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# **Proposal for Agricultural Water Pricing Adjustments**

# Agricultural Resource Management Division

Irrigation Systems Program

SEPTEMBER 2019

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#### **1** Introduction

The purpose of this report is to examine the current financial state of the Hawaii Department of Agriculture's (HDOA) Irrigation Systems Program (Program) to determine if water delivery related rate increases are required and to develop an appropriate rate structure if it is determined that increased rates are necessary. The last water delivery rate increase was implemented in 2006.

The selection of appropriate rates involves tradeoffs between the statutory requirement to be selfsufficient and the promotion of diversified agriculture. Rates that are perceived as affordable to the farmer may not generate adequate revenues, whereas, rates that generate enough revenue may oppose departmental objectives to stimulate agricultural development and commerce. These factors must be carefully considered within the context of basic rate making objectives and the tradeoffs among them. This study attempts to examine these issues to arrive at a rate structure proposal that is adequate in generating enough revenue for the program to be self-sufficient yet is consistent with departmental objectives and fair to the users ultimately affected by these changes.

#### 2 General Information

#### 2.1 History of the State Irrigation Program

The Hawaii Irrigation Authority, created in July of 1953, was established to further agricultural development in the State by providing irrigation water for small-scale farming and overall agricultural production. Later renamed the Hawaii Water Authority (HWA), it served as program policy maker and overall administrator until it was abolished in 1961. After the HWA's abolishment, the program was transferred to the Department of Land and Natural Resources (DLNR).

In 1989, the legislature transferred the program to the HDOA, Agricultural Resource Management Division (ARMD). The transfer was done to consolidate agricultural resource functions within the HDOA to maximize the development of state-owned agricultural resources. The function of the ARMD is summarized in its current statement of objectives: "To assist in developing and managing the State's agricultural resources by ensuring adequate and reliable supplies of irrigation water, farmland, infrastructure, and produce processing facilities."

#### 2.2 The Irrigation Systems

The Irrigation Program (Program) under ARMD consists of five independently operated irrigation systems. General information about each system is summarized below:

	Waimea	Waimanalo	Molokai	Lower Hamakua	Kahuku
Tunnels, Ditches, Pipeline, Flumes (miles)	25	15	25	25	4
Farms Served	132	79	240	110 (Ag)	25
				51 (Pasture)	
Farm Land Supported (acres)	781	1,078	3,362	945 (Ag)	168
				5,862 (Pasture)	
Approximate Gallons Served in FY 2018	210,735	65,837	895,342	34,545 (Ag)	35,914
(thousands)				14,174 (Pasture)	

Table 2.1 Irrigation Program General Information

The Program can be compared to a public utility. On the cost side, the commodity conveyed by the irrigation system (non-potable water) is free from nature. There is no cost for the commodity itself. However, the infrastructure required to deliver the commodity bears perpetual operation and maintenance (O&M) costs regardless of how much of the commodity is delivered. Like any other type of public infrastructure, the irrigation systems will fall into disrepair if not properly maintained. Furthermore, the infrastructure of the irrigation system is highly susceptible to damage from unpredictable weather events such as storms, floods, landslides, etc.

On the revenue side of the Program, the supply of water is dependent on rainfall. In times of drought, the supply of water is low, and revenues are correspondingly low. In times of abundant rain, the consumption of irrigation water may be limited to the needs of farmers as dictated by market conditions. Nevertheless, it is important to understand that revenues for the Program are not consistent due to weather and economic forces, while expenses are generally consistent with a gradual upward trend due to O&M costs and collective bargaining labor costs.

#### 2.3 Current Rate Structure

The current Program rate structure consists of acreage assessments, a water delivery fee, and various smaller customer request fees. Acreage assessments are tied to the land area of an irrigation customer and are generally fixed on an annual basis. These assessments are intended to cover a fixed percentage of the operation and maintenance costs and should be adjusted annually. The water delivery fee is a variable revenue source tied to actual water usage. The water delivery fee is relied upon to fund all other expenses associated with the program, while at the same time discouraging wasteful water usage. The purpose of the two-tier structure is to maintain a combination of fixed and variable charges.

