,002.7	1,205.1	1,240.9	75.1	577.7	1,466.0	1,854.3
	Profit/Deficit	-154.3	0.0	-23.1	-62.0	-552.4	-1,446.1	-1,818.4
10.Provision	Write-back	0.0	596.5	0.0	0.0	0.0	0.0	0.0
11.Profit and Loss before Tax		-1,009.1	-2,511.5	-4,336.3	-7,334.3	-2,470.3	-100.0	-507.0
12.Tax	(-)Deferred tax Liabilities	-285.9	-459.6	275.1	155.1	281.2	409.8	508.1
13.P/L for the period (11-12)		-732.2	-2,051.9	-4,611.4	-7,489.4	-2,751.5	-509.7	-1,015.1

Accounting scheme of WASAC and Government



Comparison of two accounting system

	Government accounting system	Corporate accounting system
Characteristics and Advantage	- Strictly regulated by budget system = Transparent and accountability = public interest	- Budget system is a inner control tool = flexible in budget
	- Single entry accounting Cash-basis No depreciation Not suitable for profit-raising entity Simplicity	-Double-entry accounting Accrual Basis Depreciation Suitable for profit raising entity Asset replacement planning Match costs with revenue
Dis-advantage	- Strict budget system = difficult for autonomous management, process can be bureaucratic and time consuming, political intervention	- Indirect influence of public interests
	- Weak in asset management = Long term planning - Difficult to catch actual cost of service	- Misunderstanding of profit in utilities - Complexity for customers

3. Full cost recovery vs. Sustainable cost recovery

Full cost recovery vs. Sustainable cost recovery

All Costs include:

- Operation and Maintenance Costs (Recurrent Costs)
- Capital Investment Costs (Finance Costs)
 - Costs for expansion
 - Costs for improvement (modernization)
 - Costs for Renewing Existing infrastructure

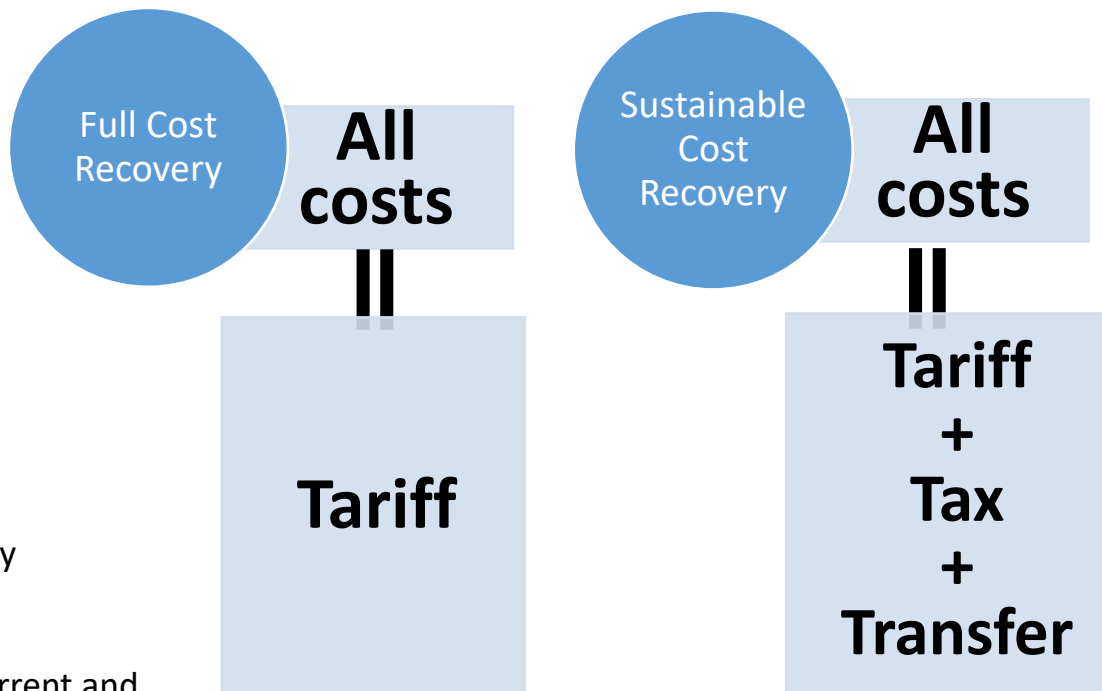
Full Cost Recovery

- All costs covered solely by tariff
- Ideal long-term aim, but not feasible in reality

Sustainable Cost Recovery

- An appropriate mix of the 3Ts to finance recurrent and capital costs, and to leverage other forms of financing;
- Predictability of public subsidies to facilitate investment (planning),
- Tariff policies affordable to all, including the poorest, while ensuring the financial sustainability of service providers

