

# UCL

**MSc Building and Urban Design  
in Development  
Student Report**

**Resilient Yangon:  
Incremental planning  
towards risk mitigation**

In partnership with WFW, ACHR, CAN,  
YTU and AMA



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## ACRONYMS

ACCA	Asian Coalition of Community Action
ACHR	Asian Coalition of Housing Right
ADPC	Asian Disaster Preparedness Centre
AMA	Association of Myanmar Architect
BUDD	Building & Urban Design in Development, DPU, The Bartlett, UCL
CHDB	Construction and Housing Development Bank
DMCs	Disaster Risk Management Committees
DPU	Development Planning Unit, The Bartlett, UCL
DRRSSWG	Disaster Risk Reduction Sub Sector Working Group
DRRWG	Disaster Risk Reduction Working Group
DUHD	Committee Department of Urban & Housing Development
EWS	Early Warning System
GEN	Gender Equality Network
GIDRM	Global Initiative for Disaster Risk Management
GoUM	Government of United Myanmar
JICA	Japan International Cooperation Agency
MAA	Myanmar Action Aid
MAPDRR	Myanmar Action Plan for Disaster Risk Reduction
MC	Ministry of Construction
MCCR	Myanmar Consortium for Community Resilience
MCDRR	Myanmar Consortium for Disaster Risk Reduction
MCEA	Myanmar Construction Entrepreneurs Association
MEC	Myanmar Earthquake committee
MES	Myanmar Engineers Society
MHA	Ministry of Housing Affairs
MIC	Myanmar Investment Committee
MIFER	Ministry of Investment and Foreign Economic Relations
MMCWA	Myanmar Maternal and Child Welfare Association
MNBC	Myanmar National Building Code
MNPED	Ministry of National Planning and Economic Development
MPF	Ministry of Planning and Finance
MRAC	Ministry of Religious Affairs and Culture
MRT	Mass Rapid Transit
MSWRR	Ministry of Social Welfare, Relief and Resettlement
MWAF	Myanmar Women Affairs Federation
NDPCC	Natural Disaster Preparedness Central Committee
NGO	Non-Governmental Organization
NLUC	National Land Use Committee
ORDA	Office of the registration of Deed and Assurances
SLRD	Settlement and Land Record Department
SUDP	Strategic Urban Development Plan of the Greater Yangon
UCL	University College London
UN	United Nations
UN-Habitat	United Nations Human Settlement Programme
URDI	Urban Research & Development Institute
USAID	United States Agency for International Development
UNISDR	The United Nations Office for Disaster Risk Reduction
WfW	Women for the World
WMF	World Monuments Fund
WPT	Women's Protection Technical
YCDC	Yangon City Development Committee
YCZC	Yangon City Zoning Committee
YHT	Yangon Heritage Trust
YTU	Yangon Technological University

## EXECUTIVE SUMMARY

This report is part of a research-based design project that has been conducted by UCL students as a result of an ongoing collaboration between multiple institutes under the coordination of Women for the World and the Development Planning Unit with the participation of the community members of Ward 20 of the city of Yangon Myanmar on the topic of Resilience and Risk Reduction in the time of Transition.

The process of Transition in Myanmar is facing many political, social, environmental and Economic challenges. The country is going through this historical moment under many national and global challenging, one from which is Climate change. Following the research topic of this report “Risk Reduction”, the focus of this research is directed towards understanding the coping mechanisms of communities towards natural hazards within the context of the political transition in the country. The area of focus is Ward 20, which is an area that is considered as one of the densest and fast growing areas in Yangon with a high number of informal settlers who have been denied rights to land and basic services which make them the most vulnerable to natural hazards. Many of these informal settlers have moved to this area as a result of a Natural hazard in other locations. This fact didn’t support their rights for support and basic services, in an opposite manner, many are facing the risk of eviction due to their status as informal settlers.

The country is highly affected by Climate change and natural hazards which along with conflict is considered among the main causes of internal displacement in the region. In relation to the research topic and the initial desk research that has been conducted in London, the group has developed the main research question; “To what extent could the scaling up of the existing Nalehmu practices contribute to risk mitigation and preparedness, leading to a more resilient Yangon?”, from where we identified two main analytical tools to conduct the research: Risk accumulation and Resilience.

The research was conducted on multiple stages, Pre-field work where the group have examined secondary data about the area and developed methods of engagement with the community during the field work. The second phase was in Myanmar, the group collected a high amount of primary data, worked long-side local students and community members to develop a better understanding of the community’s ideas on what is risk and disaster for the community, where and how disaster occurs, and which are their existing practices to cope with disasters.

After this phase, and following our understanding that The accumulation of risk increases the community’s vulnerability from hazards, we have concluded three main findings that led to the development of strategies and interventions in the third phase of this project;

1. Despite knowing the causes of the accumulation of risk, there is little technical and financial capacity among the community to improve their physical environment.
2. The existing practices of Nalehmu increase the community’s ability to cope with risk, but is not enough to build a resilient community.
3. The process of transition and transformation in Myanmar has exposed multiple exclusionary planning gaps, difficult to bridge through social practices and solidarity.

From here we defined our main design guidelines towards the concept of Accumulating Resilience:

1. Upgrading Physical Environment.
2. Amplifying Collective Action.
3. Bridging Planning Gaps.

All of them, unfolded in specific strategies and interventions, aimed at answering the research question, while scaling up social practices and bring collaboration between different actors towards resilience; we hope that despite all the limitations related to this research it will be considered useful for our partners and the community in Ward 20.