#### 2.3.1 Acreage Assessments

- Defined as levies on agricultural lands within an irrigation system for acquiring, establishing, and/or maintaining irrigation facilities and capabilities.
- Acreage is broken down into two main categories, pastureland for livestock grazing, and agriculture for all other uses.
- Agricultural acreage is charged at different rates depending on service area of the irrigation system. For fiscal year 2018, agricultural acreage assessments ranged from \$2.18 to \$14.07 per acre per month.
- Pastureland acreage applies only to the Lower Hamakua irrigation system and was assessed at \$0.38 an acre for fiscal year 2018.
- Acreage assessments are charged to all farms that are a part of the irrigation system irrespective of whether they choose to draw water from the system. The minimum acreage assessment is for two acres per month, which usually applies to those who choose not to draw water from the system but are within the irrigation district. They maintain the right to draw water in the future.

#### 2.3.2 Water Delivery Charges

• Defined as charges established by the Board of Agriculture to deliver irrigation water. Water rates are broken down into two classes, agriculture (and diversified agriculture) and livestock watering. The rate is billed in 1,000-gallon units.

- The current agriculture water rate is \$0.50 per thousand gallons of irrigation water for all irrigation systems except the Lower Hamakua irrigation system.
- The current Lower Hamakua water rate is \$0.20 per thousand gallons and only applies to eligible customers of the Lower Hamakua irrigation system. This water rate cannot be changed until July 1, 2025.

#### 2.4 Irrigation Systems Revolving Fund

Fees charged for acreage assessments and water delivery charges are collected and deposited in the Irrigation Systems Revolving Fund. The fund was established to provide for the operating, maintaining, and administering requirements of the Program. By state statute, a revolving fund must be self-sufficient.

#### **3 Study Methodology**

The basic methodology used in this study to determine financial requirements and an appropriate rate structure is as follows:

- Using historical data on the Program's operating costs, project future operating costs with respect to historical precedents and additional projected expenditures based on filling immediate, critical needs and operating the organization in a safe and professional manner.
- Assess all revenue generating sources by projecting future growth of these sources (i.e., chargeable acreage and water consumption) and then developing a rate structure that will generate enough revenue to balance projected expenses over a reasonable amount of time.
- Examine revenue related issues both supporting and opposing rate increases such as legislative intent, the current state of the Program, Program objectives, and impact on farmers.

#### 4 **Revenue Requirements**

#### 4.1 Revenue Requirements – Cash Balance Approach

The cash balance approach was used to determine the program's revenue requirements for this study. The basic objective of the cash balance method is to use the program's projected operating costs as a basis to determine projected revenue needs.

The cash balance basis is a straightforward approach that tallies all operating, maintenance, and administrative expenses not related to capital improvement projects. Capital Improvement Projects (CIP) are funded by general obligation bonds and may be co-funded by grants from the federal government. General obligation bonds are currently not re-paid by the program.

#### 4.2 Financial Projections

Projections of system revenues and expenditures, based on the current rate structure, were made for a 5-year period beginning with fiscal year 2020 and ending with fiscal year 2024.

#### 4.2.1 Revenue Projections

Revenue projections are based on historical data of system usage and financial plan projections, adjusted for the following factors:

- Acreage Assessments. The growth in acreage assessments for the Program is expected to be flat. The acreage within the Program is expected to remain stable with essentially 0% growth, as the systems are established and mature. With acreage projections in place, acreage assessment revenues are obtained by multiplying the authorized annual revolving fund budget by 30%. This figure is set each fiscal year by the state legislature.
- Water Charges. The average annual water consumption for all the irrigation systems for FY2018 is 1,242,386,874 gallons. The projected water consumption is shown in the table below:

FY20	FY21	FY22	FY23	FY24	FY25
1,263,801,150	1,267,981,095	1,272,579,035	1,277,636,768	1,283,200,275	1,289,320,132

Table 4.1
Water Use Projection, Gallons per Year

The water consumption projection was obtained from the financial plan used during the development of the FY 2020 and FY 2021 operating budgets. The sum of water revenues from all systems, minus a historically based provision for payment delinquencies (approximately 9% delinquencies), yields the consolidated revenue projections for the water delivery fees.

#### 4.2.2 Irrigation Program Cost Projections

• Irrigation Revolving Fund. Because operations and maintenance costs are largely independent from actual water consumption, program expenditures have been relatively steady during the years from 2014 through 2018 the average annual program expenditures over the last five years is \$1,243,979.