(Three Principles; OECD/ Camdessus Report)

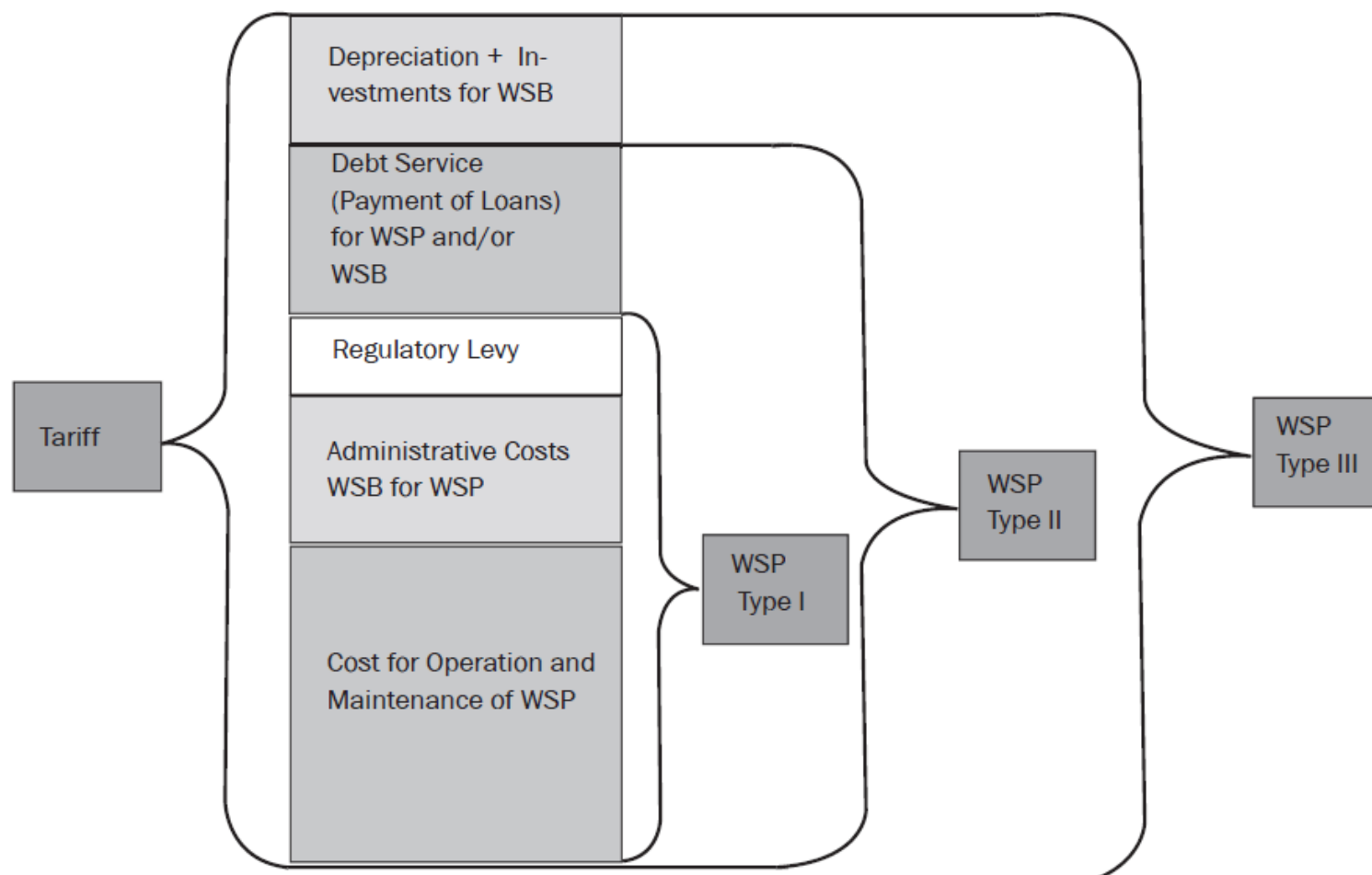


3Ts: Tariff + Tax + Transfer

- Tariff: Consumer
- Tax: Subsidies from government budget
- Transfer: Bilateral /Multilateral Assistance

WASREB's tariff setting approach

Tariff Composition and tariff setting approach



Source: Tariff Guidelines by WASREB (Water Service Regulatory Board), Kenya (Supported by GTZ)

NAWASCO's Tariff Setting Approach

Type 1 and Type 2 based on the level of cost coverage

➤ **Type 1 Below 100% O&M cost coverage**

A utility is classified as Type 1 if it is unable to, or barely covers the O&M costs. In this category, economic viability is of primary concern. As long as the utilities operate with negative cash flows, debts will continue to accumulate and pose a continuous threat to the sustainability of the companies. Therefore, the aim is to ensure that 100% O&M cost coverage is achieved.

