Week 11_Background Research

▼ Finding the Best Location for Pumping Stations in the Galovica Drainage Area of Serbia: the AHP Approach for Sustainable Development

The study aimed to determine the optimal location for pumping stations in the Galovica drainage area of Serbia, using the Analytic Hierarchy Process (AHP) method for sustainable development. AHP is a multi-criteria decision-making tool that considers both qualitative and quantitative factors.

The researchers identified six criteria for determining the best location: **land use, water quality, hydraulic capacity, energy efficiency, construction costs, and maintenance costs**.

▼ DROUGHT MANAGEMENT OF EXISTING WATER SUPPLY SYSTEM

The article presents the steps taken by Melbourne's water supply system to manage drought, including increasing storage capacity, reducing water demand through water conservation and efficiency measures, and implementing alternative water sources such as desalination and recycled water.

- **water demand of the region**
- **net revenue: water selling cost, electrical cost for pumping water**

▼ A case-based reasoning approach for estimating the costs of pump station projects

The study proposes a case-based reasoning (CBR) approach for estimating the costs of pump station projects. The study found that the CBR approach was able to accurately estimate the costs of pump station projects, with an average error of 4.9%.

Some typical factors and components which may be included in a reliability and availability evaluation are as follows:
(1) Water demand and emergency storage.
(2) Preventative maintenance.
(3) Wear/life expectancy of subcomponent.
(4) Repair.
(5) Power transmission.

(6) Parallel operation and stand-by equipment.
(7) Emergency power.
(8) Surge protection.
(9) Pumps, valves and piping
(10) Motors.
(11) Controls.
(12) Time factors.

Cost factors of pump station:

Table 3 Identified cost drivers.

No.	Cost driver
1	Project type
2	Location of project
3	Population no.
4	Total capacity of station
5	Distance between pump station and source
6	Type of pumps
7	No. of pumps
8	Individual pump capacity "Rate"
9	Head of pump
10	Pump arrangement
11	Type of pump motor
12	Rate of pump motor
13	Types of header pipes
14	Pump price

▼ Water Supply Alternatives for Drought by Weather Scenarios Considering Resilience: Focusing on Naju Reservoir

유역특성을 활용한 물수지 분석:

분석 자료를 통해 산출된 필요수량과 공급가능수량으로 물 부족량을 산출하였, 이를 토대로 초기 저수율별 임시대책 (관정개발, 양수기 설치)과 항구대책 (말단 물 부족지역 양수장 신설, 영산강-나주호 연계 양수저류)으로 나누어 비교하여 대안을 평가하였다.

Table 2 HOMWRS input data

Division	Naju reservoir
Benefit area	9,054 ha
Basin area	Total : 10,470 ha Direct basin : 8,460ha, Indirect basin : 2,010 ha
Meteorological station	Gwangju
Rainfall data	1967~2016 (50years)
Infiltration rate	3.4 mm/day
Waterway loss	15 %
Basin inflow estimated factor	1st basin : 2,900 ha, 2nd basin : 2,900 ha, 3rd basin : 1,881ha Subtotal : 7,681ha (Except full water area) Indirect basin : 2,010ha (Maximum 7 ㎥/s inflow)
Landuse of watershed	Rice field 11.3 %, Upland 3.8 %, Forest 78.3 %
Lower stream flow	34,000 ㎥/day
Ponding depth	Maximum : 60mm, Minimum 0mm

▼ 농림축산식품부 다목적농촌용수개발사업 환경평가 보고서

분야:

- 생물 다양성. 서식지 보전
- 지형 및 생태축 보전
- 주변 자연 경관에 미치는 영향
- 수환경의 보전
- 환경기준 부합성: 기상 및 대기질, 토양, 소음-진동
- 환경 기초시설의 적정성
- 자원 에너지 순환 효율성
- 사회경제환경과의 조화성

다목적 농촌용수 개발사업 평가서 링크

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