	FY14	FY15	FY16	FY17	FY18	Average
Total	\$1,281,229	\$1,209,484	\$1,184,497	\$1,228,913	\$1,315,773	\$1,243,979

Table 4.2 FY 14-18 Program Expenditures

• The projected program expenditures were developed using the average program expenditures and escalating that cost by three percent, to account for inflation.

Projected Program Expenditures								
FY20 FY21 FY22 FY23 FY24								
Program Expenditures \$1,319,760 \$1,359,352 \$1,400,133 \$1,442,137 \$1,485,401								

three percent, to account for inf

- Additional Expenditures. In addition to the program expenditures listed above there are additional expenditures that should be included in the program expenditures. These expenditures include the following:
  - Additional Labor. This is the labor costs funded by the general fund. These labor costs are associated with engineering, clerical and administrative positions performing work on the irrigation system. Adding the additional labor costs to the program expenditures will eliminate the general fund subsidies.
  - Vehicles and Equipment. The Program plans to replace vehicles and equipment currently in use and purchase new vehicles and equipment to maintain and/or improve the capabilities of the Program. Some of the existing trucks and sport utility vehicles are old and need to be replaced. The plan to purchase new mini-excavators, dump trucks, trailers, brush cutters and all terrain vehicles will increase the capabilities of the irrigation system personnel. This is estimated to be \$75,000 per year
  - On-call Contractor. The Program plans to procure construction contractors who will be available on short notice to perform work following disaster events or whenever work surpasses the capabilities of the irrigation system personnel. This is estimated to be \$200,000 per year.
- Since the growth trend is anticipated to be relatively steady, expenditure projections for future years were calculated by using a 3% inflation rate.
- Debt Service. The Program does not service the debt of any general obligation bonds that are used for capital improvement projects.

#### 4.3 Operating Revenue Scenarios

Four revenue scenarios were developed, one that maintains the status quo of required general fund subsidies, and the other that achieves 100% self-sufficiency. The revenue scenarios are as follows:

#### 4.3.1 Scenario 1 – All Program Expenses Covered by Revenues

The Program is currently funded by several funds in the ARMD budget. Although a major portion of the Program's expenses are covered by revenues, some operating and labor expenses are included in other funds. This scenario determines the delivery rate that would be required to cover all Program expenditures per Hawaii Revised Statutes (HRS) §167-11.

	FY20	FY21	FY22	FY23	FY24
IRRIGATION SYSTEM EXPENSES					
Program Expenditures	\$1,319,760	\$1,359,352	\$1,400,133	\$1,442,137	\$1,485,401
Additional Labor	\$931,470	\$959,414	\$988,197	\$1,017,843	\$1,048,378
Vehicles and Equipment	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Standby Contractor	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
TOTAL EXPENSES	\$2,526,230	\$2,593,767	\$2,663,330	\$2,734,980	\$2,808,779

 Table 4.4

 Scenario 1 – All Program Expenses Covered by Revenues

	FY20	FY21	FY22	FY23	FY24
IRRIGATION SYSTEM REVENUE					
Water Revenue	\$2,426,850	\$2,427,686	\$2,428,606	\$2,429,617	\$2,430,730
Acreage Assessment	\$330,495	\$330,495	\$330,495	\$330,495	\$330,495
TOTAL REVENUE	\$2,757,345	\$2,758,181	\$2,759,101	\$2,760,112	\$2,761,225
End of Year Balance	\$231,115	\$164,414	\$95,771	\$25,133	(\$47,554)

Water Rate = \$1.93/k gallons

Scenario 1 proposes a rate of \$2.00 per 1,000 gallons consumed. This rate is almost four times higher than the existing rate. The proposed rate should allow the Irrigation System Revolving Fund to realize a positive end of the year balance for the first three years and a negative balance for the last two. The cumulative projected balance at the end of five-year rate period is \$46,140. Irrigation water rates should be reevaluated before the end of the rate period to determine suitability.

## 4.3.2 Scenario 2 – All Program Expenses Covered by Revenues, Excluding Additional Labor

This scenario is the same as Scenario 1 but excludes the additional labor costs. Scenario 2 will continue to allow some of the irrigation system labor to be funded by the general fund.