➤ **Type 2 Above 100% O&M cost coverage**

A utility is classified as Type 2 if it is above 100% O&M cost coverage. In this category, the primary objective is the realisation of efficiency gains to be passed on to the consumers while continually improving service delivery and extending coverage. Therefore, the objective is to attain full cost recovery.

➤ **Type 1** = Projected O&M Costs - **less Deductions for disallowed costs**
= Adjusted O&M Costs I

➤ **Type 2** = Projected O&M Costs + **plus Depreciation and finance costs**
= Adjusted full Costs II

➤ For the purpose of simplicity, it is assumed that full cost recovery is reached when the revenue covers O&M plus depreciation and finance costs.

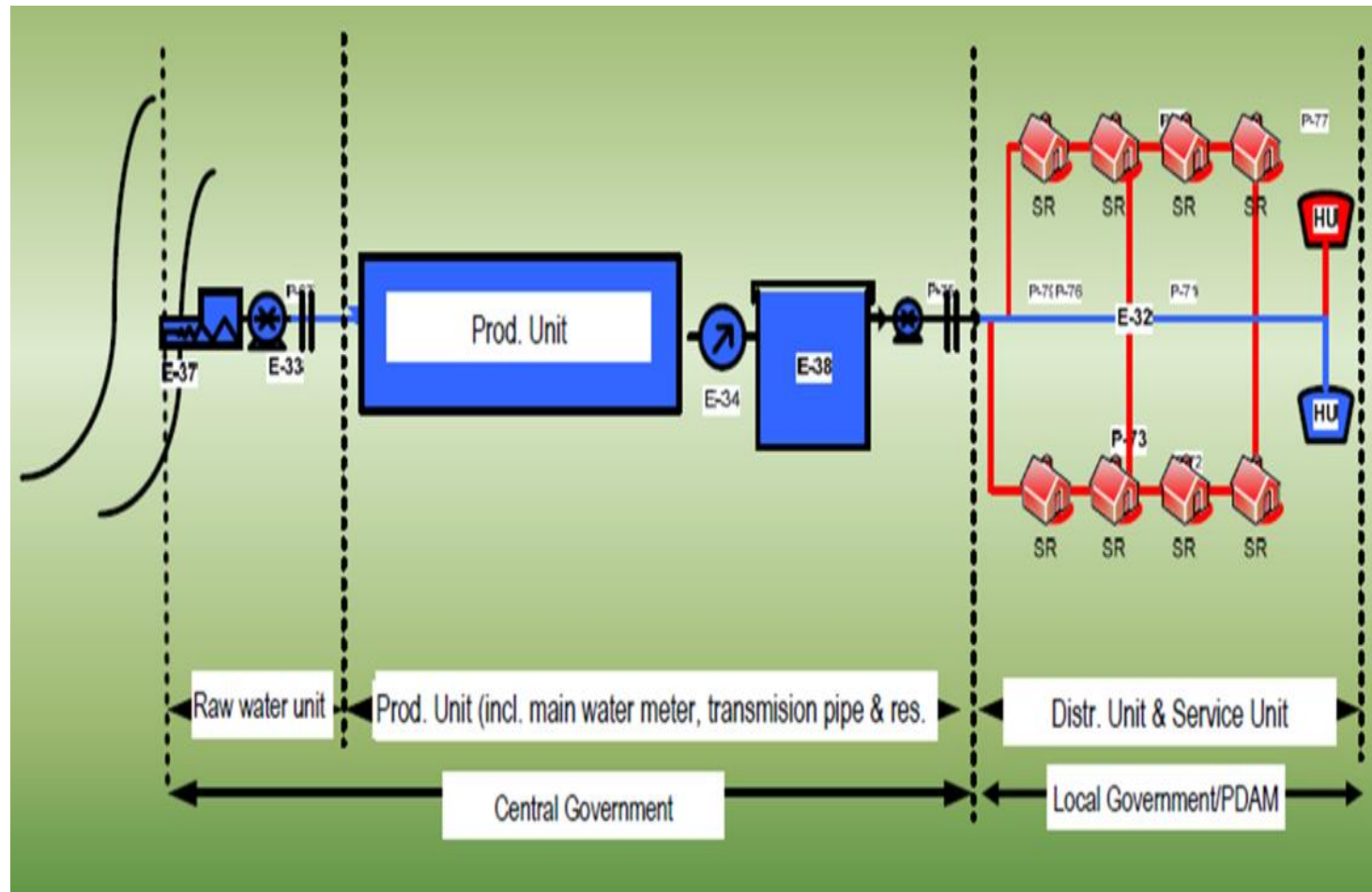
Cost Recovery Scenario

	Scenario A	Scenario B	Scenario C
O&M cost	900.000	900,000	900,000
Depreciation	400,000	400,000	400,000
Capital cost	500,000	500,000	***875,000
Total costs	1,800,000	1,800,000	2,175,000
Subsidy 1 (Capital cost)	*500,000	*125,000	*0
Subsidy 2 (Capital maintenance cost)	**400,000	**0	**0
Revenue requirement	900,000	1,675,000	2,175,000
Billed Water (m3)	3,120,000	3,600,000	4,080,000
Average Tariff	0.29	0.47	0.53
	Subsidy for depreciation (capital maintenance cost) and capital cost	Subsidy only for a part of capital cost	No subsidy ***Equity ratio is higher

*Subsidy 1 (Capital cost)	Any cost of capital (debt or equity) not charged to utility (or charged)
**Subsidy 2 (Capital maintenance cost)	Any direct budgetary subvention, usually for (deferred) capital maintenance
Capital cost	debt/(debt+equity) ratio = 50%, average cost of debt = 7.5%, average cost of equity = 2.5% or 10% weighted average cost of capital (to service debt & equity) = 5% or 8.8%

