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Mr. Daniel M. Nzonzo, H.S.C
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Having come to the end of financial year 2021/2022, we credit all the Unyunyizi News milestones to our esteemed reader. This newsletter has grown exponentially by dealing with matters irrigation through outstanding journalistic work, by asking clever and insightful questions, by having excellent and substance writing, and by thinking outside the present paradigm.

Readers have shared views, stories, encouragement and criticism. Thank you. We encourage you to keep the conversation running as we enrich this publication with your knowledge and expertise in matters irrigation and service delivery. Irrigation development and management of irrigation services in Kenya are key

to the development of the national economy.

In this issue, we walk you through the journey of delivering the 15.6 million cubic-metre Thiba Dam. We also look deeply into the coming to life of Mwea Irrigation Scheme up to now, Irrigation interventions for food security and community resilience against climate change and share how we celebrated 'The World Environment Day' and the nuggets gathered from a Green Growth and Circular Economy Training at Kenya School of Government.

We continue our segment on demystifying irrigation terms with a focus on "Water Impounding" and engage with Eng. Stephen Mutinda, REng, MIEK, the Project Manager for the Thiba Dam, in the One on One segment.

For entertainment, we have a crossword puzzle capturing irrigation terms.

Enjoy.

To download a copy of our Newsletter and share feedback, visit our website www.irrigation.go.ke/Newsletter/

Chairman's Note



Chairman of the Board

Hon. Eng. Joshua Toro, REng, MIEK

Congratulations to my Board, the management, staff, farmers and all stakeholders, including the Irrigation Water Users Association (IWUA) for the noticeable impact irrigation is creating in our country. Your efforts have been recognised and reflected in the Annual Performance Evaluation report for the Financial Year 2020-2021 published by the Public Service Performance Management and Monitoring Unit.

The Authority emerged as the best performing State Corporation in the 2020-2021 financial year with an excellent score

of 1.889 in service delivery. This covers operational performance, absorption of externally mobilized funds and resources allocated by the Treasury, and delivery on its mandate. In the execution of core mandate, it was second-best with an excellent score of 0.8400. This was out of the 232 State Corporations whose performance was evaluated.

During the Fourth Quarter of the Financial Year 2021/2022, the Authority continued to implement irrigation projects across the country. Key among these projects was Thiba Dam that was completed during the third quarter and had its diversion gate closed to mark the official commencement of water impoundment on May 24, 2022.

Thiba Dam will put an additional 10,000 acres under irrigation in Mwea to make the scheme have a cumulative 35,000 acres and introduce double cropping of 35,000 acres resulting in having 70,000 acres under irrigation in a year. This will cause an increase in rice production from the current 114,000 metric tonnes to 200,000 metric tonnes.

The plans of introducing double cropping are under way at Mwea Irrigation Scheme

with the objective of increasing crop intensity and acreage under irrigation through the Thiba Dam. The dam's water capacity is 15.6 million cubic metres.

The Authority is also on course with the implementation of Household Irrigation Water Storage Programme, which incorporates construction of water pans and rehabilitation of community dams. The project is tailored to yield more acreage under irrigation through use of surface run-off water harvested from rainfall.

Under the Expanded National Irrigation Programme (ENIP), the Authority is executing more than 200 irrigation projects across the country, putting more than 259,058 acres under irrigation and benefiting 108,275 farmers.

The Authority is studying potential areas to be opened up to irrigation and sustainable irrigation developments as well as educating stakeholders for sustainability.

To the Board, the management, our staff, farmers and all partners in this noble cause, a big thank you for profound contribution to the irrigation journey this far.

Word from the CEO

In a special way, I salute the National Irrigation Authority fraternity for clinching Position One with a score of 1.889 in the 2020/2021 Performance Contract as per the report released by Public Service Performance Management and Monitoring Unit. Operational performance, absorption of externally mobilized funds and resources allocated by the Treasury and more delivery on its mandate were the areas under study and registered this impressive score. We are on the right track, team. Congratulations!

In the fourth quarter of the Financial Year 2021/2022, the Authority launched two irrigation projects, namely Navakholo Irrigation Project in Kakamega County and Kahawa Earth Dam Water reticulation system in Nyamira County to increase area under irrigation. Upon completion, the projects will directly benefit 2,000 households by irrigating 1,200 acres of horticultural crops such as cabbages, kales, bananas and tomatoes.

In the quarter, I also officiated the lowering of Thiba Dam gate to mark the official impounding of the water in



Mr. Gitonga Mugambi, E.B.S
CEO National Irrigation Authority

the dam, which is expected to ease the problem of water shortage in Mwea Irrigation Scheme, support an additional of 10,000 acres of rice and help farmers practise double cropping in a year. After two weeks of impounding water in the dam, I was accompanied by the Irrigation Secretary, Mr. Aboud Moeva, to inspect the progress of the rising water levels, which had reached the top of the inlet tower. We witnessed the opening of the gates to allow the water back into the stream, which takes the water into farms

through canals.

In the quarter, the Authority hosted the President's Delivery Unit Secretary Andrew Wakahiu, MBS and Public Service Commissioners Amb. Anthony Muchiri and Dr. Nancy Mwandia, MBS, who were inspecting the progress of Thiba Dam. They picked out the successful completion of the dam ahead of time at less cost, saving KSh400 million. Budgeted to cost KSh8.2 billion, it was delivered at KSh7.8 billion, a feat I attribute to effective management and enhanced supervision.

The Japan Ambassador to Kenya Mr. Okaniwa Ken also paid a courtesy call in Ahero Irrigation Scheme, Kisumu County, to assess the progress of the implementation of Capacity Development Project for Enhancement of Rice Production in Irrigation Schemes in Kenya (CaDPERP). He discussed new areas of collaboration in the expansion and rehabilitation of western Kenya irrigation schemes, as well as enhancing the capacity of farmers to competitively produce rice of high quality.