Figure 1. Pagoda in Yangon, Myanmar

## POSITIONALITY AND SUBJECTIVITY

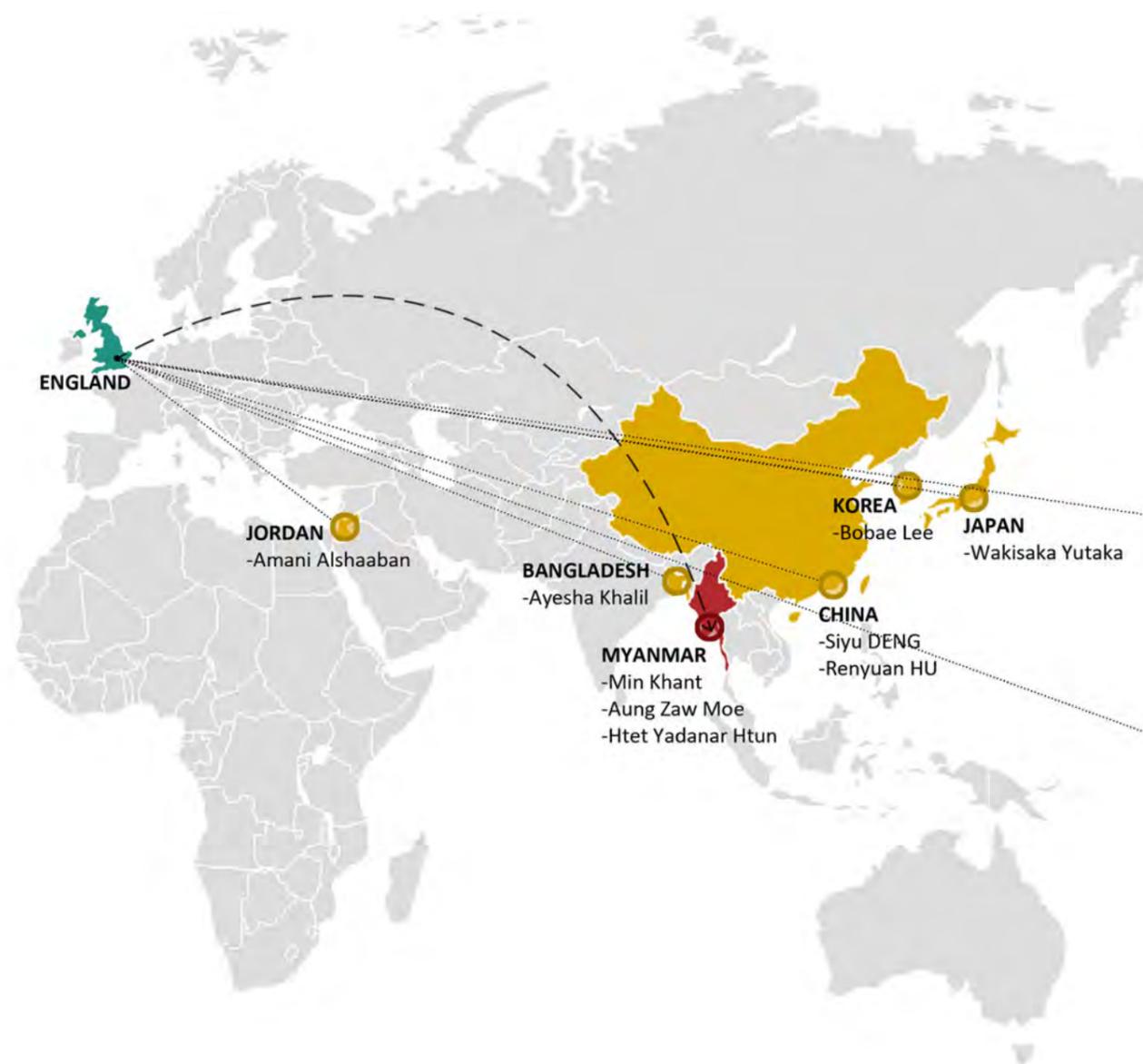


Figure 2. Map of Origin of Team Members and Reflected Positionality Related to

In the pre-fieldwork stage, we identified several issues we would face during our field trip in Yangon, to which we did not have a clear or easy answer:

Firstly, and despite the pre-field research, the political, cultural and social context was still difficult to understand for most of us. Secondly, the problem with language: not only the obvious fact of us not speaking Burmese, but also the different jargon and discourses used by us, coming from a very specific academic/architectural culture, and the community or the local students. Thirdly, we had the issue of our own positionality: postgraduate students coming from London to do a research on a “case study”, and the power/knowledge imbalances this could bring about. Finally, reflexivity: the effect of the researcher on the researched. How to make sure our proposals for the Ward 20, were taken by the community members as it is, and no more: an academic exercise – research-based, part of a long-term partnership, developed as thoroughly as possible- all of that, yes, but an exercise and not a solution. A starting point for a conversation, instead of the final word or a clear statement.



The first thing we did as an intuitive answer to these issues was using what we had at hand: our own stories and our countries “. Our group was formed by people coming from Jordan, Bangladesh, China, Japan, Korea, Mexico and Chile, all of which shared some link with Myanmar: trade and cooperation traditions, a shared Japanese colonisation, informality and solidarity practices, transition from dictatorships to (weak) democracies, etc. We defined a “Geography of positionality” (Rose 1997) as depicted in this map.

Secondly, we made a conscious effort to avoid knowledge imbalances, listening as much as possible to the community members and constantly talking and developing strategies with the local students. We also took enough time to find the right translation for the key concepts.

Finally, reflexivity becomes the most difficult aspect of our work: a strong emotional bond between all the participants was quickly developed, along with an intense co-production of knowledge, being difficult to define and make explicit the boundaries and reach of our work. WFW did an intense preparation and contextualisation work before our arrival, which helped us enormously. Nevertheless, reflexivity remains the most critical topic for us.

## ACKNOWLEDGEMENTS

# FINAL PRESENTATION OF TRANSFORMATION IN A TIME OF WORKSHOP



City Hall



We acknowledge the privilege of engaging with the community in Ward 20 and the fruitful collaboration with many individuals and institutions in both Myanmar and London. This experience has widened our horizon and understanding on the complexity of the urban reality.

We are most grateful to the community of Ward 20, who hosted us and supported our research with kindness and enthusiasm, willing to share with us their personal stories, despite how hard some of them were. All of this left us with an overwhelming feeling of appreciation and responsibility to give back to the community some of our knowledge.

Throughout this process of collaboration, we have learned a lot from our local partners in Yangon. We thank all individuals and institutions that engaged with us on different levels. Special thanks go to Women for the World for providing us with multiple opportunities of engagement with the community and multiple actors and, most importantly, for setting an example for us through their inspiring work. A special thanks to Van Liza Aung for her outstanding efforts and hard work to support the communities in Yangon.

We would like to extend our gratitude to ACHR, CAN and CPB for supporting us and kindly sharing all their knowledge and experiences with us, which became a significant part of our trip and learning process. Furthermore, a special thanks goes to YTU students who joined us in Yangon: Min and Aung have added a great value to our team, supporting us with the fieldwork and during the activities with the community members. Our experiences wouldn't be the same without the enthusiasm and knowledge of them, which we really appreciated and highly enjoyed.

Our time in Yangon have opened our minds into a completely different reality: we tried to remain stand humble when facing all the complexity that the city holds; being aware of the language limitations between us and the community of Ward 20, we have tried to break these boundaries as much as possible.

This process would not have been possible without the continuous guidance and support provided by our tutors from DPU; we highly acknowledge the efforts of the BUDD team and DPU administration in organizing this valuable experience and making our stay as pleasant as possible. Furthermore, we would like to thank our BUDD colleagues who have enriched our work with their knowledge, enthusiasm and joyful spirits.

