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| THURA RIVER BASIN FUTURE DIRECTIONS AND ACTIONS PLAN | | May 1  2010 |
| CADASAL-KENYA STRATEGIC ACTION PLAN driven by quest to empower people of Mbeere Central Region – Embu County with information and skills necessary in changing their social and economic standards through addressing environmental issues that relates to their life | Water and Environmental Management Department | |

**CADASALKENYA**

***(My people are destroyed for lack of knowledge)***

***Hosea 4:6***

This document was produced by CADASAL-KENYA in collaboration with Mbeere Central Integrated Natural Resources Forum (MCINRF).

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**EXECTIVE SUMMARY**

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**Forward**

In 2008, CADASAL-KENYA hired CIPRA consultants to conduct the THURA BASIN ENVIRONMENTAL STUDY after a 2007 Environmental audit that found Thura River Ecosystem were poised on the edge of significant degradation. It was clear that massive sand harvesting and other environmentally degrading activities on the basin were the main problems. It was found that great understanding of the significance of the river ecosystem by the communities was urgently needed before long term management decisions could be made with certainty.

CIPRA consultants and CADASAL-KENYA collaborated on the study which was completed in 2010. The report provides an understanding of the river functions and interactions with surrounding catchments and outlines actions needed to improve water quality and quantity, and to reduce forest destruction along the river. This major advance in understanding the river’s dynamics provided practical answers and solutions to management questions that have been the subject of community debate over the last ten years. These include:

* How will sand harvesting affect the river flow?
* What will be the changes in water system or flow and what it means to the community that depends on the Thura River resources?
* What will be the socio-economic impact of the destruction of the entire ecosystem?

The study became the foundation of the current efforts to safe Thura River ecosystem from further destruction. Thura River Basin Future Directions and Actions Plan sets out a clear course of action that supports community participation and provides an adaptive system of management. The plan establishes clear priorities and directions, and outlines a suite of programs which will be implemented by the communities within each catchment, supported by the government and coordinated by CADASAL-KENYA and THURA RIVER RESOURCES USERS ASSOCIATION. Some of the actions may take time to fully implement but progress will be reviewed regularly and priorities and strategies adjusted as required. In essence this strategic Action Plan complements government of Kenya Vision 2030 in a very unique way. It articulates the social strategy which proposes to invest on the Kenya people as way of marching towards prosperity and building of a just and cohesive society. Thura River Future Directions and Actions Plan focuses on empowerment through training of the locals in order for them to meaningfully participate in conserving water sources and enhancing their skills of harvesting water from the rain and underground water. The basis of the attaining these ideals is the community within Thura River Basin being able to secure clean and sustainable environment as soon as possible. Detailed environmental conservation plans are outlined with a view of rolling out the vision 2030 at local level.

***Rev. Isaac Muringih***

***Director CADASAL-KENYA***

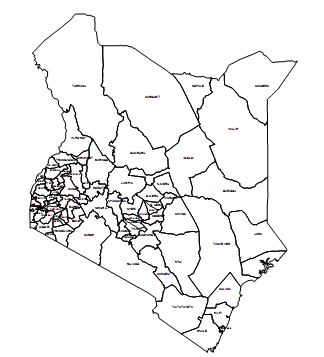
1. **INTRODUCTION**

*1.1****Thura River Basin –Under Threat***

Thura River originates from Kiangombe hills and flows southwards before changing its course eastward and feeding its waters to River Tana on the lower side of Kiambeere Dam. The river cuts across central region of Mbeere land covering an estimated 193 kilometers. For centuries the river provided with water through out the year. In the last 20 years the river began drying up due to much encroachment and forest destruction on the upper side which is the source of the river. While it seemed forest destruction was not enough, in the last 10 years, constructors coming as far as in Nairobi and Nyeri in Central province descended on the river harvesting sand in tones. It was not long before the river gave in, and the much treasured commodity-water- was no more available for the community and animals. The little available have a high level of salinity. Mother Nature turned its wrath upon the inhabitant of Thura river Basin who currently faces serious shortage of water and food.

Thura River is the only source of water to over 15,000 people and over 23,000 animals. It is the farming belt that has been providing volumes of food grains to the Mbeere central region. In 2007 environmental audit conducted by CADASAL-KENYA found that the ecosystem was poised on the edge of significant and possible inevasible degradation. The compiling evidence of this degradation has been a dramatic increase in sand harvesting and river bank destruction of the ecosystem that had already under threat of increased drought in eastern region of Africa. The negative impact on the health river ecosystem has severe economic consequences. For example, due to lack of water for the animals 2008-2009 led to great losses of animals estimated over 4 million shillings.

Map showing the location of Embu County.



EMBU COUNTY

Map of Embu

County

Embu Region

Mbeere Region

Map of Mbeere Region showing the location of Thura River Basin

HHi

HHi

*Thura River*

CIPRA Thura River Basin Environmental Study was partly funded by CADASAL-KENYA and Touchmind International Company that recognizes the need for a combined assault on the water quality and ecological health problems facing Thura River Basin.

The key findings of the Thura River Environmental study were:

* Deteriorating water quality and quantity, and drying of river vegetation.
* Increased flash floods and high level soil erosion
* Disappearing of riverine vegetation
* Increased siltation thus affecting the quality of water
* High level destruction of river bank due to lack of soil cover
* Increased water evaporation due to lack of shade
* High level sand harvesting leaving the river bare
* Introduction of man made gullies on the steep banks while accessing sand at the base of the river
* Extinction of water living creatures and certain species of plants that only flourish on the river banks

**2. Way Forward**

Thura River Basin Environmental Study has helped CADASAL-KENYA and the community stakeholders to understand how the river functions, including the factors controlling water retention and quality. It has been pivotal in developing and aligning programs with a greed objective and priorities and has provided CADASAL-KENYA with a clear framework for action. The fact that the entire river cycle is the primary basis for existence of quality water, and life in it, increased sand harvesting, river bank and vegetation destruction are symptom of the poor health of Thura River. Though, they are not the only important indicators of ecological health.