I look forward to a great new financial year. Together we will achieve more.

The Journey of Mwea Irrigation Scheme



By **Brenda Muli**

After the British had established the colony and protectorate in Kenya in 1949, they were convinced the Tebere section was suitable for rice farming and prepared test plots. The Mwea Scheme initially occupied about 65 acres in the Tebere section and the first crop was harvested from the trial plots in the early 1950s. It is during this period that the Mau Mau war started and the colonial government declared the 1952 Emergency as they attempted to suppress the increasing demand for Independence.

Operations were conducted to kill or capture anyone who was against the colonial Government, and those captured alive were taken to detention camps where they were tortured and forced to work. Many of the detainees were taken to Mwea, which had seven detention camps. While there, they were forced to level land in Tebere as well as dig canals to divert water from River Nyamindi and River Thiba to irrigate rice. "We used to dig canals all the way from Karoti and later on I, together with 207 labourers, were moved to Karaba camp to build



Levelling of rice fields by detainees in Mwea Irrigation Scheme

gathigiriri village, "explains Mr. Kiarieh Ng'ang'a, who was among the detainees taken to Mwea in 1954.

The detainees did not have experience in irrigation infrastructure, but were trained by the British and most construction projects were complete by 1960. Unfortunately, many detainees died while working there because of snakebites, diseases such as malaria, burnout and starvation. Some detainees were tortured to the point where they lost their sight, while others became physically disabled due to the brutal beatings they were given by British soldiers.

However, not all the farmers were detainees as some were employed to work there. The colonial Government would forward letters to chiefs in Central Kenya, who were outside Kirinyaga County, to forward a list of people to work at the scheme for small wages to increase the number of workers.

In 1963, after Kenya gained Independence, the Mwea Irrigation Scheme was taken over by the Government of Kenya and National Irrigation Board, now National Irrigation Authority (NIA).

The organization defined what was to be done, grown, when and how and where to sell the crops. Since the Government of Kenya took over, the Scheme has been treated as a flagship project by all subsequent governments.

In 1969, the first President of Kenya Mzee Jomo Kenyatta opened a rice mill to enhance efficiency and production. He also oversaw the construction of the Mwea Irrigation road to improve accessibility and movement within the project. The programme thrived and acreage under rice increased.

Daniel Toroitich arap Moi, the second President, oversaw the reconstruction of the water system as well as the construction of new waterworks and canals. In addition, he replaced the rice mill Mzee Kenyatta installed with two new ones in 1996. He initially proposed the building of Thiba



Detainees Harvesting rice in Mwea Irrigation Scheme



Farmers working on rice field in Mwea Irrigation Scheme

Dam, but the project stalled due to disagreements between rice growers and the Government.

During Mzee Moi's regime, the NIB, now NIA, was fully in charge of the scheme, until 1998 when farmers demanded rice-growing deregulation. In 2002, a majority of the roles were given to farmers such as determining the irrigation activities and cropping programmes.

Despite the changes made, the NIA continues to conduct research on high-quality rice and assist farmers in adopting technologies such as mechanical harvesting.

When Mwai Kibaki became President in 2002, his Government expanded Mwea Irrigation Scheme. During his presidency, through NIA, Mwea farmers got more training, helping them to take up more roles in the management of the scheme.

Since Hon. Uhuru Muigai Kenyatta, E.G.H, took over as the Commander-in-Chief of the Defence Forces and fourth President, Mwea has been a key part of the government's push to improve food security. The rice mill, which was installed in 1996, was upgraded in 2014.

President Kenyatta has overseen the

completion of Thiba Dam, which will enable 10,000 more acres to be put under irrigation, increasing the Scheme's total size to 35,000 acres. The dam, which has a capacity of 15.6 million cubic metres will help to stabilise water supply to the project, allowing farmers to double rice crop production. As a result, rice yield is expected to increase from the current 114,000 to 200,000 metric tonnes. Thiba Dam is also expected to boost local revenue from KSh10 billion to KSh16 billion yearly while producing 100,000 employment opportunities.

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Thiba dam has a capacity of 15.6 million cubic meters. It will help in stabilizing water supplies in Mwea Irrigation Scheme allowing farmers to double rice crop production. As a result, rice yield will increase from the current 114,000 to 200,000 metric tons. It will also boost local revenue from Ksh 10 billion to Ksh 16 billion yearly while producing 100, 000 employment opportunities.



Thiba dam in Kirinyaga County

Thiba: The making of Kenya's first irrigation dam



Eng. Charles Muasya, REng, MIEK, Deputy General Manager Infrastructure and Irrigation Development Services at National Irrigation Authority.



By **George Maina**

A mega project that has generated spirited discussions around irrigation success, agriculture, and food security in Kenya and the region, Thiba Dam has been completed. We sat down with the Deputy General Manager; Irrigation Infrastructure Development Services, Eng. Charles Muasya, for its facts and figures. Here are the excerpts.

How was Thiba Dam conceptualised?

The construction of Thiba Dam was informed by a study carried out in 1988 which also proposed the rehabilitation

of the existing Mwea Irrigation Scheme and expansion by 10,000 acres within the Mutithi area. In addition, there was a recommendation to do an inter-basin water transfer through the construction of a link canal from Nyamindi River to Thiba River. The link canal was constructed in 1991 and design work of the dam completed in 2012.

“

Eng. Charles Muasya

The magic behind completion of Thiba dam within the set timelines is attribute the achievement to proper contract management, administration and proper institutional implementation mechanism at the Authority.

When did the construction start and end?

The construction started on March 1, 2018 after the completion of a detailed design of the dam and irrigation area and completed on May 2022.

Any challenges encountered during the whole process of construction?

Yes, there were a few, including budget, tax exemptions and ground rock formation of the site. However, with team work and right expertise, we were able to get solutions to all the challenges.