Source: Guidelines for User Fees and Cost Recovery - for Urban Water and Sanitation-
(by WPP, AfDB and International Cooperation Aid of Netherlands/Canada/Denmark)

Subsidy system in Indonesia



Source: Presentation by Ir. Tamin M. Sakaria Amin, Director of Water Supply Department, Ministry of Public Works, Indonesia, Jan 2010 in Yokohama Forum

Subsidy system in Thailand (PWA)

PWA PROJECT INVESTMENT PLAN

Type of PWA's Project :

There are 5 major investment projects of PWA (5 Project Categories)

Project Categories (5 Types of Investment Projects)	Proportion of Subsidy Gov.Subsidy : PWA Income)	
1. PWA Waterworks Expansion	75%	25%
2. Transferred WWKS Expansion	100%	-
3. Water Resources Development	50%	50%
4. Pipe Replacement	100%	-
5. Acceleration of Rural Water Supply Extension (only pipe laying)	100%	-

Source: Presentation by Mr. Pisit Hongvanishkuo, Director of corporate strategy Department, PWA on 24 Nov 2016 at PWA office

Comparison of two approaches

	Full cost recovery	Sustainable cost recovery
Characteristics and Advantage	- Consistent with economic principle = appropriate allocation of resources. - Consistent with cost of service = fair price for customer and provider. - Make sure the independent and autonomous management of provider = efficient and effective management	- Feasible in the real world.
Dis-advantage	- Not feasible in reality = not affordable for most customers	- Need strong intervention of Government = difficult of autonomous management= dependence of provider on Government - Difficult management of balance between tariff and tax

