



Source: Author

# REFLECTION 9

This chapter gives personal reflection on the entire process of one year, learnings and contribution



## REFLECTION

The research question of this project was to integrate resource management into urban planning by developing local scale spatial strategies for environmentally sustainable city. The project lays emphasis on improving the socio-ecological systems and at the same time discusses its integration with socio—technical systems for a holistic implementation of circular principles. The last nine months of the thesis period was rigorous and an iterative process of research analysis followed by cumulative design proposals.

### i) *Relation between Research and Design*

The thesis has started with a personal motivation of developing environmentally sustainable cities and special interest in the concept of circular economy. The thesis follows research based design methodology. The problem analysis is both inductive and deductive study, construction of problem statement, research of the existing theories and current practices in the field of circular economy, building the methodological framework and the flow analysis form a strong research foundation of the project. The analysis of the current practices has given an overview of the negative impacts of linear metabolism, negligence of socio-ecological systems in planning and the gaps in knowledge and implementation in a multi sectoral governance system.

The understanding of the theoretical analysis came out stronger with the help of fieldwork. The interviews from the actors in micro scale such as waste collectors from household, consumers; meso scale actors – technocrats, industrialists, contractors, farmers and fisherwoman and the macro scale- governance/ responsible authorities have given an overview of the complex relations, their gaps and points of perspective. The fieldwork played a major role in synthesizing the theories and practicality together. This has also had a crucial role in developing the vision and strategies. All through the research analysis the main focus of the thesis was on developing decentralized solutions but with the help of field work and analyzing the current dynamic on the site, it resulted in a combination of both centralized and decentralized systems favoring the current situation. The design proposals resulted in integrating the spatial strategies for circular solutions as a part of public space design in the contrasting cities of centralized and decentralized systems.

### ii) *Relation between my graduation (project) topic, the studio topic, my master track, and my master programme.*

The topic of research is reusing the waste streams as secondary resources by which there is reduced pressure on the environment for resource demand through which the cities can be sustainable. The topic is directly related to the studio of urban metabolism, in the aspect of understanding the current metabolism of the city. Resource flow analysis plays a crucial role in this thesis. The design section of the project contributes to the discussion of “spatial translation of circular metabolism”. The method of Material flow analysis followed focuses along the lines of spatial impacts of the flows.

With the growing complexities in the expanding cities across the globe, transition into sustainable development is quite crucial. This thesis contributes to the knowledge of developing sustainable cities, an ongoing discussion and major goal in every master of Urbanism track.

### iii) *Elaboration on the research method and approach chosen*

The major goal as well as challenge of this project is to combine research and spatial translation of the vision. A set of seven sub-questions are formulated in order to answer the main research question. These seven steps are:

Problem Analysis – Resource Flow Analysis – Zoom in Analysis – Technical Solutions – Vision and Strategy – Policy review – Spatial design and actors integration

The step of problem analysis is an iterative process. The problem analysis is not confined to the analysis of the linear systems of resource consumption and disposal but also the existing campaigns working on waste/resource management. Finding out the gaps in the existing practices and the agendas of Clean India Mission has helped in finding the line of focus for proposing possible solutions and identify what are the measures that have to be taken into consideration.

The second stage of analysis is the resource flow analysis. Due to limitation of time for the graduation project, the resource flows analysis focused on two major flows in the city – food and water. From the problem analysis it is identified that food waste is the major waste generated in the MSW and wastewater being released into natural streams of water is one of the causes of water pollution. The flow analysis was supposed to be both qualitative analysis and quantitative analysis. However, due to unavailability of data, the quantitative analysis is confined to simple flow calculations and the losses which were based on National Statistical Data. Defining the territories for study in the food and water flow analysis was quite a challenge. Tracking the flows of food expands from household production of vegetables to global imports and the variety of food and the actors involved is beyond the time limit. And the sources of water that is distributed in the city vary from household tube wells to rivers and reservoirs in the region. Taking these factors into account the resource flow analysis is limited to the regional scale and the food flows are limited to production of fruits and vegetables. In this stage, few locations were identified which are facing environmental degradation due to the flows.