Please take us through the stages of filling the dam to its capacity of 15.6 million cubic metres.

The capacity of Thiba Dam is 15.6 million cubic metres including a dead storage of four million cubic metres. Dam filling commenced on May 24, 2022 when the stop log gates were closed. The filling of the dam will depend on inflow from the catchment and the water demand on the Scheme downstream. With the current inflow of 4.5m³ per second, the dam, without any discharge downstream, takes 2.5 months to fill but with an inflow of 9m³ per second, in a normal rainy season, the dam can fill in slightly more than a month.

At what point will Mwea Irrigation Scheme farmers start using its waters for irrigation?

The release of water for irrigation activities on the Scheme has started and is being guided by demand. Water is released through the regulated outlet gates.

Which milestones will the Authority achieve in Mwea Irrigation Scheme with water from the dam?

Before the construction the dam, the Authority was able to command 25,000 acres of rice production with water from Nyamindi and Thiba River. The 25,000 acres produced around 114,000 metric tonnes of rice with an economic value of KSh10 billion per year. About 250,350 job opportunities were also created in the farms. Now with water from the dam, the Authority will be able to command an additional 10,000 acres, hence increasing the production by 86,000 metric tonnes, grow the

economy of Kenya by an additional KSh6 billion per year and create an additional 100,000 jobs in the farms.

What was the magic behind completing Thiba Dam within the set timelines?

I will attribute the achievement to proper contract management, administration and proper institutional implementation mechanism at the Authority.

Now that the facility is complete, which is the next big dam project?

Currently, we do not have any under construction but the Authority is pursuing several dam projects, namely Thuci, Gogo, Rwabura and Thiririka.

Is this your main achievement in your engineering career while serving under the Authority?

Indeed, it is the biggest achievement. I am very happy that I was part of the team involved in the implementation of the project.

What message do you have for the team behind this dream?

First of all, congratulations for the achievement. Let us maintain the same



Thiba Dam in Kirinyaga County during its initial construction stages

spirit to ensure that we perform even better in the future. The list is endless, but allow me to name a few people: Mr. Gitonga Mugambi, EBS – the Chief Executive Officer of NIA; Eng. Loise Kahiga, the Chief Engineer (Planning and Design); Eng. Stephen Mutinda, Senior Irrigation Engineer/Project Manager at Thiba Dam; Mr. Innocent Ariemba, the Mwea Irrigation Scheme Manager; and all the contractors and consultants. Thank you for role played

and continue to play.

Message to Mwea farmers?

Now that you have sufficient stored water, use it efficiently. Play your rightful roles to make Kenya food-secure.



Completed Thiba Dam in Kirinyaga County

Thiba Dam hosts World Environment Day county fete



By **Grace Ndung'u**

The National Irrigation Authority (NIA) joined the world in commemorating this year's World Environment Day by hosting the Kirinyaga County celebrations at the site of Thiba Dam. Falling on June 5, this year's celebrations brought together key stakeholders, among them the National Environment Management Authority (NEMA), Kenya Forest Service (KFS) and residents to plant 2,000 fruit-tree seedlings and indigenous trees at the Thiba Dam project site. A project implemented by NIA, the dam has a water holding capacity of 15.6 million cubic metres.

This year's celebrations under the slogan 'Only One Earth' were hosted by Sweden and focused on "Living Sustainably in Harmony with Nature". The world agreed that the planet is our only home whose finite resources humanity must safeguard and use sustainably.

Under environment, the Authority is implementing measures to protect the environment, mitigate climate change and take active part in improving the



Nippon Koei & GIB Africa Eng. Jacob Hamisi (R), An administrative Officer at the Authority Florence Ngungu (2nd R), Environmental Officer at the Authority Grace Ndug'u (2nd L) and Environment and RAP expert Joseph Wangamati (Left) planting a tree during the event in Thiba dam

national forest cover by, among others, honouring the national strategy of achieving and maintaining more than 10 percent tree cover by this year. This has been achieved through fruit-tree seedlings initiative whose ultimate objective is to increase the national forest cover from seven percent to 10 percent. In the Fourth Quarter of last financial year, the Authority distributed 46,550 fruit seedlings in Meru, Kitui, Machakos, West Pokot, Kirinyaga and Tana River counties. Cumulatively, in the 2021/2022 financial year, the NIA

distributed 104,050 fruit-tree seedlings across regions. Grafted Hass avocado, macadamia, cashew nuts, mango, and coconut are some of the seedlings.

Further, the NIA recognises that irrigation and irrigation development may hurt the environment, hence the focus on minimising the negative environmental and social impacts while enhancing protection and conservation.

To this effect, the Authority is focused on climate-smart farming using techniques like precision farming that is friendly to the environment in Galana/Kulalu Food Security Project, Bura Irrigation Scheme and Tana Irrigation Scheme.

As responsible stewards of the environment, the NIA has an environment and social unit that periodically monitors and reports on environmental and social performance in all its projects to ensure environmental and social issues are addressed promptly for mitigation.

As António Guterres, the United Nations secretary general has said, "the only way forward is to work with nature, not against it".



Environment Officere at National Irrigation Authority (NIA) Grace Ndung'u (Left) and an Administrative Officer at NIA Florence Ngugu (Right) participate in the tree planting exercise in Thiba dam.