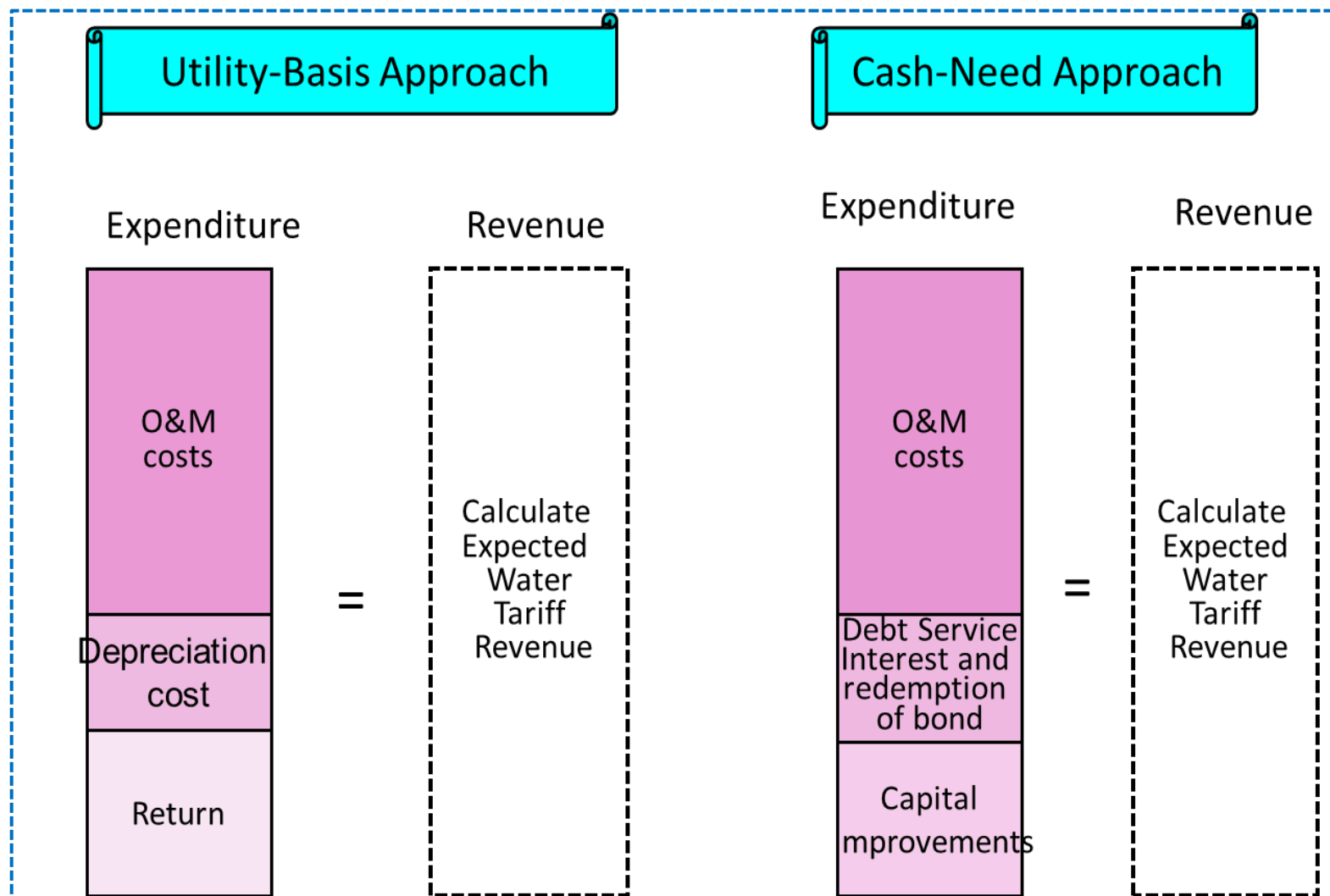
Comparison of two approaches

How to remedy dis-advantages

	Full cost recovery	Sustainable cost recovery
How to remedy dis-advantage	- Affordable rate setting = low price for family customers = Cross subsidy system or Government subsidy for family customer	- Establish autonomous management framework by government = predictable subsidy system for utility - Self-restraint (Self-control) to be efficient management by utility itself - Public awareness of the cost of service and the relation between the tariff and the tax

4. Cash-need approach vs. Utility approach

Two approaches to calculate total costs (revenue requirements)



An example of two approaches

Revenue Requirements Item	Cash-Needs	Utility
Operating Costs	\$10,000,000	\$10,000,000
Depreciation ^a		2,000,000
Return on Investment ^b		6,000,000
Debt Service ^c		
• Principal	4,000,000	
• Interest	7,000,000	7,000,000
Minor Capital Outlay	1,500,000	
Reserve Fund Contribution		
• Operating	500,000	
• Replacement	1,000,000	
• Expansion	1,000,000	
• Insurance	500,000	
• Rate Stabilization	500,000	
• Debt Service	1,000,000	
Total	\$27,000,000	\$25,000,000

^aOn an investment of \$100,000,000 (acquisition amount), with no contributions-in-aid-of-construction, and using a 2% composite depreciation rate.

^bRate of return is established at 6% (weighted cost of debt).

^cAssumes \$100,000,000 was bonded at 10% interest and amortized over 25 years with principal of \$4,000,000 and interest of \$7,000,000 during the rate recovery projection period.

Scenario C: No subsidy for private equity return, full Debt Servicing, good Non-Revenue Water and Bill Collection Efficiency

Example
of utility
approach

1	gives a resulting tariff of	0,53	CUs / m3	as shown in the calculations below	
	Tariff Calculations				
		%	Volume, m3	Currency Units (CUs)	
	Operating Costs Energy Chemicals Labour			400,000 100,000 400,000	900,000
	Depreciation (average Capital Maintenance Expenditure) Value of current Capital Employed			10,000,000	400,000
	Required Return on Capital Employed (ROCE) Debt / (Debt + Equity) Ratio Average Cost of Debt Average Cost of Equity Weighted Average Cost of Capital (to service debt & equity)	50 % 7,5 % 10 % 8,8 %			875,000
	TOTAL ANNUAL COST, CUs				2 175,000
	Government Subsidy 1 - any cost of capital (debt or equity) not charged to utility	0 %			
	Government Subsidy 2 -any direct budgetary subvention, usually for (deferred) capital maintenance			0	
7	Required Total Revenue from customers, CUs Water produced in year, m3 Non revenue water, % => m3 Billed water, m3 Bill Collection efficiency Water bills paid, m3	15% 95%	4 800,000 720,000 4 080,000 3 876,000		2 175,000
	Average Tariff Required total revenue divided by water billed, CUs/m3				0,53

