

## Summary, Recommendations and Conclusion

### 5.1 Summary

Flood disaster is a major problem in the rice bowl of Thanjavur district. The river Kaveri fetches water to the agriculture lands from the catchments of the Western Ghats parts of Karnataka. For the past ten years due to fluctuating climatic conditions the catchments are not receiving sufficient rainfall and hence the farmers are not able to feed sufficient water to the crops due to dry river conditions. At the same time due to cyclonic and local disturbances during November 2005 this region has received torrential rainfall in a continuous manner filling all the tanks and overflowing the rivers causing major breaches which further allows the excess water to flow in the rural and urban areas and heavy loss to men and materials. The Kaveri delta region of this part has been experiencing this type of conditions for the past three decades. The present study has been made in a systematic way to trace the past flood conditions in the district and also to compare the present floods (November 2005). To study the impact of urban and rural floods in this district, three latest technologies like the remote sensing, GIS and GPS were used to derive various digital maps and field survey maps to explain the reasons for heavy flooding. The remote sensing satellite data were used to assess the damages and compared with the ground truth data. The GPS technology has been used to locate the major breaches along the tanks and the rivers/streams and using the remote sensing and GPS data a vulnerability map has been designed to get information about the low to high vulnerable zone. By using this map the district administration can locate the

major disastrous areas to save the life in future. Similarly the agriculture loss map which has been designed using the remote sensing image analysis shows the places of heavy damages to the crops and by using this map and arresting the breaches this type of heavy flood damage for the crops could be avoided. Apart from these observations from the maps the following field observations were also noticed:

- a. Along the Kollidam River, particularly in the taluks of Thiruvaidaimarudur and Papanasam several breaches were observed during the field investigation. It shows that the embankments were not properly maintained and not cleared the grown bushes periodically.
- b. The artificial embankment near the Manniyar Valkai has completely been destroyed due to floods and this embankment which was constructed a long time back was not properly maintained to withstand the flow of excess water
- c. Excess flow of water in Grand Anaicut was allowed to flow in the Tohur village and completely damaged. It is mainly due to the Anaicut was sloping towards the Tohur village causing heavy damages.
- d. In Sengipatti there are 175 tanks and they were not properly maintained. During the flooding the tank embankments were washed away and this is the main reason for the heavy floods the entire Sengipatti village and as a consequence the Tiruchirapalli – Thanjavur road was cut off during floods.
- e. Along the rivers of Kollidam there are number of brickline industries (at small scale) are allowed to practice. During flood situation this would be an obstruction of diversion of water flow to the low lying areas. Similarly sand mining is common in Kollidam river and it is evident from the physical verification of huge remnants on the rivers and river beds. This would also act as diverting agent of the river course, during floods.
- f. In Pattukottai, Orathanadu and Peravurani along the Kattaru, the roads were laid equivalent to the height of river course. The contour map shows the MSL of these areas are less than 10 meters and the collection of surface runoff from various tanks and river breaches would emerge at a very faster rate and this is the reason that a bus was washed away.

- g. From the study it is evident that the Agricultural loss has been very high which is estimated that more than 60 per cent loss. Among the taluks paddy is fully cultivated in Thiruvudaimarudur, Kumbakonam, Papanasam, Thiruvaiyaru and Thanjavur have been damaged due to flash floods. For this heavy loss the reason is due to several breaches along the river Kollidam, except Thanjavur. There is no proper drain facility in Pattukottai, Orathanadu and Peravurani taluks during heavy rain/ flood season and this is the region where several rivers locally known as *Kattar* confluence and with increased volume of water in the steep slopes in some places.
- h. The present research suggests that utmost care need to be taken from the above points so as to avoid any further loss or damage to the district in the near future.

## **5.2 Recommendations**

### **5.2.1 Encroachments on the River Kaveri**

Many people have constructed houses on the river course. Many farmers and also local bodies are unhappy over the closure of Mettur reservoir for irrigation as water was drawn for drinking purposes too. But a few, however, are happy over the closure as they can easily encroach on the Cauvery River. Harvest After the dam's closure, meagre quantity of water is flowing into the river. This has thrown the field open for encroachers. The encroachers have raised paddy and it is likely to be harvested in April. Similar encroachments are also seen in many places. Many people have constructed houses on the river course. Coorg is the first recipient of Kaveri's benevolence and does her proud with verdant vegetation. It is the land of sandalwood and cedar where betel vines cling endearingly to the trees. Swaying with a grace typical of the area, areca palms and cardamom plants add spice to the exhilarating atmosphere. The jungles abound in wildlife the vistas of the hills and dales of Coorg and the breathtaking views are a treat for nature lovers.

As Kaveri turns west beyond Kushalnagar, the first important shrine is that of Ramnathpura. Rama after killing Ravana is said to have worshipped the Eswara Linga here. A majestically flowing river and lush paddy fields offer a colorful canvas. The entire area is very picturesque with high wooded hills and deep gorges alternating with the plains of the river and her tributaries. Extremely attractive idols of Sri Kodandarama and his consorts adorn the temple at Chunchanakatte.