Pictorial



1. National Irrigation Authority CEO, Mr. Gitonga Mugambi, EBS, (right) launches the official impounding of water in Thiba Dam, Kirinyaga County on May 24, 2022.
2. National Irrigation Authority management, staff, Mwea Irrigation Scheme farmers, local leaders, JICA officials and contractor witness the dam gates official closing to start water impounding inside Thiba Dam. **INSERT:** National Irrigation Authority CEO, Mr. Gitonga Mugambi, EBS, operates a crane to lower Thiba Dam gate to officially start the impounding of water.
3. National Irrigation Authority CEO, Mr. Gitonga Mugambi, EBS, (second right), Deputy General Manager Infrastructure and Irrigation Development Services Eng. Charles Muasya (second left), Irrigation Secretary, Mr. Aboud Moeva (left), Eng. Stephen Mutinda (right), Thiba Dam project manager, and other officials from the Authority assess the progress of the rising water levels at the dam on June 8, 2022. This was two weeks after official commencement of water impounding at Thiba Dam.
4. President's Delivery Unit (PDU) secretary Andrew Wakahiu, MBS, (third left), Public Service Commissioner Amb Anthony Muchiri (centre), Dr. Nancy Mwiandi, MBS, (right) and other staff from PDU are led by Deputy General Manager



Infrastructure and Irrigation Development Services at NIA Eng. Charles Muasya and Deputy General Manager, Operations, Eng. Vincent Kabuti to inspect the progress of Thiba Dam on June 10, 2022.

Pictorial



5. The Deputy Head of Public Service Mr. Wanyama Musiambo, C.B.S presenting a Presidential National Honor Award of Second class: Elder of the Order of the Burning Spear (E.B.S) to Mr. Gitonga Mugambi, E.B.S, Chief Executive Officer at National Irrigation Authority at Harambee House following proclamation.

6. The Deputy Head of Public Service Mr. Wanyama Musiambo, C.B.S presenting an Order of the Grand Warrior (O.G.W) of Kenya award to Eng. Vincent Kabuti, O.G.W, the Deputy General Manager, Research, Planning and Strategy at National Irrigation Authority at Harambe eHouse following proclamation.
7. Japan Ambassador to Kenya Mr. Okaniwa Ken (centre) , Western Kenya Irrigation Scheme Manager and Nyanza Regional Coordinator, Mr. Joel Tanui and other officers from Ahero Irrigation Scheme at the scheme’s intake on June 2, 2022. The envoy had paid a courtesy call to assess the progress of the CaDPERP project.

8. Celebration of the 28th Africa Public Service Day at Kenyatta International Convention Centre under the theme, ‘Celebrating Public Service Day Transformation: Ten Years and Beyond’. The NIA joined the country in the celebrations.

Staff news.



“We Celebrate Your Dedication”

The Board of Directors and the Management congratulates all staff and stakeholders for putting the NIA on the map of honour, emerging position one with a score of 1.889 in the 2020/2021 Financial Year Public Service Performance Management and Monitoring Unit scoring. The score pertains operational performance, absorption of externally mobilised funds and resources allocated by the Treasury and more delivery on its mandate.

This could not be possible without everyone giving your all and playing your part diligently. You are a true proof that good things come to those who are willing to sacrifice to reach a worthwhile goal.

To this, we celebrate your dedication.

We congratulate our Head of Corporate Communication for earning the Head of State Commendation award.
MR. DANIEL M. NZONZO, H.S.C



Congratulations Carol Chisutia for the delivery of your baby boy. Wishing you good tidings in the new motherhood journey. May the baby grow strong and healthy.



Stephen Apome Farewell

A man of many great hats, is how he has been honoured. The Peace Maker. The Performer. The Team player. Problem solver. The list is endless. You were loved and valued by many; big and small, young and old. Your hearty laughter; man Gerry

The experience, milestones and great memories made in your 17years of service at National Irrigation Authority remain evident and engraved in our souls.

We choose to accept your departure on May 16, 2022 at 8:04am thanking God for the time He gave us to be together as colleagues. We echo your chat with God earlier that morning where you were heard thanking Him; "Erokamano Nyasaye, Erokamano Nyasaye" (Thank you God, thank you God)

Farewell thee Apome. Till we meet again



Aerial view of completed Thiba Dam in Kirinyaga County.

Irrigation interventions for food security and community resilience against climate change

By Eng. Vincent Kabuti, O.G.W
and Daniel M. Nzonzo, H.S.C

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*These initiatives, saw the Authority being ranked as the best performing Government agency in the 2020-21 Performance Contract with an **EXCELLENT** composite score of 1.8890 as a demonstration of competency, professionalism and diligence in executing the irrigation mandate to change people's lives*

The very basic foundation of irrigation is to increase productivity by sustainably meeting crop water requirements. This gives farmers an opportunity to plant crops all year round without depending on rainfall. This is the reason the Government of Kenya is firming up irrigation as one of the priorities for agriculture to increase productivity, achieve food security and economic prosperity as envisioned in a number of policies and innovations, including the Big Four Agenda and Vision 2030.

However, the climate change is posing serious challenges to the irrigation sector and, therefore, Kenya's sustainable development. Climate change is leaving in its wake prolonged droughts and severe floods that destroy crops and irrigation infrastructure. Indeed, water harvesting for irrigation is one of the effective adaptation strategies in building resilience for communities against climate change. The National Irrigation Authority (NIA) is the government agency mandated to execute these interventions.

The agency became an Authority in 2019 after its mandate was expanded through Irrigation Act No. 14 of 2019 whose objective is to provide for the development, management and regulation of irrigation, to support sustainable food security and socioeconomic development in Kenya.

One of the projects where water harvesting and storage has been enhanced is Mwea through construction of Thiba Dam. Mwea, in Kirinyaga County, is the largest rice-producing irrigated

area that is 100km northeast of Kenya's capital Nairobi. The scheme currently accounts for more than 84 percent of locally produced rice. Its irrigation water is sourced from two rivers: Nyamindi and Thiba whose catchment is Mount Kenya.

Since its establishment in 1954, among the development partners who have played a key role in enhancing productivity of the Mwea Irrigation scheme is the Government of Japan through Japan International cooperation Agency (JICA).

Mwea Irrigation scheme started from 5,000 acres. Its modernisation/rehabilitation in 1989-1991 with assistance from JICA increased the area under irrigation to 16,000 acres and progressively to 25,000 acres. The phase II of the Mwea Irrigation Development Project included the construction of the Thiba Dam, Kenya's first ever irrigation dam that was completed in May 2022.