Figure 3. City Hall Presentation / Image source: Giorgio Talocci

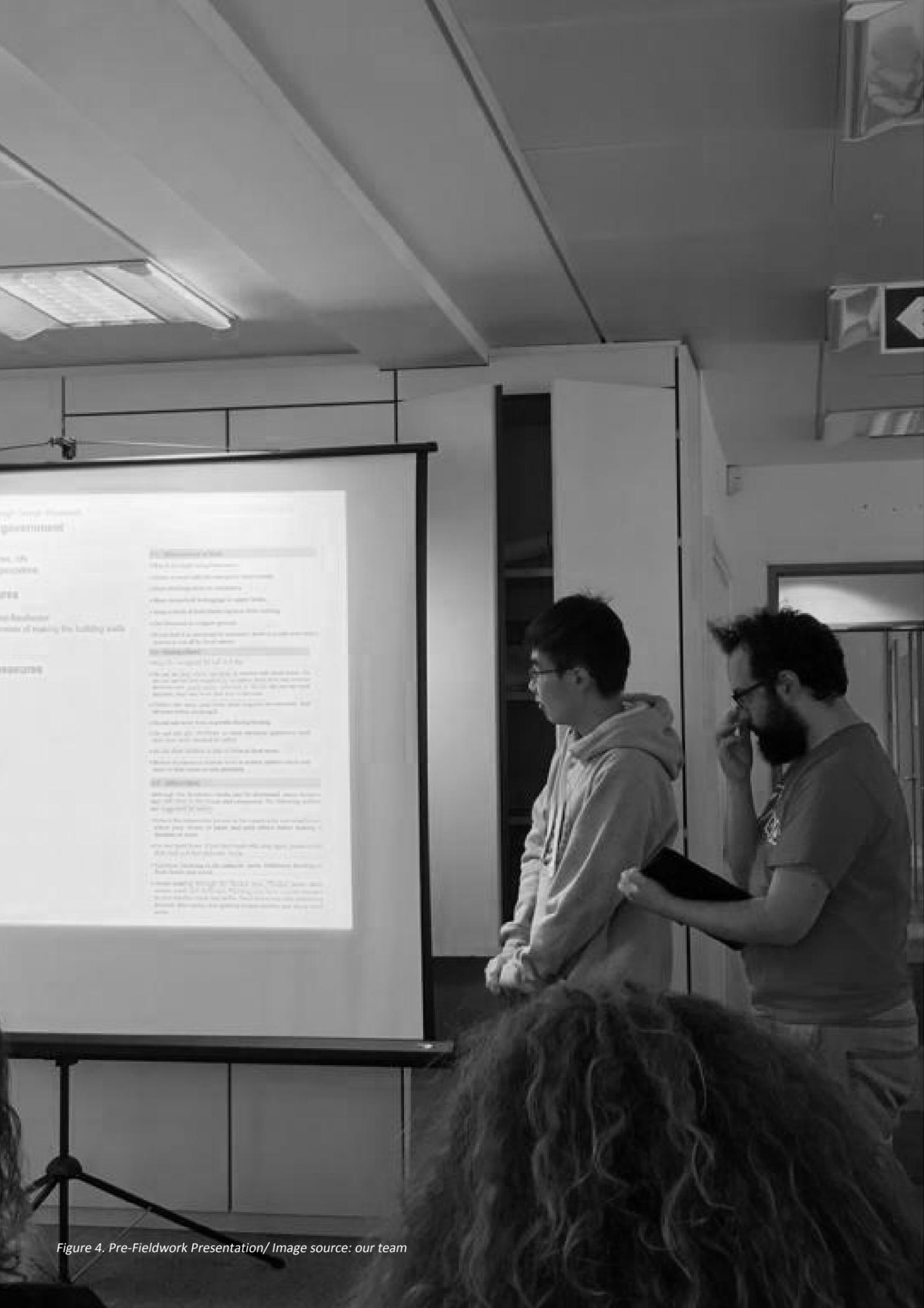


Figure 4. Pre-Fieldwork Presentation/ Image source: our team

## A. PRE-FIELDWORK

# 1. INTRODUCTION

Myanmar is considered as a low-middle income country that is witnessing a boom in economic growth and development along with the transition from Dictatorship to Democracy. The process of transition includes multiple changes in the political, social and environmental relations among people and with the government of Myanmar, which is reflected in the development approach and the practice of everyday life. Adding to the complexity of the processes of political transition; the country faces two main challenges that of a high level of impact on the process; the accelerated conflicts and climate change. Extreme natural hazards are one of the main causes of displacement and increase of vulnerability around the country. That's said, those factors have multiple implications on the increase of squatting and informality in Yangon the capital and around Myanmar (MAPDRR, 2017).

Climate change has affected Myanmar rapidly in the past 20 years which made it classified as one of the most disaster-prone countries exposed to multiple hazards. The country is vulnerable to almost most kind of hazards, including fire, earthquake, strong wind/cyclone and Industrial Hazards. The notable change in the temperature and rainfall levels have gradually affected the natural hazards in the region. (Zin et al., 2017) According to recent studies, fire, floods, cyclones and industrial pollution are among the most frequent hazards affecting Yangon (MAPDRR, 2017).

The united government of Myanmar has prioritized to integrate Disaster risk reduction strategies within the ambitious development scheme of the country. The plan focused on capacity building, preparedness, early warning systems and a comprehensive disaster management plan. One of the parallel challenges of building community resilience is the fact that the majority of the population live in peripheral areas, or areas where multiple risks accumulate such as industrial parks and Deltas. That said, the high number of informality, low level of institutional coping capacity and the complexity of the citizenship rights put informal settlement residents in a continuous cycle of vulnerability towards natural and man-made hazards (MAPDRR, 2017; Smith and Chan, 2018).

## **Disaster risk reduction as an urgent requirement**

The impact of natural and man-made hazards goes beyond the immediate damage, but they also have far-reaching implications, particularly on the most vulnerable

communities including small rural households, small businesses, farmers and marginalized groups which usually continue for years afterwards. In the case of Cyclone Nargis; it was found that the social and economic fabric were still affected 8 years after the disaster. The effects of natural hazards could evolve over time based on the strength of the community to cope through collective action, the effectiveness of aid efforts, subsequent external events, the living circumstances in the pre-disaster era and the adaptation capacity towards the environmental and economic changes. (MAPDRR, 2017; MIMU, 2018)

That said, the rapid growth in the number of population in Yangon accompanied with the urbanization of farmland and squatting within the context of weak or non-existing infrastructure is adding into the accumulation of the factors that increase the vulnerability of people toward natural hazards. Furthermore, the illegal status of informal settlers increases the complexity of the situation as these people's recovery processes after any natural hazard, being denied basic services and citizenship rights from the governments leave them with no choice but depending mainly on their limited capacities and social contacts to cope with the situation.