1. **How do we proceed?**

Lack of water and quality water are complex problems confronting communities living on the Thura River Basin. This study represents the best current knowledge available on environmental situation in the region. However, the study did not consider the hilly forest and their situation in regard to the cultivation that is going on in the upper part of the Thura River.

Thura River Basin Future Direction and Action Plan is the CADASAL-KENYA’s strategic framework for implementing the recommendations of Thura River Basin Environmental Study. The plan is based on adaptive management principles – its programs are ***‘- indirect-bet’ and ‘-multi-benefit’***, and will be reviewed and re-prioritized as knowledge and certainty increases.

Thura River Basin Future Directions and Action Plan prioritizes programs aimed at increasing water accessibility, water quality and restoring river life over the next ten years, with particular emphasis being on the first four years phase. It will influence and inform Thura River Resources Users’ Association catchment strategies and similarly informs all other community plans and strategies that guide management activities in the adjoining catchments.

1. **Strategic Dimension**

***Vision***

To restore life of Thura River by rehabilitating its ecosystem in order to make it a dependable water resource for economic improvement of the people within Mbeere Central Region

***Overall Objective***

To carry out activities of soil control, river bank reclamation, reduction of sand harvesting and flash flood control, and enhancing riverine regeneration.

***Target***

By the year 2020, to have constructed at least 10 weir to control the flow of water and increase water accessibility during dry spell. To conduct riverine regeneration activities in six catchment areas, to plant 500,000 seedlings within the 15 meter distance from the river. To increase quality water intake by constructing at least 2 underground water tanks near the weir in each of the catchment area. Further, to construct one animal watering pan in every catchment area. Train and re-train 600 stakeholders from all the six catchment areas within Thura River Basin. Introduce Management of acceptable number of animals as a means of reducing overgrazing and introduction of more friendly dry land farming methods.

As a result of improved ecosystem, the river will support the increasing population with more women, youth and farmers accessing quality water, and increased riverine vegetation that control water siltation and evaporation. This will greatly enhance habitat for flora and fauna. The training to impart the relevant environmental knowledge and understanding, will lead to beneficiaries managing lands and other resources to achieve better production and ameliorate poverty. Management practices of the environment will significantly reduce water poverty, poor health and harsh climatic conditions being experienced currently.

1. **Coordination**

***Thura River Task Force***

The task force will oversee development of an effective and efficiency delivery and coordination mechanisms, building on the existing responsibilities and providing clear accountabilities. The members of the task force will be drawn from CADASAL-KENYA, THURA RIVER RESOURCES USER’S ASSOCIATION, MINISTRY OF ENVIRONMENT, MINISTRY OF FORESTRY AND WILDLIFE, MINISTRY OF WATER AND IRRIGATION, MINISTRY OF HEALTH, and MINISTRY OF AGRICULTURE AND UNIVERSITY RESEARCH INSTITUTIONS.

1. **Catchment Management Authority**

CADASAL-KENYA will coordinate delivery of programs, including regular state of the river basin and catchment reporting and use of adaptive management tools to refine targets and improve the effectiveness of on-ground activities. CADASAL-KENYA will be responsible for reviewing and monitoring progress and reporting to government.

Thura River Resources User’s Association (TRRUA) will provide leadership to the community in each catchment area during implementation of Thura River Basin Future Directions and Action Plan. TRRUA and CADASAL-KENYA will provide a forum for the interchange of ideas and views between agencies and the communities and promote the concept of integrated management and aligned objectives for the Thura River Basin Environmental Project (TRBEP).

1. **Implementation Priorities**

Implementation priorities for TRBEP will be based on:

1. Implementing of related environmental policies and advocating the same at local level
2. Water management
3. Eco-cycle strengthening
4. Promoting agri-business
5. Capacity building on all levels
6. Planning, monitoring and evaluation

Further, research will be necessary to develop short term and long term targets consistent with National Framework for Natural Resource management standards and Targets.

**Main Programs and Acceptable Projects**

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| **MEGA PROGRAM** | **OBJECTIVES** | **DESCRIPTION** | **PROJECTS** |
| ***1.Policy Implementing and Education*** | Stop activities of sand harvesting on Thura River | Sand retention on the river is the key to holding water during droughts, reduction of siltation and regeneration of riverine vegetation. Developments of specific policy that address the need to enhance key contributors of health river ecosystem are greatly encouraged. | Construction of weirs  Setting up advocacy groups and lobbying mechanisms that clearly articulate the interests of Thura River Basin |
| ***2.Water management*** | To establish suitable ways of accessing quality and enough water from the river during droughts | The traditional way of accessing water on the river beds during dry period is scooping the sand to reach underground water. The water is for domestic and animal use. The available water is muddy or highly salty when used for long the user develops various health problems. | Underground water tanks  Animal watering pans |
| ***3.Eco-cycle Strengthening*** | To replant the destroyed river banks with trees | In order to enhance natural water cycle, replanting of trees along the open river banks will accelerate regeneration of natural vegetation needed in water cycle. The vegetation act as the river cover during droughts lowing water evaporation and direct heating of the river sand. | Setting Up tree nurseries  Setting up soil erosion gabions on the gullies near the river and on the near by farms |
| ***4.Promoting Agrarian Business*** | Encourage land owners to open up their farms for horticultural growing | The value of the sand during dry period can only be understood when the community learn how to use underground water to grow food and vegetables for marketing. Various produce can be grown easily using the available water as a means of eradicating poverty in the community and increasing food at household level. Neppia grass will be grown to feed animals during dry period. | Agricultural Cooperatives  Village Food Banks  Farmer Field Schools |
| ***5.Capacity Building*** | To improve the capacity of the community to understand and participate in actions and changes necessary to reach the objectives of Thura River Future Directions and Actions Plan. | Considerable progress has been made in addressing the impact resulting from destruction of river ecosystem. Consultations have been made with all the prospective beneficiaries. Capacity building includes increasing the community ability to demand proper and clear implementation of the policies on the river resources, the stakeholders’ accountability and resource contribution locally and for the agencies and line ministries, to best deliver on the objectives of Thura River Basin Future Directions and Actions Plan. | Out of school Youth projects  Community Environment awareness seminars  School environmental awareness clubs |
| ***6.Planning, Monitoring and Evaluation*** | Develop and implement the framework for the coordinated Management of the whole Thura River Basin and to monitor and evaluate the effectiveness of the document and associated activities and to provide tools for continual adjustment of directions and priorities | Primary monitoring: Entails measuring of actual changes occurring on the environment and related to the activities undertaken  Secondary monitoring: Involves measuring the rejuvenation of the river live including certain animals and plat species. Further, use of the best-practice by land users along the river.  Tertiary monitoring: will include successful completion of projects within agreed time and resources allocation.  The specialized monitoring will be required for special activities; priority will be given to monitoring that contributes to the assessment of the whole catchment environmental improvement.  Monitoring will incorporate the principles of Adaptive Management | Underground tank water quality monitoring  River bank vegetation regeneration monitoring,  Agri-business activities monitoring  Improvement of management qualities of different committees  Planning, Evaluation and Adaptation |
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1. **Financing of the Programme**