The third step involved zoom in analysis of the problematic locations. This analysis is performed in the form of field trip. The field visit has played another important role in designing the thesis. The inputs received from the actors in these locations, technocrats and the authorities has made the challenges of my thesis more evident and understand the ground reality. The major breakthrough is understanding the attitude of the consumers and their role in bringing change.

The following stages involved developing a vision for the city, propose possible solutions and develop into a regional strategy. In the phase of developing a vision, it was a hard task to figure out to have a totally centralized or totally decentralized systems. The field trip experience has given me enough validation for both the cases, as there were problems and benefits with both centralization and decentralization. Further, the comparative studies of existing practices has helped me in deciding to have both the systems in place. Apart from this, there is huge investment already made in the existing infrastructure and actors involved in it have their income from this. And to centralize the entire city will require more investments and infrastructure. Hence the vision of the city is developed as “Local – Adaptable city” where both the systems exist in place. The goals of the vision are classified into changes in policies and guidelines at the governance scale, change in attitude of the consumers and the changes required in the technology. With this the systemic goals are developed and the actors are identified who are capable of implementing this and placed in an onion diagram. The onion diagram has helped me to identify the actors across different scales and sectors and link them to create the accord. Two pilot projects were chosen on the basis of severity of the environmental damage they are facing and possible solutions are proposed based on the part of the city they are located in. Each pilot case study has a challenge of its own, so it is difficult to propose the same solutions to every case, thus, the solutions have to be tailored according to the issue and the scenario. This implies to every case study not only in this city but also to other cities facing similar challenges. The solutions also result in continuous change in the relation of human and natural systems, an evolutionary resilience as explained by Davoudi (2012).

### iv) *Elaboration on the research method and approach chosen*

This project is a contribution to the growing discussions of circular economy in India and the study of implementation through integrating it into the framework of urban planning. This study has focused on creating the link between socio-ecological systems, socio-technical

systems and governance. During my study I came across reference studies that are dealing with similar situations and had developed small scale eco-innovative solutions. But these cases worked independently and in isolation from the broader spectrum, developed by technocrats or NGOs and are less known to the citizens or other locations in the country. With an integrated approach, there is more scope for betterment across all the sectors of governance, socio-ecological and socio-technical systems.

This project has dealt only with two flows that are causing environmental degradation. However, there are many other waste streams/resource flows that are causing damage such as plastics, textiles, metals and inert wastes that do not damage the environment but occupy volumes of space in the landfills. So the scope of study of resources is huge in the fields of agriculture, industrial metals/alloys, e-waste, textiles, etc. This study has focused on the relations between governance, socio ecological systems and socio technical systems where each entity has its own scope of research in implementing circular economy. The study of circular economy in India is still in its initial stages and there is more need for research in this field which can help in sustainable development. The thesis is developed in a holistic approach on considering the entire loop of flow cycle. Each section within the loop can also be studied under the perspective of urban planning, since majority of the studies are limited to the perspective of industrial ecology.

v) *The ethical issues and dilemmas I have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.*

The ethical issues and dilemmas in thesis have been a constant part in the entire process. The principles of the thesis focus predominantly on the reuse and recycle of waste streams. The question of successful transition has been a hinderance while formulating research question and proposing design strategies. Change is not an overnight process. Changes in society take more time compared to others. The change in the society reflects as breaking down of a belief system and developing a new one. If there is any section of new systems that goes wrong, there are high chances of risks in tearing down the entire effort. Hence, there is higher responsibility in proposing the solutions.

The proposed solutions recommend integration of actors and focus on changing the consumer behavioral patterns. The proposals made in the thesis are ensured that the recommendations for change in consumer behavior are not top down but mostly bottom up and motivating. The role of the actors especially in the local community members is divided equally irrespective of their economic background. This is a conscious decision made observing the current scenario in the country. In India, even today, the actors participating or working in the facilities of waste flows is carried out by the economically weaker sections and socially identified/implied backward community members. Working with the waste flows is considered as taboo and looked down upon. With this attitude, it is difficult to bring change. Thus, the proposed solutions try to create a cleaner working environment to some extent (odour from the organic compost can be controlled but not totally eliminated), encouraging the other economic group members of the community to participate. The employees of the waste collection logistics, street sweepers are mostly women and only men in large infrastructural systems. In the proposed solutions, it is expected to have gender equity in the roles of implementing the solutions.