Kaveri now heads eastwards and deposits all the water in the Krishnarajsagar reservoir built very close to Mysore. The reservoir sports the world famous Brindavan Gardens. The dancing fountains and the myriad colored lights turn this well laid out garden into a veritable dreamland in the evening. En route to Srirangapatnam is the Ranganathittu bird sanctuary. White crane, night heron, darter, spotted pigeons and other birds of varied plumes and colors flock to this place and often take a joy ride on the backs of the crocodiles lazing in the sun.

Srirangapatnam, which is at a distance of about 15 km from Mysore, was the capital of Tipu Sultan. Standing amidst the minarets and the royal palace is the temple of Sri Ranganatha or Vishnu. Tipu made generous contributions in the form of gold jewelry and silver ritual vessels to the temple. About 40 km from Mysore lies Somnathpura on the banks of the river and is noted for its Lakshmikeshava temple, a splendid specimen of Hoysala style of sculpture and architecture. Constructed in AD 1268 by Soma, an officer in the court of Hoysala Mummadi Narasimha, this temple must be one of the most beautiful buildings in the world. It has superbly sculpted walls and intricate ceilings, and no two friezes are alike. The flowing contours of majestic elephants, soldiers and galloping

horses, as also the use of space to highlight the dramatic effect, infuse a remarkable realism into stone.

Talakad is another well-known pilgrimage center sanctified by Kaveri and it is described as changing the direction of her flow in four ways, and in each of these vantage points stand temples dedicated to Shiva. These are the Panchlingeshwara temples nestling in huge mounds of sand. Having distributed her largesse in the form of mineral deposits and water over a vast tract of land, Kaveri next turns into a gigantic waterfall at Sivanasamudram whose hydroelectric potential has been tapped. The deafening roar with which she cascades down at Gaganchukki and Barachukki silences the spectators into a mute awe. She then touches the southern border of Bangalore district and makes her entry into Tamil Nadu through an extremely narrow passage aptly called Meke Datu, or goat's leap. Her tributaries Kanva and Arkavathi swell her ranks here. As in the case of Karnataka, Kaveri has bestowed immense agricultural prosperity to Tiruchi and Tanjore districts of Tamil Nadu.

As the last lap of her marathon journey, she links her lot with the Bay of Bengal at Kaveripupattinam exactly one year after her emergence at Bagamandala and lends credence to the Hindu theory of rebirth by starting her journey all over again on Tula Sankramana, bringing in her tide a new hope, a renewed faith.

### **5.2.2 A Water vision from the community perspective**

Rooted in power, poverty and equality, not in physical availability". It argues that there is more than enough water in the world for domestic purposes, for agriculture and for industry. The problem is that some people — notably the poor — are systematically excluded from access by their

poverty, by their limited legal rights or by public policies. The report concludes that decentralised, small-scale solutions and efficiency improvements are more likely to reach the poor than large centralised reservoirs and canals.

### **5.2.3 Warning**

When asked about such encroachments, the Public Works Department officials said that they had warned the encroachers to no avail. Govt takes safety measures as Cauvery swells Tuesday, 14 August , 2007, 09:16 With River Cauvery in spate following opening of the Mettur Dam, the Tamil Nadu Government today said it was taking all steps to ensure the safety of the people and property. An official release here said 486 families in Namakkal and another 278 in Erode living in encroached structures on the banks of the river had been evacuated to safety following huge inflows into the river.

The government had instructed the District Collectors of Salem, Namakkal, Erode, Karur, Tiruchi, Perambalur, Tanjavur, Tiruvarur, Nagapattinam, Puthukottai and Cuddalore to initiate round-the-clock preventive and safety measures. Revenue officials were monitoring the situation in the respective districts, the release said. Meanwhile a report from Erode said three persons were washed away in floods at Kodumuddi and Kodivery today. Komarapalayam, Pallipalayam of Namakkal District and Karungalpalayam, Kodumuddy and Vairapalayam of Erode District were badly affected due to the release of about 1.35 lakh cusecs into River Cauvery. From both the districts, about 2,000 people were evacuated and shifted to safer places.

A medical team was deputed to Erode. The Health Department had taken precautionary measures to control any outbreak of water-borne diseases in the flood-hit areas.