Actions carried out to achieve the Thura River Basin Future Directions and Actions Plan will be funded from local contribution efforts, donor, County Development Fund and Constituency Development Fund. CADASAL-KENYA will spearhead full implementation of present and future projects together with stakeholders of Thura River Resources User’s Association.

**7:1 Costs**

Beneficiaries will be expected to enter into long term resource contribution commitment to ensure sustainability and ownership of the projects after donor funding comes to an end. In every project guidelines will be developed in a participatory approach, at all time observing the economic standards of the beneficiaries. This approach will apply to areas where the funding agency may find it difficult to take up the whole responsibility. The Government of Kenya and Embu County Government will consider taxes paid by citizens as the contribution of the beneficiaries.

1. **Programs Description**

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| **PROGRAM:** Implementing of water resources related Policies | |
| **PROJECT:** Construction of weirs | |
| **NO:** A-1 | |
| **OBJECTIVE:** | |
| To increase water level and retention during dry periods to enable community to access it with ease. | |
| **PROJECT DESCRIPTION** | |
| The destruction of the river resources has been going on for a long period without signs of stopping. The local authority issue permits to lorry owners to harvest sand on the river without even consulting with the community. Further, due to absence of clear policy on management of the resources, the river resources have been abused and a serious environmental degradation has taken place.  Weirs will be constructed across the river to hold back sand where water will be able to remain without evaporating or being contaminated during dry period. These weirs are important barriers that will create underground water reservoir at different parts of the river.  The river has various strategic places where such constructions can be done without much cost. Mainly this is possible where there are rocks across the river, which even when it is dry, the community is able to access water by scooping on the upper side even currently.  The part of the river where such weirs will be constructed will also be useful catchments for planting tree as the level of the sand and water will be higher after building of the weir. The river can hold over twenty weirs depending with the population and distance. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Improved river resources profitability * Increased local agricultural production * Reduction of hunger and poverty level in the participating households |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Improved water quality and river ecosystem within the catchment areas * Reduction to riverine destruction and water evaporation |
| PRIORITY CATCHMENTS | 8- Catchment areas (Kamugu-Itira, Kabuguri-Kerwa, Kiang’anja-Kathiri, Karambari-Gatororo, Karambari-Gitumi, Karambari-Ntharawe, Ciamucurungi-Kiangunguru, Mbarwari-Kagwang’ombe. |
| RESEARCH PRIORITIES | * Improvement in understanding of the community knowledge on ecosystems * Use of Adaptive Environment Assessment and Management Model to target quality water management activities * Assessment of the sources of other degrading factors related to the river ecosystem |
| ACCOUNTABILITY | Lead Agency: CADASAL-KENYA  Support: Resources User’s Associations and  Funding Agencies concern with environmental stewardship. |
| SUGGESTED ACTIVITIES | Advocate for development of policies that guard against reckless exploitation of river resources in Mbeere region  Lobbying government officers and local leaders to take up environmental matters at all levels  Lobby forestry department and ICRA to support planting of riverine trees along the rivers. |

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| **PROGRAM:** Implementing of water resources related Policies | |
| **PROJECT:**  Setting up advocacy and lobbying groups | |
| **NO:** A- 2 | |
| **OBJECTIVE:** | |
| To stop all environmental abuses over the river resources and encourage community ownership of the resources for betterment of the community now and for the generations to come. | |
| **PROJECT DESCRIPTION:** | |
| The project will entail comprehensive understanding of the resources and protection of each resource in order to encourage Collaborative use by all in the community. The main focus will be to introduce policies recognized at county level and local level on each of the river resource. The lobbying will be to make each and every leadership to acknowledge the efforts that has been employed towards restoring of river ecosystem and accepting to guard the same.  Active groups will be set up in each catchment and the members are trained in all skills necessary in advocacy and lobbying. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The cost of living will be reduced with easy accessibility to crucial resources such as water and firewood at family level. * Time spend searching for water will greatly reduce and the quality will be higher * The resources will be accessed by all people equally and being sustained for future generations * The community will have less conflict where policies are held and implemented together by all people. |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Through enactment of rules on the river resources, regeneration of river vegetation will be achieved in a shorter period * Restoration of river flora and fauna |
| PRIORITY CATCHMENTS | All catchments |
| RESEARCH PRIORITIES | * The identification of various river resources * The policy impact on social economic life of the community living within Thura River Basin * The implementation of the policies and the attitude of those who exploited the resources |
| ACCOUNTABILITY | * Catchment Committee * Thura River Resources User\s Association * CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Training of selected people on advocacy and lobbying skills, * Developing literature to inform different sectors of the society on management of the Thura River Basin |