Source: Guidelines for User Fees and Cost Recovery - for Urban Water and Sanitation- (by WPP, AfDB and International Cooperation Aid of Netherlands/Canada/Denmark)

JWWA: Manual for Water Tariff Setting

First Edition: July 1967, Revised: August 1979, Revised: October 1997, Revised: March 2008, Revised: February 2015

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1. General Provisions

(1) Objective

2. Revenue Requirements

(1) Basic Concept

(2) Period of Calculation of Water Tariff

(3) Operational Cost

- a. Personnel Cost
- b. Chemical Cost
- c. Electricity Cost
- d. Repair Cost
- e. Water Receiving Cost
- f. Depreciation Cost
- g. Asset Diminishing Cost
- h. Other Operation & Maintenance Cost
- i. Item of Deduction

(4) Capital Cost

- a. Interest Cost
- b. Asset Maintenance Cost

(5) Management Improvement Planning

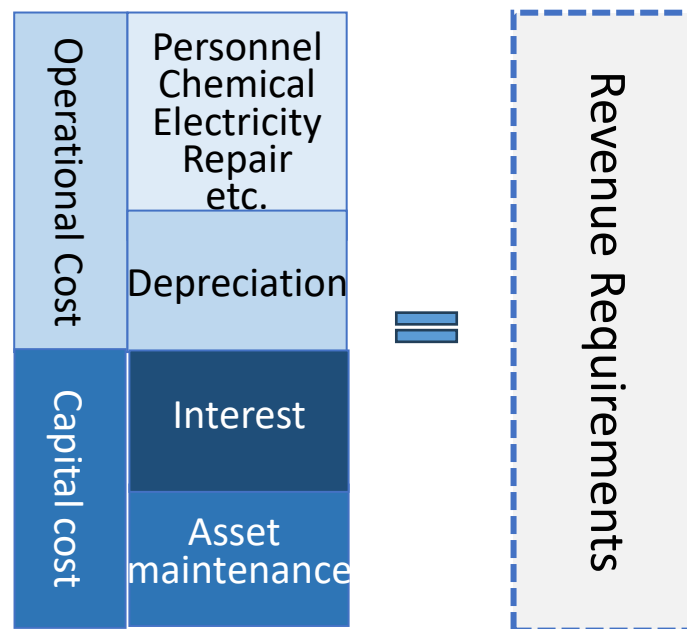
3. Water Tariff Structure

(1) General Provisions

a. Individual Cost of Service Principle

b. Special Measures

(2) Transitional Measures Adapting New Manual



Example of cash-need approach

Fiscal Balance Plan (2021-2025)

(Unit: Million yen) (単位：百万円)

division 区分 Fiscal Year 年度	Income 収 入						Expenditure 支 出					Deficiency of excess of income and expenditure 収支過不足額	Accumulated deficiency or excess of income and expenditure (estimated as the end of FY2020:984) 累積収支過不足額 (2年度末見込 984)
	Charges 料 金	Bond issues 起 債	National subsidies 国庫補助金	Money transferred from general account 一般会計 繰入金	Others その他	Total 計	Operating cost 営業費用	Interest expenses 支払利息	Principal expenses 元金償還金	Construction & improvement costs 建設改良費	Total 計		
2021	309,385	45,279	65	3,171	50,629	408,529	260,124	3,605	15,727	133,721 (3,848)	413,177	△ 4,648	△ 3,664
2022	319,580	43,527	157	3,270	47,176	413,710	257,801	3,252	16,880	134,633 (△ 10,674)	412,566	1,144	△ 2,520
2023	321,364	46,429	157	3,270	45,987	417,207	258,754	3,399	16,197	142,497 (△ 1,361)	420,847	△ 3,640	△ 6,160
2024	321,235	43,775	157	3,270	45,730	414,167	256,320	3,609	14,796	140,202 (1,588)	414,927	△ 760	△ 6,920
2025	321,625	40,804	157	3,270	50,800	416,656	257,923	3,839	11,055	136,919 (1,350)	409,736	6,920	0
Total 計	1,593,189	219,814	693	16,251	240,322	2,070,269	1,290,922	17,704	74,655	687,972 (△ 5,249)	2,071,253	△ 984	—

(Note 1) Bond issues and principal redemption money do not include those refunded.

(Note 2) Construction & improvement costs include amounts in the accumulated fund for the renewal of large purification plants, but do not include amounts from reversals of that fund or reversals of the reserve fund for facilities improvement of Okutama waterworks operations.