Impounding of water in Thiba Dam. The objective of Thiba Dam is to create an irrigation water supply buffer along the Thiba River to meet the scheme crop water requirements, especially during drought events. The dam comprises

40-metre high clay centre core rockfill dam with a 1.1km crest length to store 15.6 million cubic metres of water seen in the two-kilometre fetch. The dam has a 68.5m wide side channel spillway designed for 1/500 year return flood with a discharge of 581m³/s. The dam outlet is a submerged intake with a 1.5m steel pipe that has a maximum discharge of 22.9m³/s with the irrigation supply discharge set at 6.88m³/s. To sustain the downstream ecosystems and ecology, an environmental flow of 2m³/s has been provided. Accumulation of silt in the dam is controlled using a 45,000 cubic metre sand trap dam made of 11.2m high 126m long gravity concrete dam.

Thiba dam will not only expand irrigation area in the scheme but also support crop intensification, diversification, increase Kenya's food basket and improve livelihood. Yields will help reduce rice imports and spur economic growth as envisioned in the Big 4 agenda and Vision 2030.

After the successful implementation of the mega dam, area under rice production in Mwea is set to increase to 35,000 acres, translating to additional 10,000 acres under irrigation and about 50,000 residents benefiting directly. The dam will further enable the scheme to undertake double rice cropping, increasing rice production from the current 114,000 metric tonnes to about 200,000 metric tonnes per year. This will inject an additional KSh6 billion into the economy of the Kirinyaga County and Kenya at large with the additional 86,000 metric tonnes of rice increasing local rice earnings from KSh10 billion to Sh16 billion per year.

The NIA is working with researchers to pick climate-friendly rice production in Mwea to mitigate against production of greenhouse gases. In response to the effect of paddy rice production and climate change in terms of water consumption and greenhouse gas emission, the Authority in collaboration with other partners has been implementing interventions to mitigate and build resilience to climate change in rice production in Mwea.

In collaboration with JICA, the water saving technology of Alternate Wetting and Drying (AWD) has been introduced to rice farmers in the scheme. Use of AWD in rice production has potential to reduce water consumption to between

25 percent and 47 percent and methane emission to between 35 percent and 43 percent when compared to continuous flooding. The Systems of Rice Intensification (SRI) which emphasises application of intermitted irrigation in combination with other agronomic practices has also been widely adopted.

SRI reduces greenhouse emission by creating alternate aerobic and



Beneficiaries of household water pans in Sijaloni, Kajiado County.

anaerobic soil conditions that suppress methane production. SRI reduces water consumption and methane production in rice systems by 32 percent and 64 percent respectively when compared to traditional practice of continuous flooding.

The Scheme is evaluating the potential for direct seeded rice (DSR) as a climate change mitigation measure to save water and reduce greenhouse gas emissions.

Since Kenya's dry lands (ASALs) occupy 80-89 percent of the country, climate change, severe drought, decline in food and livestock production as well as water supply have continued to affect communities in over 24 counties. These counties include Kajiado, Taita Taveta, Kilifi, Kwale, Tana River, Kitui, Makueni, Marsabit, West Pokot, Tharaka Nithi, Samburu, Wajir, Mandera, Lamu, Laikipia, Isiolo, Garissa, and Turkana among others.

Other irrigation water harvesting initiatives

The National Irrigation Authority is implementing household irrigation water harvesting programme as well

as construction and rehabilitation of community water pans and small dams as a mitigation measure.

This transformative initiative provides localised water access through construction of water harvesting and storage reservoirs for irrigation at the household level by harnessing surface water (runoff) in the arid counties. The household water pans range from

1000 to 3000 cubic metres, which are positioned such that water collected, is easily directed to maximise on the collection from natural depressions / drains and storm water from roads.

The Authority has constructed more than 29,400 water pans with a cumulative volume of 42,800,000 cubic metres that can supplement irrigation water for about 42,000 acres. It is estimated that up to 1,797,884 acres can be put under irrigation at household level across the country and benefit more than 1.8 million households, especially in the ASALs areas increasing access to food and nutrition, generating income and preventing resource driven conflicts caused by water scarcity.

Since the colonial times, there have been many interventions of increasing access to water through harvesting and storage. It is estimated that there are more than 6,000 water pans and small dams spread across the country both on public and private land.

Beneficiaries of household water pans in Sijaloni, Kajiado County.

To date, the Authority has implemented 373 community water pans to harvest 29,884,000 cubic meters to provide



Olookil Community water pan in Kajiado South Sub-County of Kajiado County.

supplemental irrigation water for about 29,000 acres. Farmers in Kajiado are growing tomatoes where they generate an annual income of up to KSh450,000 per acre. This translates to enhanced access to food of high nutritional value as well as income and employment for communities using harvested water for agriculture. The Authority aims at mobilizing resources including climate financing to rehabilitate more than 6,000 water pans across the country to increase resilience for communities against effects of climate change and lower loss of lives, livelihoods and reduce resource-induced conflicts.

Olookil Community water pan in Kajiado South Sub County of Kajiado County.
The Authority has identified more large dams as climate resilience interventions alongside installation of irrigation infrastructure to build resilience for communities against effects of climate change. This will require partnerships and collaborations in mobilizing resources, research and innovations, dissemination of technologies, community mobilization and sensitisation as well as developing policies.

Indeed, in Kenya, water is the primary medium through which the effects of climate change are felt. Thus, interventions geared towards enhanced access to water will

have the most impact in building resilience and safeguarding the vulnerable communities.