## **Population growth and urbanization in Yangon**

Yangon is the primary city in Myanmar with an overall population of 5.2 Million people, the city is widely known of urban sprawl and growth in number of population with an average of 1.9% per year since 2006. JICA has estimated the growth to reach 2% from the present day forward at this rate of population growth Yangon will double in size by 2040. Since the economic boom in 2005, many migrants moved to Yangon as individuals looking for better opportunities, but in recent years and due to the increase in rental prices in the city of Yangon, many people are moving to settle in the peripheries. Furthermore, Yangon has welcomed a fair amount of immigrants due to extreme climate conditions especially after 2008. Informal settlements are already taken place around the sites of industrial parks that are pre-urban areas. Furthermore, many settlers in the peripheries need access to the business center of Yangon and due to the lack of proper connected network of public transportation, some try to solve this issue by squatting in the inner city, which has been ended by eviction due to development plans (MIMU, 2018, Smith and Chan, 2018, Forbes, 2016).

## RESEARCH QUESTION

### The Trajectories of Nalehmu Practice on the Notion of Accountability and Citizenship

In the context of Yangon, the accountability based on membership has a limitation within its transitional context. A vast number of community members lives in the informal settlement without legal registration which is the base for gaining rights to basic services of practicing citizenship. On a broader understanding of the topic, Nicola Yeates argued that in the complex times of the contemporary era of democratization within the context of globalization beyond physical and political boundaries there have been an increase demand to extend the notion of citizenship from its membership form to a human right. (Yeates, 2001, Standing, 2013). In a more inclusive terms Gaventa argues that when citizenship is understood as an inclusive human rights; accountability to values, such a peace, humanity, respect for differences and diversity, as well as responsibilities, empathy and solidarity becomes mandatory and necessity to cope with the influx of development and globalization (Gaventa,2006, UNESCO,2015).

In Myanmar culture, there is a traditional practice called Nalehmu, literally meaning “understanding”. Roberts (2018) states that Nalehmu is a “personalized network of implicit mutual obligations, reciprocity and trust established through long term interactions among community members”. He also recognizes that this social practice in between the formal and the informal, the legal and illegal is “essential to any kind of life beyond mere survival” (ibid.). It is also a network of relationships between individuals, that provides a “sense of security when there is no generalized trust or universal justice” (Ibid.). Nalehmu is based on accountability to values that is embedded in the cultural heritage and practice among many of the Asian cultures, which is based on sharing principles of humanity, empathy, and solidarity. In the current situation of transition; with the limited resources and support from the government especially for those who fall under the categorization of informality, the Nalehmu practices can be seen as a key component of the everyday practice that helps those communities coping with different challenges, one from which; coping with natural Hazards and risks.

For our analysis, we have grounded the theoretical framework into one of the themes provided by the Ward 20 community and the NGO Women for the World (WFW): “Disaster Risk Reduction”, while the narrative of DRR is highly technical and connected to physical and practical terms, our research question is structured

around multiple clues for scaling-up, geographically, physically and socially by bridging the gap between the community and the government through expanding our understanding of the implications of the existing collective actions, the accountability and ethical engagement between the community through Nalehmu practice as a starting point towards building resilience. That said, we have framed our research question as follows:

**“To what extent could the scaling up of the existing Nalehmu practices contribute to risk mitigation and preparedness, leading to a more resilient Yangon?”**

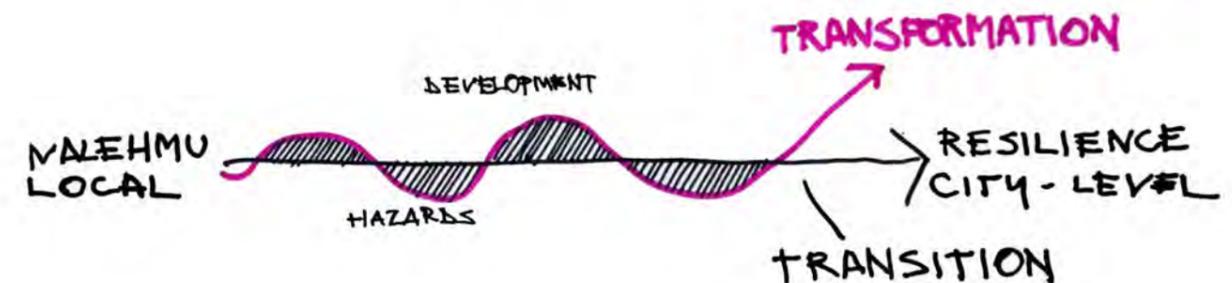


Figure 5. Diagram of Transition and Transformation towards Resilient City

## RESEARCH METHODOLOGY

With reference to the main research question, the group has conducted the research based on primary data from field and secondary data from literature and official reports with the national government in Myanmar and Multilateral agencies that are operating in the country. For the first phase of the research the group examined literature on some main topics, the transition and transformation of the county by looking at historical data and current situation from the lenses of multiple actors supported with news reports and short report. The aim of this process was to understand the implications of the process of transition from dictatorship to democracy and to examine if this process is matching the current mode of governance in the country. That said, the team has put a lot of emphasis on understanding the institutional structure and the operational flow within in relation to Disaster Risk Reduction and development on the national level and the operational flow of YCDC on the local level. This process aimed to find the institutional gaps and the level of community participation in the decision making processes. The outcome of this desk research were examined on field through engagement with institutional bodies and community members.

Furthermore, the group has put emphasis on understanding Nalehmu Practice through examining secondary data and news reports at first in an attempt to understand how actors see and engage with this practice, it was essential to understand the government approach to dealing with this practice and how the community relate to this. Taking this forward; during the field trip,

the team has openly discussed this and investigated these practices with the community. The results of this investigation fed into the understanding of the operation flow and the decision making processes within the governmental body, which eventually aimed to understand the implications of scaling up the Nalehmu practices and the relation between this strong socially driven approach and the multiple notions of citizenship.

During the community engagement events in the field work, the team conducted multiple activities with the community members that aimed to understand their view and perception of the notion of Risk, their coping mechanism and their proposed solutions. The participatory tools and the structure of the 3 days' workshop were directed to two main goals, one to spread awareness on the idea of risk accumulation, and second to examine the previous reflections with the community. The tools will be further explained in the field work chapter. but it largely consisted of focus group, risk mapping, transect walks and other tools to assess the local perceptions about risk and how to deal with it.