Comparison of two approach

	Utility Approach	Cash-Needs Approach
Advantage	- Less subjective. - Better matches cost of service with beneficiary use. - More consistent with generally accepted accounting principles.	- Consistent with governmental budget practices. - Easier to understand because it matches revenue with cash needs. - More flexibility - Consistent with bond repayment schedule.
Dis- advantage	- May generate insufficient or excessive revenue for cash needs. - Not consistent with governmental budget practices - Less flexibility - More difficult to explain to customers or plicy-makers	-May result in large net profits in the financial statement of P/L account. - More difficult to match the recovering capital costs in varying periods (more difficult on fair capital costs sharing among varying generations). -May be accepted as a valid method in specific case, not generally

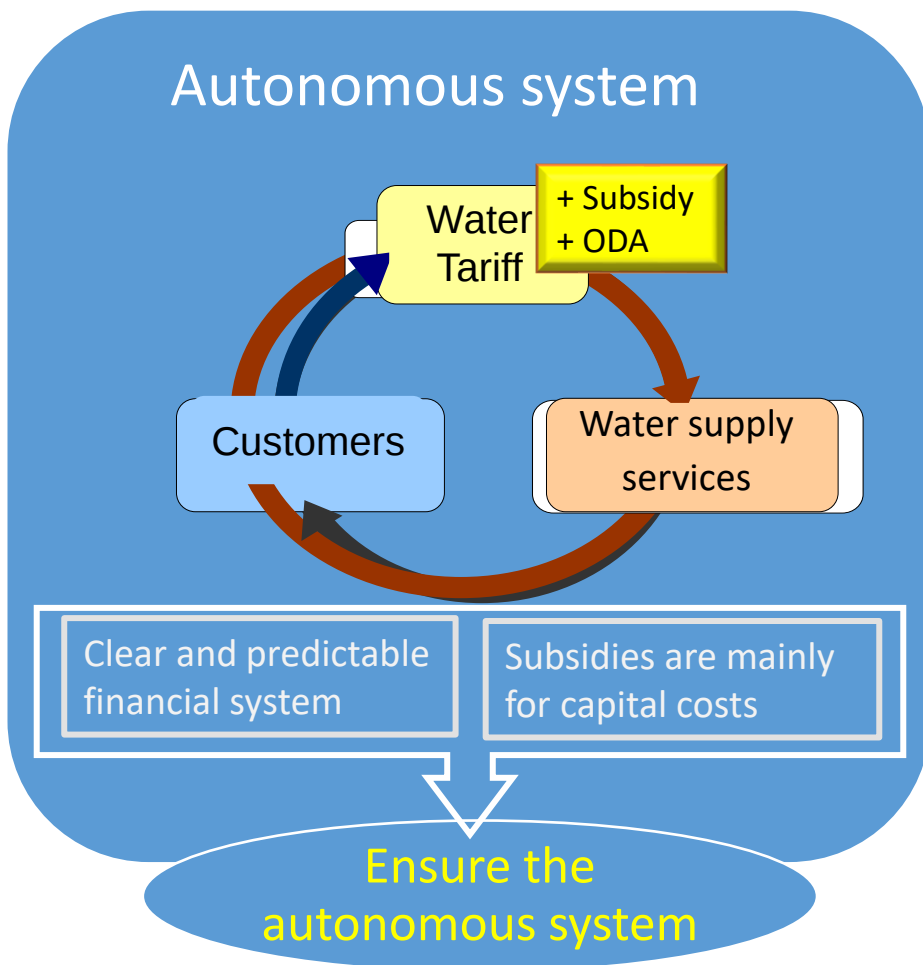
Arranged by author: Original source: (1) The Arthur Young guide to water and wastewater finance and pricing, George A. Raftelis, 1989 (2) Ministry of Soumu GoJ, March 2014, https://www.soumu.go.jp/main_content/000286182.pdf (3) JWWA Handbook for water tariff revision procedures, March 2017

Appendix

(i) Autonomous management

Autonomous management in water supply utility

-- Why autonomous is so important --



❑ Efficient management

- ✓ Cost-consciousness, work as cost-center
- ✓ Make efforts to obtain enough tariff revenues and to save costs in order to make ends meet

❑ Transparency for customers (Compliance)

- ✓ Clear responsibility in supplying water services
- ✓ Clear responsibility in financial management