NIA ranks top in the country

Among others, these initiatives, saw the Authority being ranked as the best performing Government agency in the 2020-21 Performance Contract with an EXCELLENT composite score of 1.8890 as a demonstration of competency, professionalism and diligence in executing the irrigation mandate to change people’s lives. The table below presents the composite scores for the top ten performing State Corporations as per the report released in December 2021 by the Public Service Performance Management and Monitoring Unit of the Ministry of Public Service, Gender, Senior Citizens Affairs and Special Programmes.

S/NO.	State Corporation	Composite Score
1	National Irrigation Authority	1.8890
2	University of Embu	1.9290
3	Tharaka University College	1.9682
4	University of Nairobi	2.1361
5	Kenya Industrial Estates	2.1477
6	Kenya University Research, Referral and Teaching Hospital	2.1765
7	Chuka University	2.2855
8	South Eastern Kenya University	2.3902
9	Technical University of Mombasa	2.4240
10	Water Resources Authority	2.4307

How green growth, circular economy feed the world



KSG Pioneer class on Green Growth and Circular Economy

By **Eng. Jairus Serede**
and **Mr. Oscar Mutiga**

In promoting the Green Growth and Circular Economy, the National Irrigation Authority has embraced the use of water from its drain canal in Bunyala Irrigation Scheme. It is a new approach tied to managing water as well as mitigating floods, which is frequent in the area.

This innovation has not only opened up 600 acres in Magavera area of Bunyala Irrigation Scheme but has done so at no extra pumping cost. About 300 acres have been cropped in this area and farmers are enjoying high yields of an average 45 bags of 80kg per acre.

The Authority joined ministries, departments and agencies at the Kenya School of Government for five days, beginning June 20 to learn about Green Growth and Circular Economy. The concept is a path of economic growth that is sufficient in its use of natural resources, clean in minimising pollution and environmental impacts and resilient in how it accounts for natural hazards, according to the World Bank.

Its main driver is the transition towards low-carbon emissions and sustainable systems and processes. Green growth ensures that even as we implement development projects/initiatives, people should be conscious not to deplete natural resource base as well as contribute to environmental degradation that hinders growth and development.

Green growth enhances productivity, reduces risks of negative shocks to growth, and opens up new markets among other benefits.

Circular economy is a concept whose main focus is on eliminating waste by reusing, recycling and renovation of equipment, products, machinery and infrastructure to ensure they are utilized for a longer duration. By contrast, in a linear economy, we take materials from the Earth, make products from them, and eventually throw them away as waste.

The principle of circular economy is anchored in minimising waste and pollution, extending the useful life of products and

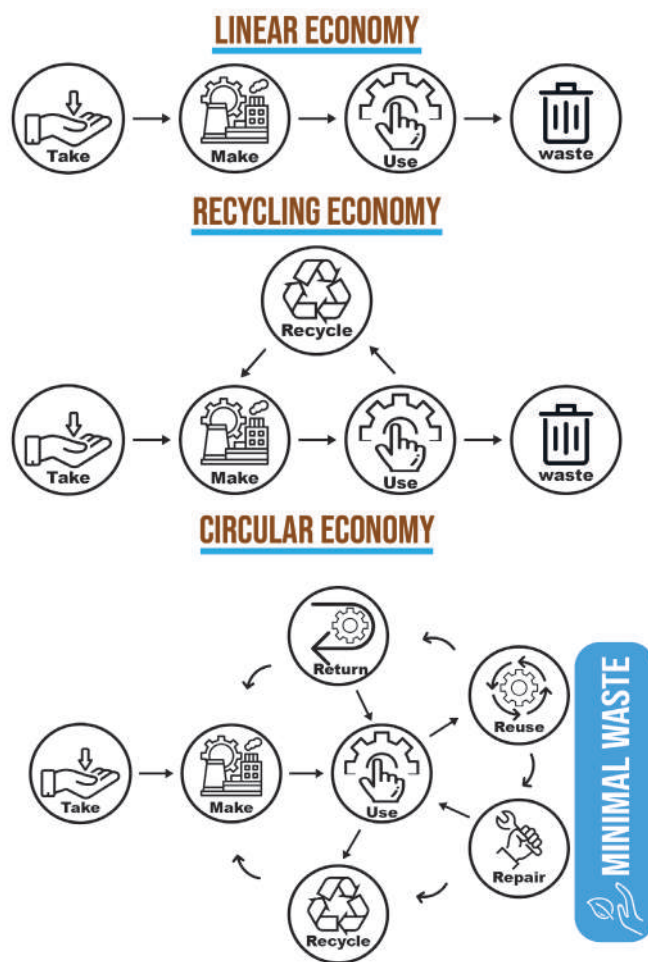
materials and regeneration of natural systems.

In our case as an Authority, Circular economy looks at waste or drain water as a resource and an input into a new process.

The Authority will be more deliberate in this pursuit to

integrate benefits of circular economy in its operations.

Eng. Jairus Serede is a Senior Irrigation Engineer and Mr. Oscar Mutiga is an Environmental Officer at National Irrigation Authority



Irrigation demystified: Water impounding

What is water impounding?

As explained by the National Irrigation Authority's Deputy General Manager, Infrastructure and Irrigation Development Services Eng. Charles Muasya, water impounding is the permanent closure of the reservoir gates for water to accumulate in a dam. To happen, a water reservoir has to be constructed to hold water. Water reservoirs vary in size and complexity from small single-purpose impoundments to huge and complex multiple-purpose types. A single-purpose reservoir is designed to fulfill only one function while a multiple-purpose reservoir serves at least two principal functions.

Why impound water in a dam/reservoir?

Water is impounded for different purposes such as irrigation, hydroelectric power generation, navigation, flood control, water supply, recreation, or low-flow regulation.

For example, on May 24, 2022, the CEO National Irrigation Authority Mr. Gitonga Mugambi, EBS, officiated the lowering of Thiba Dam gate to mark the official commencement of its impounding. The impounded water is targeted at increasing the acreage under irrigation at Mwea Irrigation Scheme.