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| **PROGRAM:** Water Management and conservation | |
| **PROJECT:** Underground water tanks | |
| **NO:** B-1 | |
| **OBJECTIVE:** | |
| To construct underground collection water tanks on the upper side of the weir, as direct reservoir during dry spell to make accessibility easier for women and cattle herders. | |
| **PROJECT DESCRIPTION:** | |
| Thura river since change in climate in this part of the country began drying up in the month of August to October only to regain its normal life when the rain returns. The year 2008 the river dry even earlier than August. This condition is not perceived to end soon and therefore, for the people to have direct access to water for both domestic and animal use; underground water tank will provide this needed commodity. Currently, women spend many hours scooping the sand to reach the scarce commodity, and the exercise also entails many risks. Some include getting contaminated water by animals, and taking too much time to get enough for each jilican. Women have to gather together at night in order to walk long distances and in many cases even snakes and other reptiles conflict with human being also trying to get to the wells.  The underground tanks will be constructed using the stones right at the river base, in a manner that, water will be left to collect in the enclosed underground tank with an opening that allows water to be fetched from the top. Being on the upper side of the weir, the tank collects a lot of water depending with the amount of water in the sand held by the weir. The tank act as low pressure belt because of constant drawing by the community. This water is cleaner than the water found in the open wells along the river bed.  The water tanks time saving given that, the community will only be using robes to pull out water according to ones ability. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The water from underground tank is clean hygienically compared to the one drawn from open wells * Its time saving and reduces animal and human conflict * The water collected underground is more in volume making easy for those who are fetching to spend less time. * The farmers around will use the water to grow vegetables that they can sell to those fetching water. * The water will be used in watering the tree seedlings at the nurseries to be set-up in each catchment * Animals will also be watered from these underground tanks making the work easier for the herders |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Many tree nurseries are difficult to manage due to lack of water. These tanks will provide with constant water until the tree seedling mature for distribution to farmers |
| PRIORITY CATCHMENTS | All the Six Catchments |
| RESEARCH PRIORITIES | * The improvement in sanitation at household level as result of using water from these tanks * The treatment method suitable for the water to improve its quality * The quality of animal improvement and the income improvement associated with accessibility of water from the underground tanks |
| ACCOUNTABILITY | Catchment committees, TRRUA and CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Collecting of stones, listing of the members in each catchment, building of the designed concrete to make the underground tank |

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| **PROGRAM:** Water Management and Conservation | |
| **PROJECT:** Animal Watering Pans | |
| **NO:** B-2 | |
| **OBJECTIVE:** | |
| To provide animals with direct water from the underground tank as an economic activity | |
| **PROJECT DESCRIPTION;** | |
| Watering Pans are common in arid areas particularly where there boreholes. In this part of Embu county animals suffer during drought for lack of water. The herders experience difficulties watering their animal and occasionally the re is high mortality rate of domestic animals during drought. Water pans provide with a place where water is poured after being drawn for the underground tank. The pan serves even other wild animals at night after the animals leave the place during the day.  It is concrete rectangular shaped allowing animals’ access water without difficulties. It is connected to the upper side where water drawn from the underground tank is poured and drain downwards to the pan. The common one measure one meter by ten or fifteen meters. The water on the pans are always clean for use by the animals. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Animals accessing water from the pans are healthier * The cows access enough water to enable them continue providing with milk even during dry period * Better bleed of animals can be introduced with certainty of water |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The control of the number of animal can easily be attained through this watering system * Households can also use donkeys to carry water easily to the homesteads as way of controlling overgrazing |
| PRIORITY CATCHMENTS | * Catchment area 1, 3, 4, 5 and 6 |
| RESEARCH PRIORITIES | * The health benefit realized by the farmers on their animals * The economic viability of watering animals at pans * The impact on riverine vegetation after control of watering points |
| ACCOUNTABILITY | Catchment Management Committees, Thura River Resources User’s Association |
| SUGGESTED ACTIVITIES | * Building the pans * Training the farmers on usage of the pans and animal control * Control of soil erosion caused by overgrazing |

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| **PROGRAM:**  Eco-cycle Strengthening | |
| **PROJECT:** Tree Nurseries | |
| **NO:**  C-1 | |
| **OBJECTIVE:** | |
| The objective is to grow enough tree seedlings for replanting the river basin over a period of 10 years. | |
| **PROJECT DESCRIPTION:** | |
| Tree nursery project is intended to be roll-out in all the nine catchment areas of Thura River Basin. The project will be implemented in three phases. The first phase which has already started is covering catchment 1, 4 and 5. The second phase to start 2012 will involve setting up nurseries in catchment 3, 2 and 6. The third phase will include catchment 7, 8 and 9.  Each tree nursery is expected to hold at least 10,000 seedlings seasonally, where at least 5,000 seedlings have to be planted each season. Given the intrinsic ecosystem of the river, careful selection of trees to be planted has bee done. Great emphasis has been made to promote indigenous riverine trees that are climatically acceptable and that have economic value to the animals. The species of acacia, the cena for fire wood and timber are the most common and adapted to the dry climate.  The beneficiaries will also be encouraged to plant more tree seasonally on their farm rolls and hedges. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Increase the forest cover along the river to minimize water evaporation and river bank destruction * Increase availability of household fuel * Increase animals feeds and building timber * Control of soil erosion on the farms and breaking of the wind during droughts |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Improve soil texture * Increase and maximize water quality after the water cycle is improved * The forest cover increased within the river basin adds to the environmental change in the area |
| PRIORITY CATCHMENTS | According to the phase |
| RESEARCH PRIORITIES | * Study of the improvement of the soil building * The suitable tree to be promoted for animal feeds, timber and water quality. |
| ACCOUNTABILITY | Catchment Committees, Thura River Resource User’s Association and CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Putting soil in the paper bags, * Watering the seedlings, * transplanting to the bags, * digging of the holes, * planting the seedlings during the rains, * watering the seedlings, * caring for them until they are mature |