❑ Motivation for staff

- ✓ Performance shall be clearer for the staff of water utility

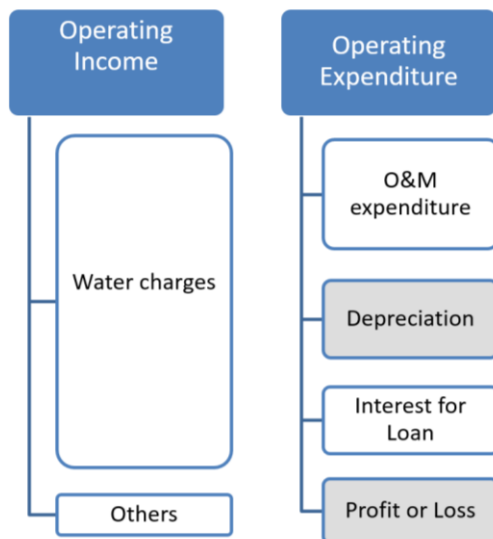
❑ Customer-oriented service, closer to customer

- ✓ Establish fair price
- ✓ Quick and fast correspondence and precise services

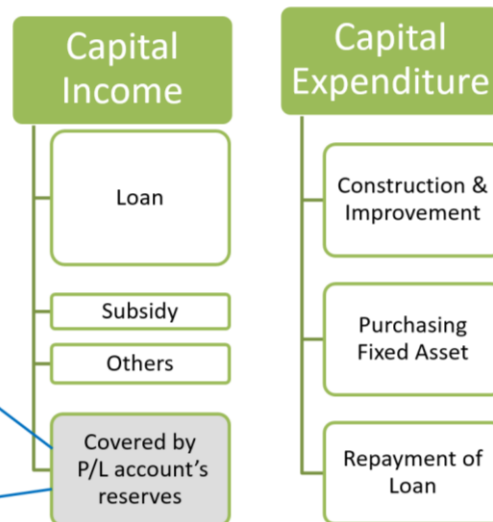
Appendix

(ii) Profit

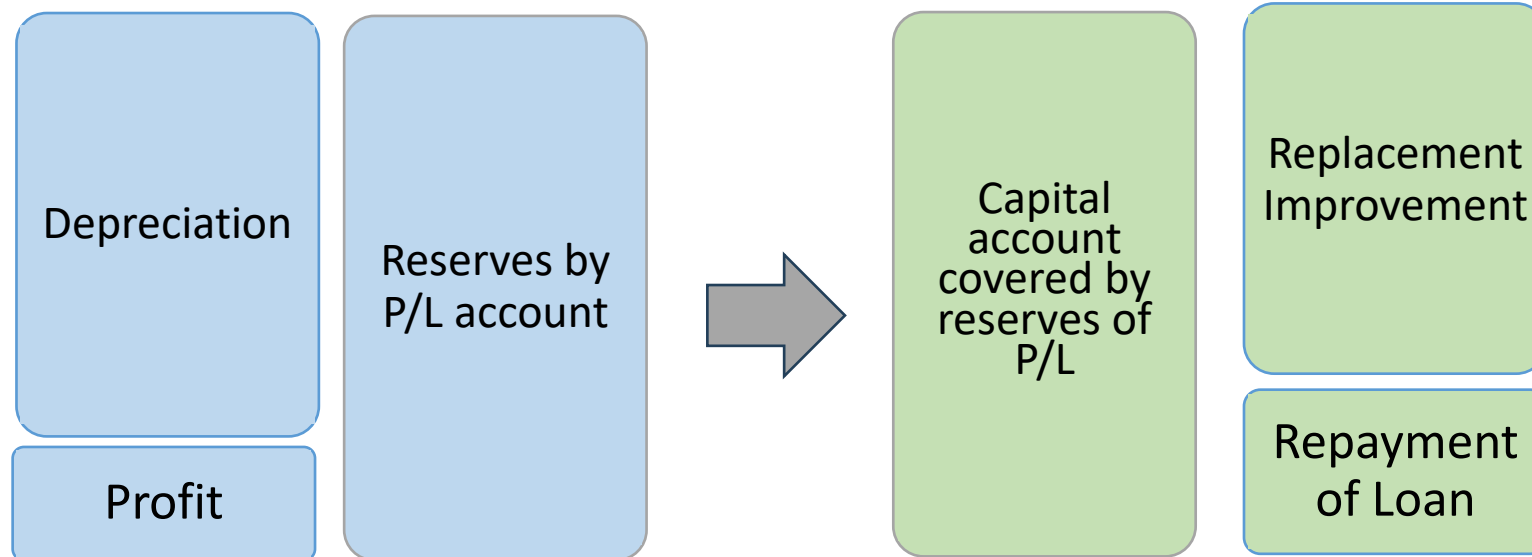
Profit and Loss Account



Capital Account



Profit is planned to use for financial resources of capital expenditures



Planned profit is used for financial resources of capital expenditures

Thank you for your attention

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