The post fieldwork was characterized by the definition of main finding, coming from both primary and secondary data, and the guidelines and strategies, being the latter a direct response to the former. Finally, the strategies, are integrated in a multiscale way, across time and spatial scales, from the Ward 20 to the city of Yangon, in order to tackle the objective of achieving a city-wide upgrading.

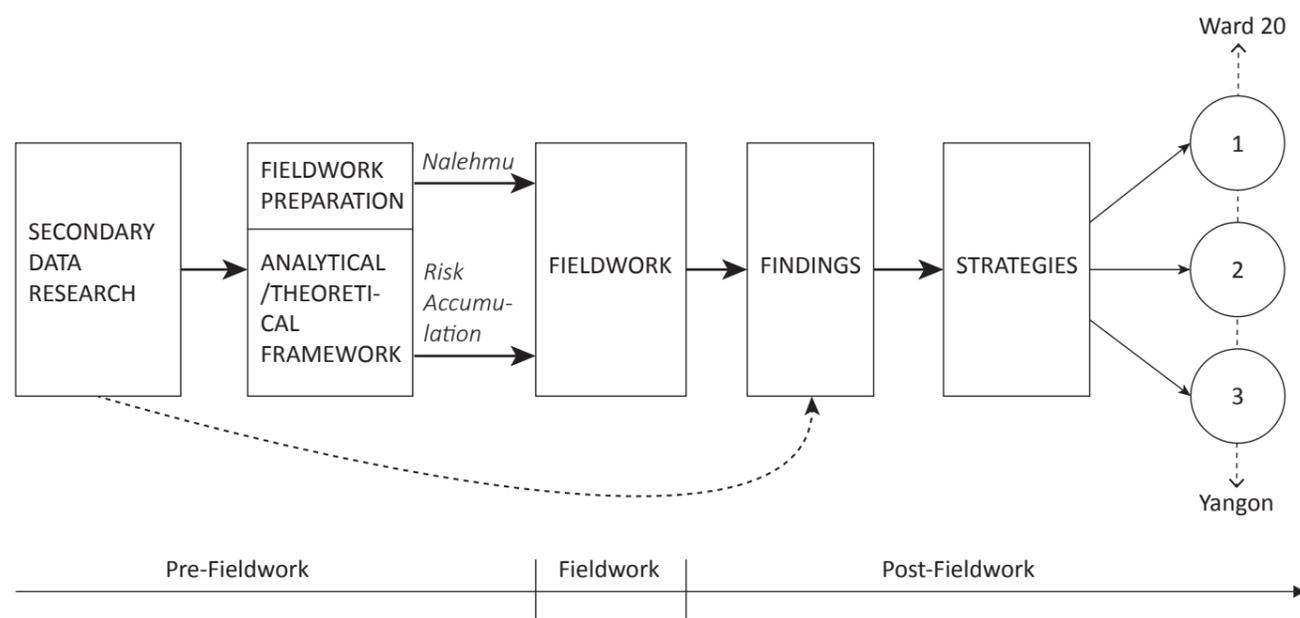


Figure 6. Research Methodology.



Figure 7. Fieldwork Activity as Part of the Main Research Methodology



# THEORETICAL FRAMEWORK

## 3. Risk Accumulation

In urban contexts, risk accumulates incrementally in time and space as a result of multidimensional aspects (Bull-Kamanga et al., 2003). That said, a thorough understanding of the accumulation of risk is required to develop strategies that support the mitigation of risk. In the Ward 20, the pressure on the area for new developments, along with the lack of new investments in sewerage and flood management infrastructure, produces conditions for the emergence of disasters. These phenomena are often characterised by cycles comprised by pre, during, and post disaster, all of which will be assessed in the fieldwork.

Accumulation of risk will be analysed in three dimensions:

- Physical
- Everyday practice
- Institutional

## 4. Resilience

UNDRR defines it as “The ability of a social, ecological, or socio-ecological system (...) to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions, its capacity for self-organization, and the capacity to adapt to stress and change” (UNDRR 2019).

Similar to Risk, we refer to resilience not only in regard to environmental hazards, increased by climate change, but also to a broader range of processes. In this way, resilience in Ward 20 and Yangon can be connected with broader social practices such as Nalehmu, deeply rooted in the country’s inhabitants. Resilience can be conceptualised as a network, that can be expanded and enhanced by connecting different actors in different scales. When scaled-up, it acts as a web that helps protecting communities from potential disasters.