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| **PROGRAM:** Eco-cycle strengthening | |
| **PROJECT:** Erecting of gabions | |
| **NO:** C-2 | |
| **OBJECTIVE:** | |
| To control soil erosion in areas where gullies have developed over the years as result of overgrazing or destruction of the vegetation | |
| **PROJECT DESCRIPTION:** | |
| The project will entail identifying areas where the land has been washed away by water leading to deep gullies. Such areas will be worked on to make sure no further eroding of the soils will take place. Upon building of the gabions, seedlings will be planted in order to make sure that the soil is made firm after the roots of the trees grow strong.  The gabions will also be constructed in some strategic areas where the roads are closing the river to minimize inflows along the roads. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The soil cover will be reclaimed * Trees usable to humans and animals will be grow * The soil that is carried to the river leading to high deposition will be controlled |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The soil erosion will be control improving the land for natural trees to grow * The environment cover will increase * The temperatures will be moderated, (cooling the ground) |
| PRIORITY CATCHMENTS | * All catchments |
| RESEARCH PRIORITIES | * The major affected soils by erosion and the areas within the river basin * The best types of gabions that can hold back the soils * The favorable trees adaptable to the climate that can be used alongside the gabions. |
| ACCOUNTABILITY | CADASAL-KENYA, Catchment Committees |
| SUGGESTED ACTIVITIES | * Identifying all the areas * Setting up of the gabions * Planting of trees besides the gabions * Caring for the trees |

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| **PROGRAM:** Eco-cycle strengthening | |
| **PROJECT:**  Replanting of Trees on river banks | |
| **NO:** C- 3 | |
| **OBJECTIVE:** | |
| To restore the soil cover along the banks, accelerate regeneration riverine vegetation that provides shade to the river. | |
| **PROJECT DESCRIPTION:** | |
| The river banks are left bare after destruction of the vegetation along the river. Planting of different tree seedlings during wet seasons and tending them, will be the main activity. These seedlings will be mainly of tree species that are adaptable to riverine vegetation in Kenya such as acacia elatior, acacia gerrardii, acacia mellifera and cena which is know to reduce termite bleeding where they grow.  The planting of the seedlings will be undertaken for six seasons before an evaluation is carried out to determine the progress of planting, tending and growth of the species being planted. The coordination will be organized at catchment level, with a lot of ideas and knowledge being exchanged at CADASAL-KENYA Resource Centre at Karambari field station.  Suitable policies guided by the forestry policy in Kenya will be introduced to safe-guard any future attempt to abuse the river cover, such will include total ban on any attempt to harvest sand or any soil in any part of the river. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The wood that matures and dry-up will provide with firewood to women or even from branches that are pruned from trees * The bees will have enough trees to flower for them to harvest nectar for honey production * The mature plants will be harvested for timber as new seedlings are being planted * The animals access plants and grass during dry period |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Reduction of Soil erosion * Reduction of evaporation during drought * Restoration of river flora and fauna |
| PRIORITY CATCHMENTS | All catchments |
| RESEARCH PRIORITIES | * The most first growing river vegetation * The common degrading activities along the river * The best activity that sustain riverine vegetation * The geomorphologic nature of the river for environmental enhancement |
| ACCOUNTABILITY | * Catchment Committee * Thura River Resources User\s Association * CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Plant at least 3,000 seedlings of acacia species in each side of the river every season for a period of three years (6 seasons) |

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| **PROGRAM:**  Agricultural Business Promotion | |
| **PROJECT:** Agricultural Co-operatives | |
| **NO:**  D-1 | |
| **OBJECTIVE:** | |
| To establish enterprise that is under the control of producers, in order for them to gain marketing strength and professionalism to enable them to achieve both a secure and profitable market for their produce and a return on the farm investment. | |
| **PROJECT DESCRIPTION:** | |
| Cooperatives have served generations in many parts of Kenya with encouraging results. They benefit the primary producers and they are known to dominate dairy, rice, fishing coffee, tea and sugar. The intended cooperative initiatives under this program entail corporate entity that exists primarily to serve the interests of the producers. Over many years farmers loss a lot of grains due to poor harvesting methods, storage skills and lack of marketing options. The projects will endeavor to establish marketing cooperatives that will be able to prepare and market member’s produce. Further, Value adding Cooperatives will also be encouraged where processing members’ produce will take place in order to give the product a greater value before it enters the national market. The third dimension of the cooperative will be service cooperative that will be set up to support the primary producers. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Increased income * Increased accessibility of funds inform of shares in the cooperative societies * Source of funds to sustain the entire Thura River Basin Environmental Projects * The community will learn to manage funds generated from their own efforts. |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The community will understand value of different trees, particularly those involved in honey production and animal raring. * Cooperatives on each area will give greater attention to managing the environment in order for them to continue gain more for the trees. |
| PRIORITY CATCHMENTS | All Catchment areas |
| RESEARCH PRIORITIES | * Honey production will be an important area of research, * Milk enhancing grass in order to have few animals that does not cause over-grazing but producing more milk, * The types of plants the are river friendly and nutritious to the animals * The best funding structures that benefit the primary producer and reduce any unnecessary exploitation by middlemen/women |
| ACCOUNTABILITY | * CADASAL-KENYA * Tura River Resources User’s Association, * Catchment management committees |
| SUGGESTED ACTIVITIES | * Training of all members on cooperative skills, * Training of the local movements that link-up with outside world in areas of marketing. * Lobbying for supplements from the county government on areas of storage of grains during harvest. |