Left. closing of Thiba dam gates.

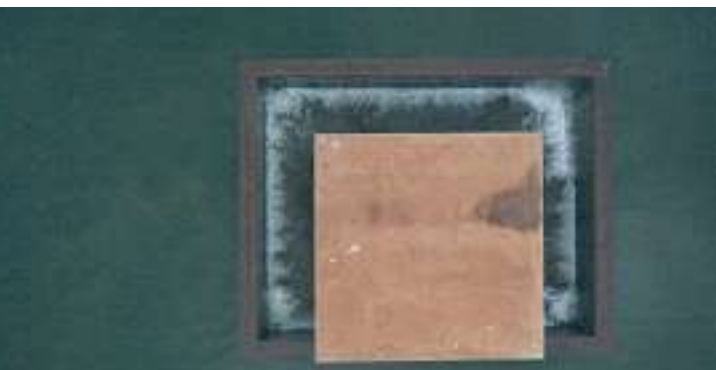
Right; Mr. Gitonga Mugambi EBS, NIA CEO operates a crane to lower Thiba dam's gate.



Filling of Thiba dam



Water levels nearly reaching the top of inlet tower



The inlet tower



The inlet tower almost submerged in water.



The inlet tower submerged



A canal conveying the impounded water to farms for irrigation.

Tying national values to economic growth



By **Rhoda Mbuvi**

We introduced the National Values segment in the Third Issue of Unyunyizi News (October to December 2020). The journey began with looking at the 17 national values from patriotism to sustainable development (the 17th value tackled in the 12th Issue). All the efforts were geared towards promoting a cohesive Kenya that can achieve Kenya Vision 2030, the Big 4 Agenda, making the country food-secure.

We will keep on assessing and highlighting matters national cohesion. In this Issue, we focus on understanding what values are and their classifications.

Defining Values

Sessional Paper No. 8 of 2013 on National Values and Principles of Governance defines national values and principles of governance as fundamental beliefs of a nation that guide the choices, actions and behaviour of its citizens.

This paper further states that National Values exert influence on the way individuals relate, engage and how citizens and government structures interact, hence defining a people's identity.

The outcome of instilling and enabling all citizens to have a sense as well as a feeling that they are members of the same community, engaged in a common enterprise, facing shared challenges and opportunities is having a national cohesion and integration, which is the optimum goal.

Classifying Values:

Individual/personal values: These are beliefs and ideals an individual upholds which define his/her character. They are acquired in childhood through association with family, relatives, friends, and schools, for instance. Some of them are integrity, generosity, commitment, acceptance, self-discipline, cleanliness, diligence, perseverance, hard work, courtesy and



Photo: courtesy
patience.

Family values: They are ideals which guide family life and are passed from one generation to another, for instance forgiveness, respect, honesty, responsibility, communication, love, team spirit, dialogue, integrity, commitment, faithfulness and loyalty.

Religious/spiritual values: They reflect the beliefs and practices which a religious person takes part in. Most of these values originate from sacred texts, religious members and organisations. For instance, faithfulness, compassion, modesty, obedience, love, humility and spirituality.

Cultural/communal/societal values: These are beliefs that guide a people's decision-making and actions. They are shared among people with a common identity and are passed over from one generation to another, such as sharing, respect, obedience, love and hard work.

Corporate/ organizational values: These are ideals or beliefs that guide staff conduct and interactions in an organization. They define the image of the organization and guide achievement of organizational goals, development and growth and include values such as excellence, fairness, professionalism, integrity, innovativeness, teamwork and accountability.

Public service values and principles:
Article 232(1) of the Constitution

provides for the values and principles that guide the public service. These values apply to all State organs at national and county governments. They include:

- High standards of professional ethics
- Efficient, effective and economic use of resources
- Responsive, prompt, effective, impartial and equitable provision of services
- Involvement of the people in policy making
- Accountability for administrative acts
- Transparency and provision to the public of timely, accurate information
- Fair competition and merit in appointments and promotions
- Representation of diverse communities
- Affording adequate and equal opportunities for appointment, training and advancement of men and women, the members of all ethnic groups, and persons with disabilities.

National values and principles of governance

These are fundamental beliefs of a nation, guiding the choices, actions and behaviour of its citizens. Article 10(2) of the Constitution highlights the following regarding governance:

- Patriotism, national unity, sharing and devolution of power, the rule of law, democracy and participation of the people;

- Human dignity, equity, social justice, inclusiveness, equality, human rights, non-discrimination, protection of the marginalised.
- Good governance, integrity, transparency and accountability; and
- Sustainable development.

Universal values: These are ideals and beliefs that are applicable across human cultures. Article 2(5) of the Constitution states “the general rules of international law shall form part of the law of Kenya.” These universal values include conservation of environment and wildlife; sustainable development goals (SDGs); maintenance of regional and international security and peace; human rights; morality; human traits; social order and patent rights.

Benefits of values:
Individual/personal values guide individual actions, the principles they live by and what they consider important for personal growth.
Family values entrench unity, dialogue and loyalty in the family. Religious/ spiritual values make important the moral code and spiritual nourishment to persons. Cultural

values allow people to maintain a unique identity and enhance solidarity. Corporate values unlock growth and development of the institutions and guide decision making while values and principles of the public service enable the government to achieve development goals and provide fair and efficient service delivery.

References
Directorate of National Cohesion and Values website: <https://www.cohesionandvalues.go.ke/>
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Sessional Paper No. 8 of 2013 on National Values and Principles of Governance; Republic Of Kenya the Presidency Ministry Of Interior and Coordination of National Government.