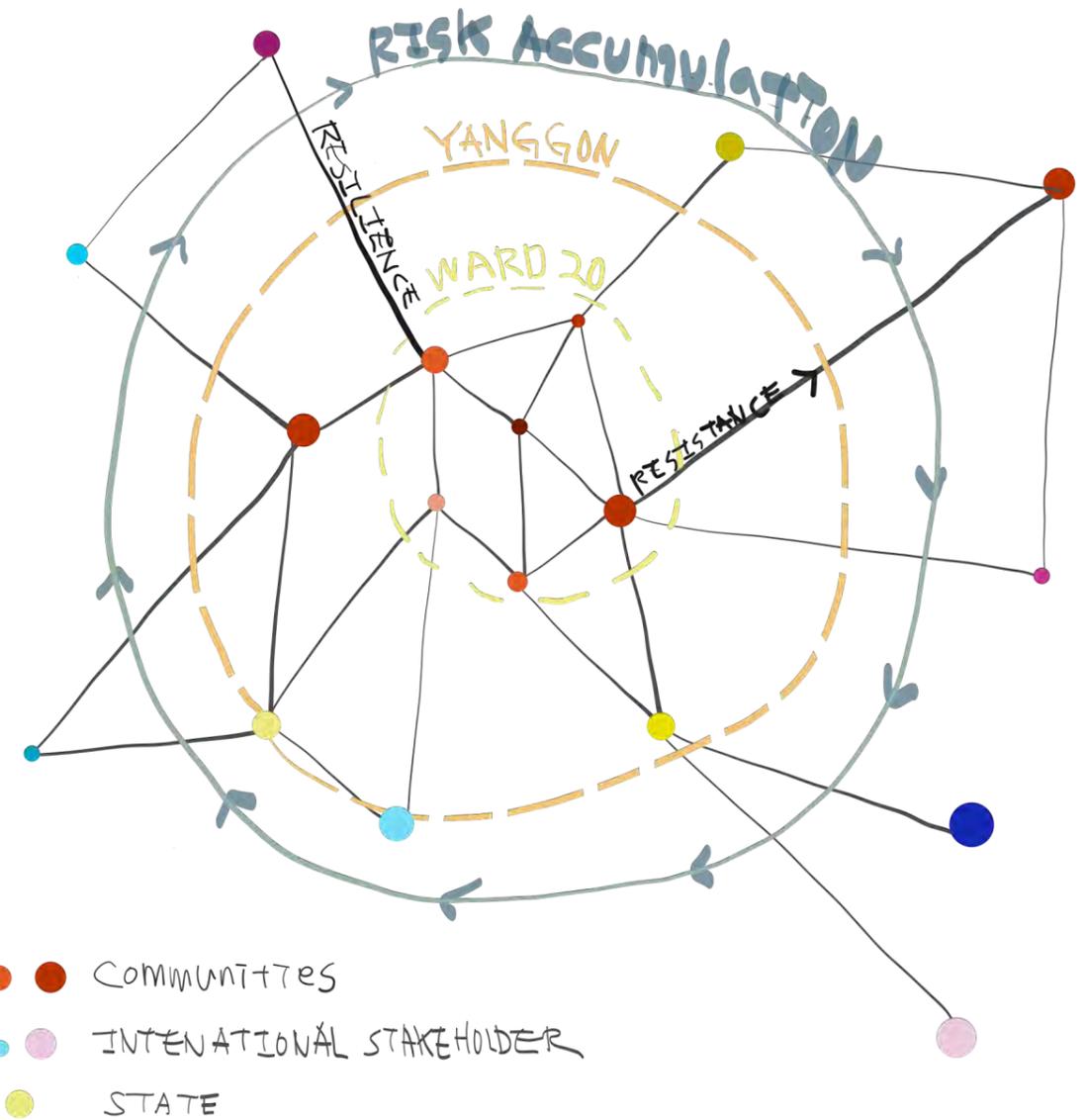


Figure 9. Theoretical Framework

## 2. CONTEXT

### **Hlaing Thar Yar in Transition**

Myanmar is a country where various ethnicities, cultures and religions are coexisting, and one of countries which have experienced the most dynamic transition in recent years. After independence from the British Empire in 1948, a socialist government was established in 1962 by a military coup. Its one-party dictatorship controlled freedom of speech and its oppressive policy delayed the development of the country. However, as a result of series of people's resistance against such suppression, in 2011, the country finally experienced transition from military rule to democratic government. Since then, the policies have been liberalised, and various changes have been taking place at multiple scales.

Yangon is the centre of such transition. It has the largest population in the country and continues to play a central role in the economy even after the relocation of the capital city to Naypyidaw in 2006. In recent years, rapid development of real estate, industry and infrastructure drastically changed the social discourse and physical environment.

Hlaing Thar Yar Township is located in the west bank of the Yangon River. The Township is one of the largest townships in Yangon and has the highest number of population in Yangon. Since the township has the most developed industrial area in the country and a good access to the city centre, many citizens migrated to this area for job opportunities.

Informal settlements in Yangon have spread rapidly after the democratization of the country, in 2012; government estimated that 10% (NGOs' number is 40%) of population in Yangon live in informality, which include sputtering and informal expansion of formal residents (WFW, 2019). Hlaing Thar yar is accommodating the highest number of informal settlements of squatters with an approximate number of 16,000 people. Since the township has the most developed industrial area in the country and a good access to the city centre, many citizens migrated to this area for job opportunities at first before many have migrated to the area due to natural hazards. The residents are lacking access to basic services as sanitation and water, and many have denied any documentation of land use rights, as most of them are immigrants from rural Ayeyarwady Delta who settled in the area after Cyclone Nargis in 2008, majority from which live in Informal settlements and have been denied their rights to be considered immigrants or internally displaced people due to Disaster; instead, they are considered as informal squatters who have no rights. (Forbes, 2016)