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| **PROGRAM:** Agricultural Business Promotion | |
| **PROJECT:** Village Food Banks | |
| **NO:**  D-2 | |
| **OBJECTIVE:** | |
| To promote cooperate storage of food grains by farmers for the purpose of accessing and marketing their produce together without incurring losses at any stage. | |
| **PROJECT DESCRIPTION:** | |
| Mbeere region is known to suffer from recurrent droughts that lead to shortage of food and malnutrition. The idea of Village Food Banks is a noble one given that at certain time the area experience high yields which go to waste due to lack of skills and ability to manage it. The Village Food Bank will entail enabling the farmers to carry out proper food harvesting and drying the grain to avoid the problem that commonly arise due to lack of knowledge. Each catchment area will be encouraged to set up such stores after proper trainings are conducted. The grain will be stored in such stores for given period after which they will be sold back to the member at reasonable cost. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Members will have the courage to grow more food without fear of losing any * During time of need the members will access the grain at cheaper price * The people to work in these Village Food Banks will be employed from the same catchment * The community will have access to grains nearer and seeds for planting |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Village Food Bank will have direct benefit to environment as people will begin to demand more skills to care for environment in order to grow more food. * Those growing vegetables and selling through Village Food Bank, will work to restore the soils for them to sustain their high yields in vegetables and other crops. |
| PRIORITY CATCHMENTS | All the catchments |
| RESEARCH PRIORITIES | * The best storage mechanism that is not high cost and locally friendly * Structures that fit the region and which can be constructed by individual members * Medicinal plants that can be used in storage instead of using chemicals |
| ACCOUNTABILITY | * CADASAL-KENYA * Line ministries |
| SUGGESTED ACTIVITIES | * Building of Village Food Banks in each catchment area * Training the members on skills and management of Village Food Banks * Lobbying the County government to support with finances |

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| **PROGRAM:** Agricultural Business Promotion | |
| **PROJECT:** Farmer Field Schools | |
| **NO:**  D-3 | |
| **OBJECTIVE:** | |
| To provide with informal learning field schools for the community, where they will train on various skills necessary to attain food security in Mbeere Central Region | |
| **PROJECT DESCRIPTION:** | |
| The project entails training of farmers on different farming skills and practical ways of implementing the same at their farm level. The trainings will focus on how farmers can increase their yields and also how they can mitigate crop failure resulting from droughts in the region. The Farmer Filed Schools will be centres of learning and demonstration set in each of the catchment area. The learner will be assembling at the catchment centre where they will learn together according to the time they have set. CADASAL- KENYA field staff will be visiting the centres according to the schedule drawn together with the catchment members. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The farmers will access knowledge without necessarily going out of their area * They will learn practical ways of improving their skills and be able to generate more food for household sustainability * People will be able to assist each other, demand services from relevant ministry as an organized group * They will reduce household poverty with 60% through the project |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The community will be able to learn the inter relationship between crop production and care for environment * The identified medicinal plants will be protected * Members will be able to learn how to use different trees for different purpose and enable to introduce various species on their farms. |
| PRIORITY CATCHMENTS | All the catchment areas |
| RESEARCH PRIORITIES | * The nutritional level of households within Thura River Basin * The food available at household level * The types of diseases related to lack food intake at household level * The tropical food or the traditional food necessary to be promoted |
| ACCOUNTABILITY | CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Set-up demonstration farms * Training sessions at CADASAL-KENYA field station * Printing of literature for use at the school * Propagation of different seeds of crops planted within Thura River Basin |

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| **PROGRAM:** Capacity Building | |
| **PROJECT:** Out of school trading and management skills | |
| **NO:** E-1 | |
| **OBJECTIVE:** | |
| To improve the knowledge and skills of the community on the area of managing their resources and marketing their produce. | |
| **PROJECT DESCRIPTION:** | |
| The biggest challenge to rural people is lack of trading skills even when they have enough produce to benefit them. They depend on middlemen and women who greatly exploit their ignorance. The project entails opening up the mind of the people on how to about marketing what they have and the benefit of cooperative society when they are approach a common market.  Various economic activities the community is involved in area the subjects of study and development of clear ways of adding value to what they produce in the region. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The project enables the community to fight poverty and increase knowledge * Various traditional crops that are not grown due to lack of market will find value after the trainings * The people as they approach the market as cooperative group will add to their cohesiveness which has a great benefit |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The value of trees which currently are on the danger of being extinct from charcoal burning will be protected * The community will have money to contribute to sustain trees nurseries without straining after marketing their produce * Those who happen to learn more skills and have ability to trade far will have access of knowledge on how to about expanding their business. |
| PRIORITY CATCHMENTS | All Catchment areas |
| RESEARCH PRIORITIES | * The study of cooperative activities suitable for the area * The best trading commodity that can easily assist in improving the trading standards of the people within the catchment * Introduction of credit schemes that assist the community without exploiting them – For example Rural banking systems |
| ACCOUNTABILITY | CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Set-up Cooperative movement * Training the community on trading skills and marketing of their produce * The forms of trades currently favouring the region |

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| **PROGRAM:** Capacity Building | |
| **PROJECT:** Community Environmental Awareness Movements | |
| **NO:** E-2 | |
| **OBJECTIVE:** | |
| To promote community awareness on the need to protect environment by embarking on various protection measures. | |
| **PROJECT DESCRIPTION:** | |
| This project is specifically tailored to assist the community develop positive interest in guarding trees and participating in environmental protection at all levels. The movement is intended to provide knowledge to all people in the rural or within the region on how to reverse the degradation that has been taking place in Mbeere Central Region. The project will link the region with various experts to draw together efforts necessary to mitigate climatic changes currently facing the region. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * The community will get more involved in planting trees of economical value * There will be increased firewood * Building materials will be available * The community will speak the same language against acts of environmental destruction |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The trees will break wind reducing possible wind erosion * The soils will be more firm from control of the tree roots * The direct heating of the ground will be reduced thus controlling possible evaporation of water |
| PRIORITY CATCHMENTS | * All catchments |
| RESEARCH PRIORITIES | * The major farm erosion in the basin * The areas where soil erosion require urgent control * Community perception on various activities of environmental degradation |
| ACCOUNTABILITY | The community and CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Training of lead people * Developing of relevant materials * Forming of movements |