	FY20	FY21	FY22	FY23	FY24
IRRIGATION SYSTEM EXPENSES					
Program Expenditures	\$1,319,760	\$1,359,352	\$1,400,133	\$1,442,137	\$1,485,401
Vehicles and Equipment	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Standby Contractor	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
TOTAL EXPENSES	\$1,594,760	\$1,634,352	\$1,675,133	\$1,717,137	\$1,760,401
IRRIGATION SYSTEM REVENUE					
Water Revenue	\$1,351,883	\$1,352,719	\$1,353,639	\$1,354,651	\$1,355,763
Acreage Assessment	\$330,495	\$330,495	\$330,495	\$330,495	\$330,495
TOTAL REVENUE	\$1,682,378	\$1,683,214	\$1,684,134	\$1,685,146	\$1,686,258
End of Year Balance	\$87,619	\$48,862	\$9,001	(\$31,991)	(\$74,143)

 Table 4.5

 Scenario 2 – All Program Expenses Covered by Revenues, Excluding Additional Labor

Water Rate = \$1.11/k gallons

Scenario 2 proposes a rate change of \$1.11 per 1,000 gallons of irrigation water consumed. Although the rate change is significantly less than Scenario 1, this scenario will not meet the self-sufficiency provisions of HRS §167-11.

The cumulative projected balance at the end of the five-year rate period is \$39,348.

#### 4.3.3 Scenario 3 – All Program Expenses Covered by Revenues, Phased Additional Labor

This scenario is like Scenarios 1 and 2 with the exception that the additional labor costs will be incrementally increased throughout the five-year rate period. The additional labor costs are phased incrementally into the rate analysis by including 1/5 of the projected additional labor costs for the first year, 2/5 of the projected labor costs for the second year, until the fifth year where the entire additional labor costs are included.

	FY20	FY21	FY22	FY23	FY24
IRRIGATION SYSTEM EXPENSES					
Program Expenditures	\$1,319,760	\$1,359,352	\$1,400,133	\$1,442,137	\$1,485,401
Additional Labor	\$186,294	\$383,766	\$592,918	\$814,274	\$1,048,378
Vehicles and Equipment	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Standby Contractor	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
TOTAL EXPENSES	\$1,781,054	\$2,018,118	\$2,268,051	\$2,531,411	\$2,808,779
IRRIGATION SYSTEM REVENUE					
Water Revenue	\$1,460,588	\$1,702,989	\$1,945,475	\$2,212,208	\$2,479,043
Acreage Assessment	\$330,495	\$330,495	\$330,495	\$330,495	\$330,495
TOTAL REVENUE	\$1,791,083	\$2,033,484	\$2,275,970	\$2,542,703	\$2,809,538
End of Year Balance	\$10,029	\$15,366	\$7,919	\$11,292	\$759
WATER RATE, \$/k gallons	\$1.20	\$1.40	\$1.60	\$1.82	\$2.04

Table 4.6 Scenario 3 – Phasing of Additional Labor

Scenario 3 propose an escalating rate fee of \$1.20 to \$2.04 per 1,000 gallons. The cumulative end of year balance for the five-year rate period is \$45,365. This scenario will eventually allow the Program to comply with HRS \$167-11 and will incrementally increase the water rates.

#### 4.3.4 Scenario 4 – No Rate Change

This scenario evaluates the impact of not increasing the water rate and maintaining the current rate of \$0.50 per 1,000 gallons. The additional labor, standby contractor and vehicle and equipment expenses were not included in this rate analysis, only the projected irrigation system revenues and program expenditures were included. The intent of this scenario is to show the effects of not increasing the water rates, while maintaining the same level of irrigation service.

Table 4.7
Scenario 4 - No Rate Change

	FY20	FY21	FY22	FY23	FY24
IRRIGATION SYSTEM EXPENSES					
Program Expenditures	\$1,319,760	\$1,359,352	\$1,400,133	\$1,442,137	\$1,485,401
TOTAL EXPENSES	\$1,319,760	1,359,352	1,400,133	1,442,137	1,485,401

	FY20	FY21	FY22	FY23	FY24
IRRIGATION SYSTEM REVENUE					
Water Revenue	\$615,109	\$615,945	\$616,864	\$617,876	\$618,988
Acreage Assessment	\$330,495	\$330,495	\$330,495	\$330,495	\$330,495
TOTAL REVENUE	\$945,604	\$946,440	\$947,359	\$948,371	\$949,483
End of Year Balance	(\$374,156)	(\$412,913)	(\$452,774)	(\$493,766)	(\$535,918)

Water Rate = \$0.50/k gallons

At the current rate of \$0.50 per 1,000 gallons of irrigation water, the end of year balance will be negative throughout the five-year rate period.