# TIMELINE OVERVIEW

## TRANSFORMATION OF HLAING THAR YAR TOWNSHIP AND WARD

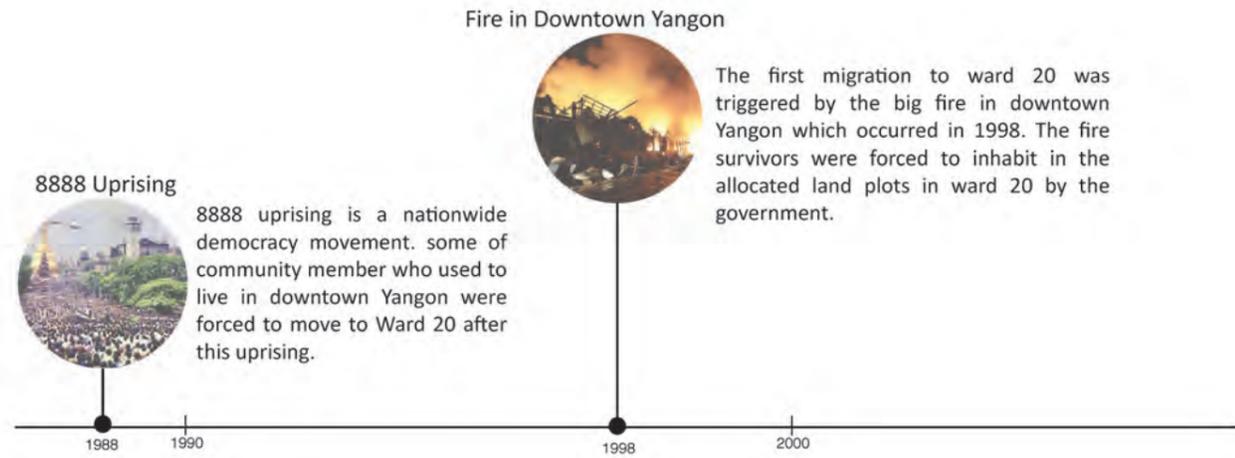


Figure 10. Timeline of Hlaing Thar Yar and Ward 20

### Sprawling and Densification

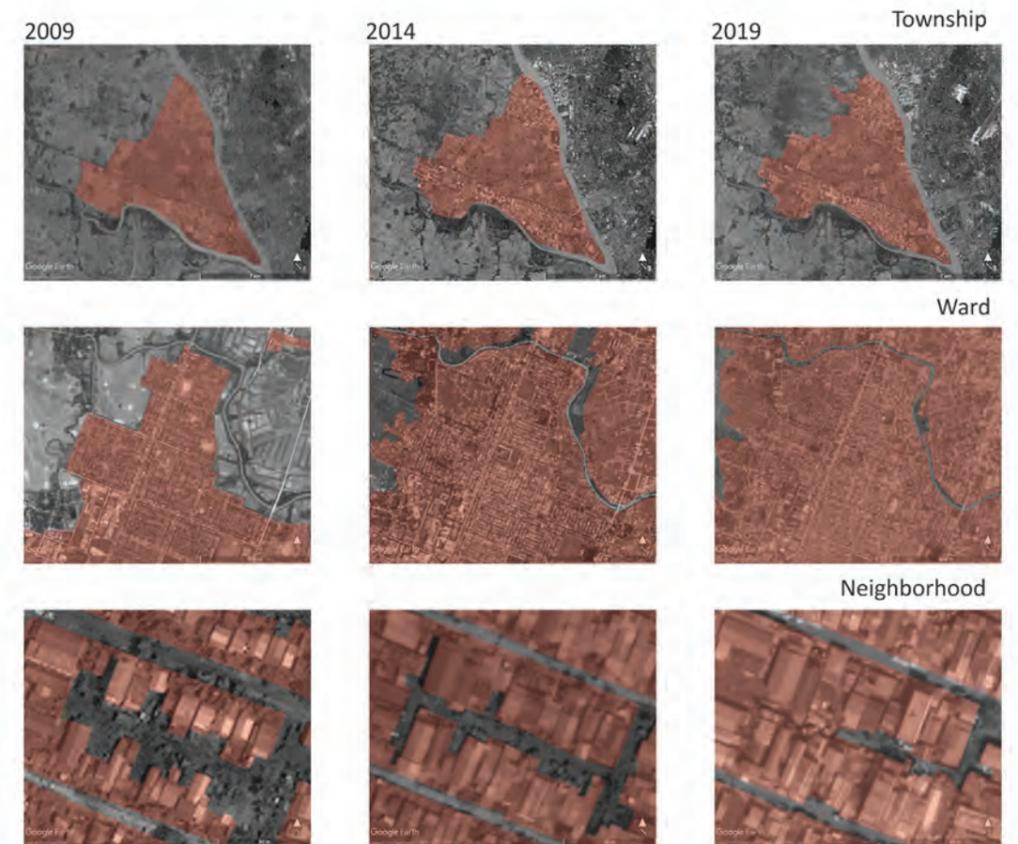
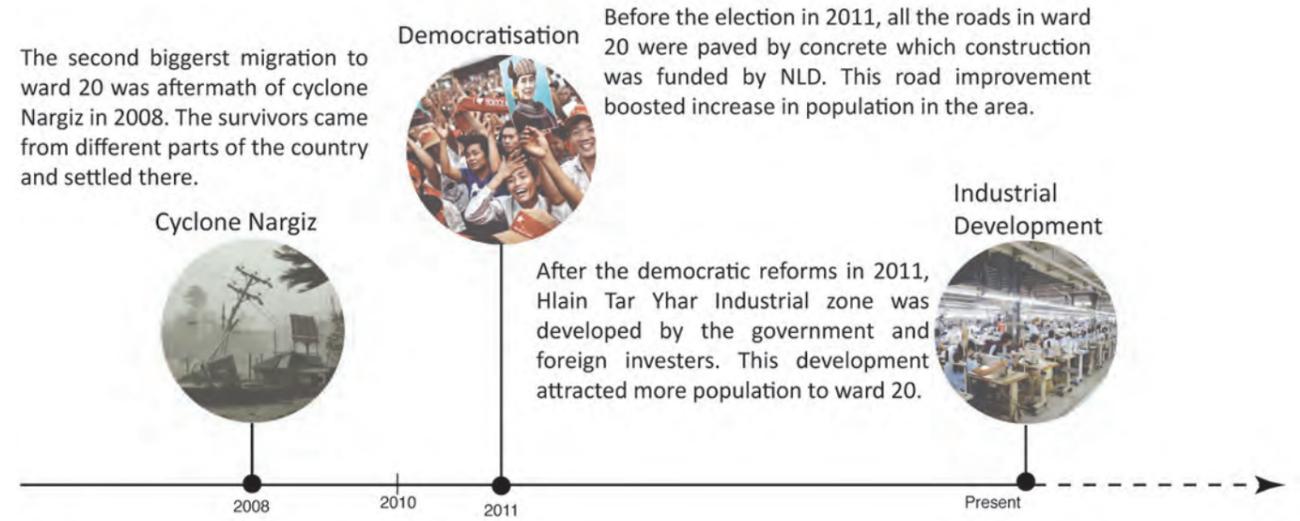
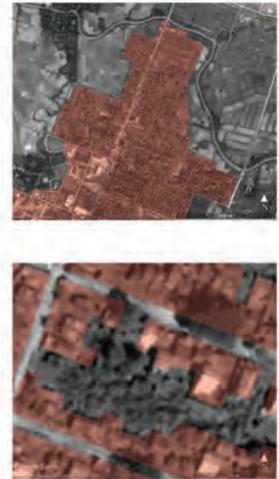
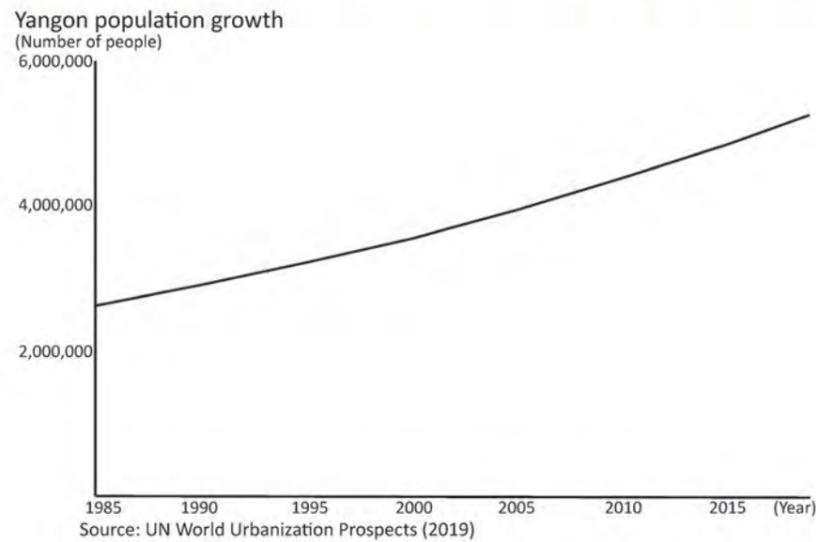
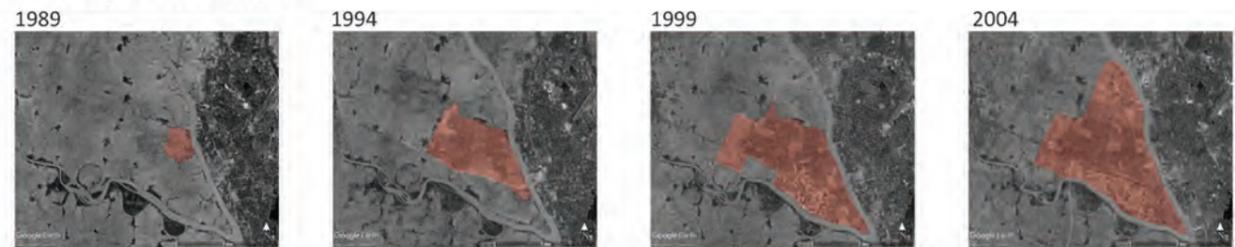


Figure 11. Yangon Population Growth

The development of the Hlaing Thar Yar Township has been taking place since the 1980s as the population of Yangon has increased. Nowadays, with the largest industrial area in Yangon, many people reside in the informal settlement seeking relatively affordable lands and job opportunities.