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| **PROGRAM:** Capacity Building | |
| **PROJECT:** School Environmental Awareness clubs | |
| **NO:** E-3 | |
| **OBJECTIVE:** | |
| To lay the basis for the generational change needed to sustain long term actions that address problems Mbeere Central Region | |
| **PROJECT DESCRIPTION:** | |
| There is need to rise up a generation of people who have substantively different approach to Thura River if long term management actions are to be successful  School Environmental Awareness Clubs will address level of knowledge and will consist of targeted messages appropriate to the age of the audience. Early school years will be given basic messages regarding value of Thura River and its resources. They will be given tour exposures to other places where environmental conservation has been done in Kenya.  A Magazine ill be developed to be sharing information the activities taking place within the river Basin. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Increased community awareness and empowerment, leading to greater willingness to participate in managing the environment among the growing youth * Increase ownership spirit of the natural resources through stewardship activities |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Increase their participation and skills in managing of the environment * Laying down future frameworks on which environmental issues will be based on |
| PRIORITY CATCHMENTS | * The whole Thura River Basin |
| RESEARCH PRIORITIES | * Research Existing school extra curriculum programs to identify gaps |
| ACCOUNTABILITY | * Ministry of Education, CADASAL-KENYA and KIDLaS |
| SUGGESTED ACTIVITIES | * Environmental exposure tours * Plants inventorying and identification * Plants protection initiatives * Additional environmental materials |

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| **PROGRAM:**  Planning, Monitoring and Evaluation | |
| **PROJECT:** Underground water quality monitoring | |
| **NO:** F-1 | |
| **OBJECTIVE:** | |
| To maintain quality water for human consumption | |
| **PROJECT DESCRIPTION:** | |
| Water collected at the underground tanks will be taken for testing before commencement of the project and after the first rain before use of the tank. The quality will be determined where the report for each catchment will be made will guidelines on place. Where certain minerals like phosphates or fluoride may be found to be in excess, the ministry will give guidance before the weir is constructed. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Reduce unnecessary cost related to treatment of long effects of using water that has high minerals * The community will understand the impact of quality water and manage the standards from a common approach |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The community will endeavor to maintain up to standard riverine vegetation in order to continue drawing quality water from the underground water tanks |
| PRIORITY CATCHMENTS | All catchments |
| RESEARCH PRIORITIES | * The level of minerals from different streams feeding into Thura river * The kinds of plants that may play negative role that increases the level of minerals in the river underground water during droughts |
| ACCOUNTABILITY | CADASAL-KENYA, Ministry of Health and Sanitation, and Ministry of Water and Irrigation |
| SUGGESTED ACTIVITIES | * Regular collection of water samples * Soil testing * Riverine Plant identification |

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| **PROGRAM:**  Planning, Monitoring and Evaluation | |
| **PROJECT:** River Bank vegetation regeneration monitoring | |
| **NO:** F-2 | |
| **OBJECTIVE:** | |
| To encourage continues protection the river vegetation | |
| **PROJECT DESCRIPTION:** | |
| The trees grown in each nursery will be planted along the river until such a time major eroded areas will be managed. Different species adaptive to the river will be used starting from the point where the weir will be constructed.  The members in each catchment will have the responsibility to carryout all tree planting activities. The CADASAL-KENYA will keep close relationship with each catchment to guide them in all areas of implementation. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * To keep the level of water evaporation low * The increase the replenishing ability of the river ecosystem normal * The maintain the quality of water collecting into the underground tanks |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * The environmental cycle will be normalized * The flora and fauna will be restored |
| PRIORITY CATCHMENTS | All catchments |
| RESEARCH PRIORITIES | * Research to identify the common flora and fauna after three years of the programme * The improvement of the fauna and flora and the advantages * The skills needed to accelerate restoration of fauna flora within the river basin |
| ACCOUNTABILITY | CADASAL-KENYA, Ministry of Environment and Mineral resources and KIDLaS |
| SUGGESTED ACTIVITIES | * Collecting of data regularly |

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| **PROGRAM:**  Planning, Monitoring and Evaluation | |
| **PROJECT:** Agricultural Business activities monitoring | |
| **NO:** F-3 | |
| **OBJECTIVE:** | |
| To determine the increase of agricultural related activities and the kinds of trade that emerges after development of Thura River Basin activities | |
| **PROJECT DESCRIPTION:** | |
| The efforts of using the resources of the river will lead to increased agricultural activities, opening new understanding in community business. The production improvement will need new ideas to avoid produce going into waste.  The project of monitoring the crop that needs marketing and that need storage will enable the community to being attaining food security in the long run.  The quality of each produce will be assessed from the beginning to determine the kinds of market suitable for each of the produce.  Where possible great efforts will be put to encourage the community focus on value added approach to business in order to gain more than entering the market with unfinished produce. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Added value and cost * Improvement at household level * Improvement of health |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Protection and improvement in the quality of land and entire riverine ecosystems |
| PRIORITY CATCHMENTS | * Catchment 1, 4 and 5, 8. |
| RESEARCH PRIORITIES | * Marketing trends of different cereals, animals and their product * Difficulties experienced by the community in marketing their produce. * The policy bottle necks in developing value added products |
| ACCOUNTABILITY | CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Set up trading networks * Set up produce collection units in each catchment * Train lobbying groups for each crop or product |