Safety is Everyone's Responsibility, Say NO to speeding

#FATAL6





X

SPEEDING



X

LANE INDISCIPLINE



X

DRINK DRIVING



X

DISTRACTED DRIVING

using mobile phone while driving



X

LACK OF HELMET



X

PEDESTRIAN WALK WAYS

Failure to use available pedestrian walk ways





#UsalamaBarabarani #NTSAapp

18

A publication of the National Irrigation Authority

Word Search

In this issue we have put all the irrigation terms tackled so far; from the 6th to the 12th edition of the “Unyunyizi News”. Locate more than 14 words from the grid below.

E	C	A	F	R	U	S	R	X	E
Z	S	O	C	J	K	I	L	C	N
S	I	D	A	M	E	W	N	D	E
T	L	E	N	W	D	A	M	O	T
N	T	F	A	B	Y	T	D	H	A
I	A	P	L	E	C	E	F	T	G
A	T	A	V	G	F	H	K	E	I
R	I	N	S	Y	S	T	E	M	R
Q	O	V	E	R	H	E	A	D	R
C	N	Y	T	I	V	A	R	G	I

ANSWERS FOR THE PREVIOUS WORD PUZZLE

			¹ S	⁵ E	M	I	A	R	I	D			
				X									
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Eng. Stephen Mutinda, REng, MIEK:Project Engineer at Thiba Dam

Eng. Stephen Mutinda: A go-getter fulfilled by service to mankind



By Johnbosco Obonyo

Eng. Stephen Mutinda is the project manager of the just completed 15.6

million cubic-metre Thiba Dam in Kirinyaga County. He is a registered engineer with the Engineers Board of Kenya and a Corporate Member of Institution of Engineers of Kenya with more than 13 years of experience in water and irrigation sectors. He has been a practising engineer for nine years. He is

finalizing his Master’s degree in Soil and Water Engineering at Jomo Kenyatta University of Agriculture and Technology and has a Bachelor of Science in Agricultural Engineering from Egerton University among other trainings.

Eng. Mutinda growing

up... Eng. Stephen Mutinda grew up in a humble setting in Mwala division, Machakos County in a family of six. He is the third born. He schooled at Mango Primary School, joined Machakos School, then a Provincial School but now a national school. He scored a B+ (plus), earning a placement

by the Joint Admission Board (JAB) [now Kenya Universities and Colleges Central Placement Service] to undertake Bachelor of Education (Early Childhood Education) at Kenyatta University. This did not sit well with him, because he had always dreamt of being an engineer and had studied hard to qualify for the course. This pushed him to approach JAB and luckily his placement was revised to BSc Agricultural Engineering.

You had a dream of being an engineer from childhood; what was your inspiration?

Growing up, we had an engineer in our village and I admired his life and popularity. In addition, I loved constructing things and desired to construct roads, buildings and dams. Later, I would find myself attached to agricultural engineering and I am happy that I have been able to practise civil engineering and gained substantial knowledge.

Has National Irrigation Authority been your employer since you entered the job market?

No. I first worked with Rea Vipingo Plantations as a supervisor in January 2009 for a year then moved to German Agro Action from January 2010 to January 2011 before moving to Del Monte in February through July 2011. Then, I applied for a position as an Irrigation Engineer at the then National Irrigation Board in April 2011 through an advertisement which was placed in the dailies and secured the position in August the same year. My work at the Authority started at Rapsu Irrigation Project as an assistant Resident Engineer and later at the Head Office where I have grown to the position of Senior Irrigation Engineer since January 2013.

Having worked with the Authority for years, what has been your driving force?

Service delivery to mankind. It fulfills me when I see people moving from one end to the other; that is when a farmer gets water and uses it for irrigation and through that their life is transformed socially and economically.

What is that one achievement that you feel crowns your career achievements?

I have achieved a lot in my career as an engineer. One notable achievement

is the timely completion of Thiba Dam, which is a mega project; one of the biggest dams in the country and the first for irrigation. Rice farmers downstream at Mwea Irrigation Scheme have for a long time suffered from insufficient supply of irrigation water. The completion of Thiba Dam is a game-changer. The river flow has been stabilised and there will be water throughout the year. With the installed infrastructure, farmers will be able to practise double cropping as well as reap double the output as a result of sufficient irrigation water.

Challenge(s) encountered along the way and dealing with it (them)?

Being the project manager of such a project –Thiba Dam — cannot lack some ups and downs. The work pressure to complete the implementation of the project was overwhelming. However, with the support of our CEO, Mr Gitonga Mugambi, E.B.S, the head of infrastructure Eng. Charles Muasya, REng, MIEK, the management and the staff, we did it. Besides that, time management which is a very critical virtue I adhere to and the cooperation with the contractor and the consultant through clear strategies enabled me to achieve the set objectives and that of the Authority as showcased through the timely completion of the dam.

Mantra?

“Nothing can bar me from reaching my goals and targets”

Do you love reading?

I do. I love reading professional materials such as the International

Commission on Large Dams (ICOLD) publications to upgrade and advance my expertise in matters engineering.

How are you ensuring that young engineers deliver?

It is always my endeavour to mentor young engineers coming out of university to tie theory to practical experience so that they can achieve professional registration status.

Do have time for something else outside work?

(He laughs heartily). My duties here at the Authority are engaging but like I mentioned earlier, I have grasped the art of proper time management, thus I get time to spend with my family, catch up with friends, concentrate on personal projects such as farming and go to the gym.

Giving back to the society... do you appreciate this concept?

Yes. You gain a unique sense of purpose by serving those around you and spending time to enrich your community. In the last five years I have served on the Board of Management of Mango Secondary School. I am also a church elder in my village. In addition, I have supported education needs of two orphans. One is a third-year student at JKUAT pursuing Bachelor of Commerce and the other one is a Form Three student. I have been with them since they were in Class Seven.

Parting shot?

“Always have a target and aim at achieving it”



Aerial view of completed Thiba dam in Kirinyaga county

VISION

“Water to every irrigable acre”

MISSION

“Provide and Coordinate Sustainable Development and Management of Irrigation Services in Kenya.”

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