## 5.2.4 Flood Control: Multi-Sectoral Approaches in River Basin Management

- a. Integrated Water Resources Management adopting the Dublin principles of 1992 involves judicial management of surface and groundwater, and
- b. Water the single and finite resource has to be managed treating it as an economic good allowing the stakeholders and women in the basin to involve in the management and development of the basin.
- c. The multi sectoral approach has been preferred by policy makers and users.
- d. This could not be practiced due to constraints in the administrative set up of our country.
- e. The World Bank which supported the development of Water resources through "Water Resources Consolidation Project" in Tamil Nadu has given exposure to tools and methodologies for affecting the Integrated Water Resources Management.
- f. Irrigation in Tamil Nadu is very ancient; hence mindset of hierarchal farmers could not be easily changed to suit present tools in short time.
- g. Participatory irrigation approach came in very handy to create ownership feeling, bringing stakeholders across the table, making them capable of understanding the language of Line Departments, Managers, Policy Makers, Consultants and Executives.
- h. World Bank supported the multi-sectoral approach for water resources development through the formation of the River Basin Management Boards, empowering them to take decisions to implement the above policy.
- i. The Participatory Irrigation Management made mandatory by forming Water Users Association thereby making them a part of system improvement works, which they themselves executed in many places and agreed to take over the system for maintenance. Finding farmer's community very receptive to this approach the Government of Tamil Nadu has formed River Basin Management Boards.
- j. Current National Water Policy and the State Water Policy adopted.
- k. Basin Boards formed for two basins out of 17 basins in Tamil Nadu.

- I. Two River Basins selected in priority by WRO - one drought prone basin in the northern part with pollution problems.

### **5.3 Conclusion**

The river Kaveri and Kollidam flows in Thanjavur and Thiruvaiyaru Taluks make this region as agriculturally fertile. Majority of the paddy-cultivated areas are present in this part of the region. Apart from these two major rivers, there are minor rivers/ streams/canals namely, Kudamurati, Vennar, Grand Anaicut canal feeds water to the rest of the areas in the taluk for agricultural activities. The seasonal floods November(2005) have affected almost all the agricultural crops in these two taluks, the reason is due to several breaches along the river Kollidam and other rivers in these taluks. For example the river Kollidam alone had two major breaches that allowed river water to rural areas, damaging to the household and agricultural resources in this region. The field investigation carried out in these two taluks implies the following to reduce the flood disaster in future:

- a. Tohur village in Thiruvaiyaru Taluk is one of the submerged village and approximately about 300 people are living in the low-lying areas, just below the banks of the river Kollidam. The field investigation shows that they are living just 15 feet below the river and naturally any flood situation occurs, these people would be affected severely. As this region is the highest vulnerable zone, the only solution is to evacuate the entire village, as it is not safe to live in this area.
- b. There are several river encroachments in the form of construction of houses and agriculture practices obstructs or divert the river flow during flooding and this type of practice must be avoided in future.
- c. The tanks in Sengipatti taluk and Perambur tank near Bhudalur are not properly maintained and hence several breakages were noticed. This has caused breaches of tanks and overflows and

causing and entering heavy floods in Thanjavur taluk, destroying many houses and agricultural properties.

- d. The artificial levees along the river Kollidam must be strengthened to withstand the excess flow during the flood season.

Papanasam taluk is one of the worst affected areas of Thanjavur District. Due to numerous breaches in the Kollidam River several villages along the river has been marooned and incurred a loss of huge properties. Several pucca buildings were damages and a number of huts were washed away in the flash floods out of the cyclonic storms in the Bay of Bengal. Apart from the household properties several hectares of agricultural standing crops were destroyed. In the southern part of the taluk due to mixed drainage system for irrigation purpose had been overflowed during the season flood (2005). The recent flood is mainly due to heavy rainfall along the catchments areas of the river Kaveri and local rainfall due to severe and continues cyclones. Apart from this fact there are some of the hidden facts are also seen during the filed investigation. Along the rivers of Kollidam and Manniyar there are several encroachments in the form of huts, cultivation of sugarcane, growing coconut trees. Bamboo and so on obstructs or diverts water to the nearby villages causing heavy damages. Proper management of riverbanks, artificial embankments need to be strengthened. The district administration must not allow the people in the low-lying areas (villages) or at least they should be evacuated during erratic cyclone seasons.

Pattukkottai is a coastal taluk in Thanjavur district. There are several rivers and small streams confluence along the Bay of Bengal. Most of the rivers in this taluk are dry throughout the year except occasional cyclone induced rainfall, which leads to flash floods. During flood season the rivers/ streams in

this taluk are flooded with water. The general gradient of the taluk is towards south ranging from 30 feet (in the north and south, almost sea level). Due to the topographic nature of this taluk, when the river/stream gets water through torrential rainfall in catchments and cyclonic disturbances the water flows at a very faster rate and that is the reason they are called locally as "*Kattar*". The roads are laid equivalent to the height of the rivers in this region and they are not advisable to use during the flood situations. Field investigation reveals that several breaches were located along the rivers/ streams and tanks. According to the data there are eleven breaches in the taluk during the November 2005 seasonal floods. The vulnerability map clearly shows that majority of the area falls in the category of very high and high vulnerable zones during flooding. There has been heavy loss to agricultural productivity in this taluk due to the floods.