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| **PROGRAM:**  Planning, Monitoring and Evaluation | |
| **PROJECT:** Improvement of management qualities of committees | |
| **NO:** F-4 | |
| **OBJECTIVE:** | |
| To equip the member with the necessary knowledge to promote catchment monitoring network that provide uniformity and long term trends and effectiveness of management actions | |
| **PROJECT DESCRIPTION:** | |
| The catchment monitoring network is likely to consist of line ministry experts, trained committee members and Department of Water and Environmental Management (CADASAL-KENYA). The core focus for the basin monitoring network will be:   * Collection of baseline data on environmental activities taking place in each catchment area * Long term development and maintenance needs based on the data collected * Collection of the data on water and land management activities within the basin. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * Measurement of progress towards objectives will ensure efficient use of investment |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * Measurement of environmental performance indicators to ensure greater understanding of environmental systems. |
| PRIORITY CATCHMENTS | The whole River Basin |
| RESEARCH PRIORITIES | * Investigate the linkage between poor leadership and catchment performance * Assess other strategic plans that may impact on the basin performance * Establish risk based monitoring designs – eg hunger and diseases |
| ACCOUNTABILITY | CADASAL-KENYA |
| SUGGESTED ACTIVITIES | * Install strong data storage equipments |

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| **PROGRAM:**  Planning, Monitoring and Evaluation | |
| **PROJECT:** Planning, Evaluation and Adaptation | |
| **NO:** F-5 | |
| **OBJECTIVE:** | |
| To model, analyze and evaluate the results of monitoring. To adapt future management actions in response to better understanding of the effectiveness of past activities | |
| **PROJECT DESCRIPTION:** | |
| CADASAL-KENYA and THURA RIVER MANAGEMENT AUTHORITY will oversee development of an effective and efficient delivery and coordination mechanism, build on existing responsibilities and providing directions.  The review of the Thura River Basin Environmental Strategy and Actions Plans will lead to detailed development and prioritization of actions and associated short-term and medium term targets that allow measurement of progress towards the long term target of improved forest vegetation along the river and quality water from the river.  Considerable efforts will be required in the next five years to complete the first phase of the suggested projects.  The completion and use of the Adaptive Environmental Assessment and Management Model will target water quality management activities and Vegetation stewardship initiatives along the river.  Programs and priorities will be to increase the quantity and quality of water and to improve vegetation cover through planting of trees. | |
| POTENTIAL ECONOMIC & SOCIAL BENEFITS SPECIFIC TO PROGRAM | * More effective use of human and financial resources to achieve management objectives |
| POTENTIAL ENVIRONMENTAL BENEFITS SPECIFIC TO THE PROGRAM | * More effective targeting of activities to maximize total environmental benefits |
| PRIORITY CATCHMENTS | Not applicable |
| RESEARCH PRIORITIES | * Use of the collected data to check the understanding and assumptions used to set objectives * Identify information requirements and best methods for collection and analysis * Evaluate the socio-economic impacts of tapping underground water from the river |
| ACCOUNTABILITY | * CADASAL-KENYA, KIDLS (Kenya Institute of Dry Land Studies) |
| SUGGESTED ACTIVITIES | * Development and implementation of knowledge and information system for CADASAL-KENYA reporting process |

**INFORMATION SHEET INDEX FOR ACTION**

***FUTURE RESEARCH FOCUS***

1. **Thura River Basin Information sheet**

There will be two kinds of information Sheets to be developed under research project activities. One will be a on Learning about the River and the other will be on Learning about the River Basin.

* 1. ***Learning about the River***

1. River navigation and Course
2. Unique river features
3. The major water collections
4. The river vegetation cover
5. The feeder streams
6. The rock system of the river
7. Erosion on the river banks
   1. ***Learning about the River Basin***
8. Settlement and Population
9. Agricultural activities
10. The Natural Resources
11. Animal life
12. The Pests
13. Forest and Soils
14. River Basin Mapping
15. The major River Threats
16. **Natural Resources Report Card – 2007**

The report Card-2007 is summary information on the present position of environmental intergradations of the nine catchment areas of Thura River Basin. The details are part of the findings of 2007 Environmental Audit conducted by CADASAL-KENYA and CIPRA Consultants- Nairobi.

The report Card is basically the position of the river basin before 2007. It is divided into nine (9) catchment areas after several geo-economic considerations. The Report Card is reviewable after a period of five years.

***See 2007 Report Card***

APPENDICIES

1. ***Current Activities***

CADASAL-KENYA launched phase one of Thura River Basin Restoration Initiatives(TRBRI) this year -2011. The activities started with group awareness process, where all the groups within Thura River Basin began rigorous seminars on environmental protection and management.

***Activities are:***

1. Setting up Tree Nurseries in Catchment 5 and 6.
2. Training on weir site identification and measuring and costing
3. Simple income activities near the Weir construction sites
4. Lobbying against sand harvesting and public meetings by the Ministry of Environment and Minerals resources
5. ***Glossary***

ADAPTIVE MANAGEMENT – A system of management where objectives, priorities and actions are reviewed and refined as better information becomes available.

AEAM – Adaptive Environmental Assessment and Management Model – is a modeling tool used to assess the impact and effectiveness of management actions.

TRRUA – Thura River Resources User’s Association – is a registered association by the community within Thura River Basin in Central Mbeere Region in Embu County in Kenya.

TRBEP - Thura River Basin Environmental Project- Is the first phase projects selected to be implemented in the next five years in Thura River Basin by CADASAL-KENYA in conjunction with the communities living in Central Mbeere Region.

TRBFDAP - Thura River Basin Future Directions and Action Plan – It is the Strategic Action Plan forming this document intended spur environmental related project in the next few years aligning with the Kenyan Vision 2030.

KIDLaS – Kenya Institute of Dry Land Studies – A proposed institutions to be started in 2012 for the purpose of conducting studies and disseminating to the community in form of seminars and workshops in all working areas of CADASAL-KENYA

TRBRI –Thura River Basin Restoration Initiatives – The name of the first phase of the activities that have started in Thura River in 2011. This will continue to the year 2015 when a comprehensive evaluation will be undertaken to determine the impact of the activities of phase one towards restoring the river.