#### **5** Recommendations

#### 5.1 Recommended Scenario

This report recommends Scenario 3 as the preferred water rate program. This scenario will allow the Program to eventually be self-sustaining and operate without the uncertainties associated with obtaining funding subsidies.

The impact of the rate increase could be significant to the water users. Based on an average consumption of 142,020 gallons of irrigation water per month, the cost for water (including acreage assessment) will raise from \$111 per month (existing \$0.50/1,000 gallons) to \$210 per month at the beginning of the rate phasing period and \$329 per month in FY24, the end of the rate phasing period.

Scenario 3 provides a method to incrementally increase the irrigation water rate over the five-year rate period. The incremental increase in rates will allow the farmers adjust their finances and farming practices over a longer period.

Without the Program to supply agricultural water, the agricultural water demand would fall on the respective municipal, county water systems. Comparisons with municipal water systems indicate that county rates are significantly higher than HDOA rates, except for the City and County of Honolulu Board of Water Supply (BWS) and County of Maui Department of Water Supply (MDWS) (see table below).

Although monthly charges for BWS and MDWS may be lower, farmers will be charged a facilities impact fee if they do not currently have a potable water meter sized to suit their needs. The facilities impact fee for a 2-inch meter, most prevalent meter size on HDOA irrigation systems, charge by BWS and MDWS are \$64,865.60 and \$125,012 respectively. Other county water systems will have similar charges.

Contributing to the typical higher rates for municipal and county water systems are requirements for higher water quality. The additional costs of these requirements do not necessarily contribute to "added value" for most farmers. Furthermore, the county's agricultural water rates are lower than the actual cost incurred to deliver the water because agricultural water users are being subsidized by the potable water users. Unfortunately, the Program does not have this ability.

The following table is a comparison of estimated charges for municipal water departments agricultural water charges (includes water and service charges):

Table 5.1 Comparison of Estimated Monthly Agricultural Water Bills, 142,020 gallons/month

Agency	Monthly Bill
HDOA, Existing Rate	\$111
HDOA, Proposed Rate	\$210-\$329
County of Hawaii, Department of Water Supply	\$583
County of Maui, Department of Water Supply	\$279
County of Kauai, Department of Water	\$412
City and County of Honolulu, Board of Water Supply	\$311

Although the proposed rate increase is significant, the average agricultural water user's bill will still be lower on HDOA's system than half of the municipal and county water systems.

#### 5.1.1 Impact on Farmers

The primary opposing factor to increasing water rates is the adverse impact that higher production costs will have on the economic viability of farmers. Rate hikes may negatively impact production costs, profit margins, and ultimately the economic sustainability of some farmers using HDOA water. However, rate hikes may have a positive effect in the long-term. Rate hikes may cause a greater move towards agricultural efficiency and may cause under-performing agri-businesses to cease operations, thus providing opportunities for new entrants to agriculture and opportunities for successful operations to expand.

The specific impacts of rate hikes on farmers have not been determined due to the diversity of agricultural operations supported by HDOA irrigation systems. However, if rates are increased too much, too quickly, the impact on smaller farmers could be significant.

#### 5.1.2 Hurting Departmental Objective of Agricultural Growth

It is the primary goal of the HDOA is to promote agricultural growth within the State. Raising water rates could deter farmers from expanding existing operations and discourage potential farmers from starting new agricultural ventures. Fortunately, even with the proposed water toll increases, the Program's water rates will remain the most affordable alternative for agricultural irrigation water.

Nevertheless, the Program is beneficial to the agricultural industry and it is doubtful that privatization would yield better service and cheaper water rates. Whether or not the Program exists now or in the future, the agricultural industry will still require irrigation water.

#### 6 Summary

The HDOA's irrigation system program is meant to be financially self-sufficient. Unfortunately, due to the traditionally low rate structure, the Program has always had to rely on general fund subsidies from the state. General fund subsidies to the Program are not guaranteed and must be justified every budget period. To eliminate the need for recurring general fund subsidies and become self-sufficient, the Program must be allowed to make the following changes to its administrative rules and pricing structure:

1. Increase the baseline water toll rates to accurately reflect the actual cost of operating the irrigation system program.

2. Spread the increase in water toll rates over several years in a set schedule to help farmers plan and adjust to new water toll rates.