Democratisation triggered the concentration of the population in the Township. Since the democratisation, urban sprawl and densification have taken place simultaneously, and the majority of the informal settlements currently seen have been made in this period.

# DEMOGRAPHY

## DEMOGRAPHIC FEATURES IN HLAING THAR YAR

As the population pyramid shows, the township has a higher population aged 15-39, compared to the population of the Union of Myanmar. Also, as shown in the graph; most people between the age of 15-64 work in the industrial sector, compared to the national average, where the proportion of dependence on primary industries is significantly low, and the majority of population is engaged in secondary and tertiary industries.

Although development in the west bank of the Yangon River has not been carried out for a long time, development plans were formulated in the 1980s. Since the 1990s, and rapid development progressed with the construction of highways and bridges. Nowadays, the area is the most developed satellite city in Yangon.

Refugees of the fire in downtown Yangon, which occurred in 1998, were denied to re-settle the area where they originally lived, and were forced to migrate to ward 20 by the government. In addition, cyclone Nargis, which occurred in 2008, caused great damage to Yangon, and the number of deaths reached 140,000. The government provided this land as a relocation destination for these victims. As a result, township experienced rapid population growth. At the time of migration, the roads were not paved, and infrastructure such as land levelling, drainage, and sewage was not in place, and the residents struggled to live with poor living condition. In the last decade, democratization and increased foreign investment have greatly contributed to industrialization in this area, and many people moved to this area for the job opportunity. Currently, the clothing industry and other light industries are thriving. As a result, the increase in informal settlement and rapid progress of densification and urban sprawl have worsened the living environment. On the other hand, it should be noted that the gated community and golf clubs for the wealthy are located in the southeastern part of the township, and the gap between rich and poor is remarkable.

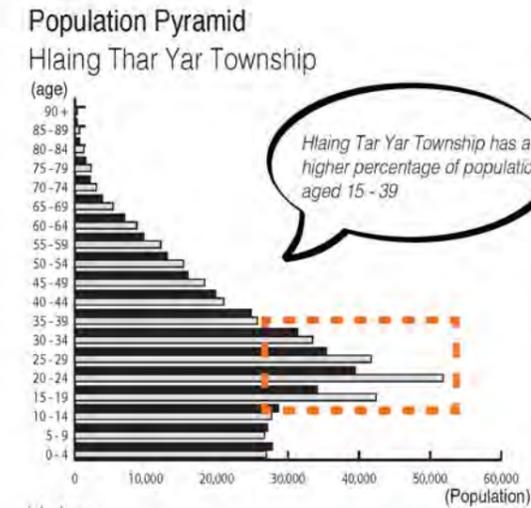


Figure 12. Population Pyramid of Hlaing Thar Yar

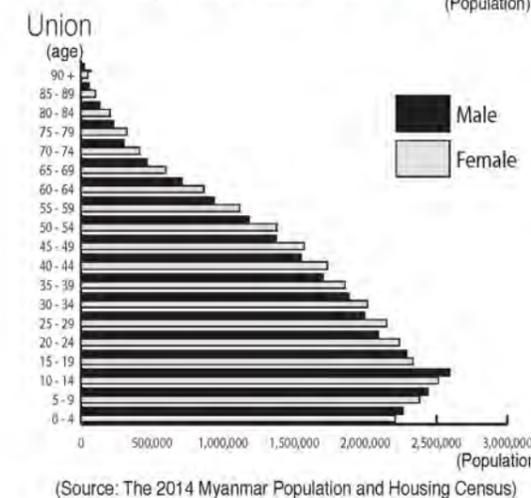


Figure 13. Population Pyramid of Union

### Employed persons aged 15-64 by Industry

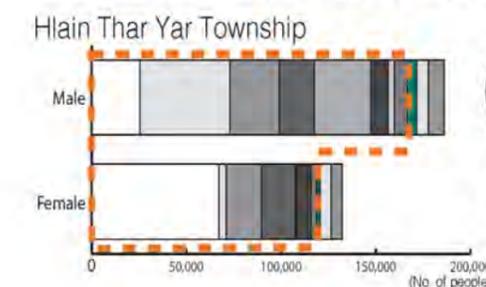
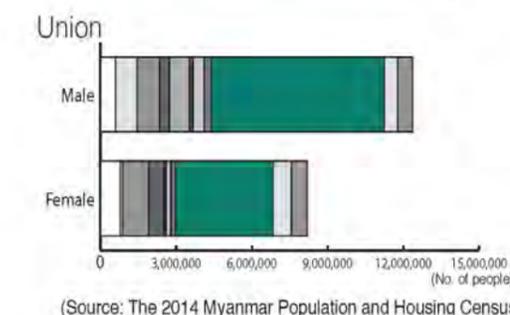


Figure 14. Employed persons aged 15-64 by Industry in Hlaing Thar Yar



- Manufacturing
- Construction
- Wholesale and retail trade; repair of motor vehicles and motorcycles
- Accommodation and food service activities
- Transportation and storage
- Administrative and support service activities
- Public administration including civil servants
- Other service activities
- Agriculture, forestry and fishing
- Not stated
- Others

Figure 15. Employed persons aged 15-64 by Industry in Union

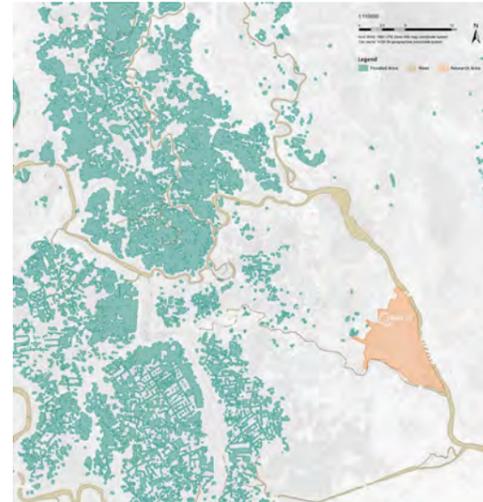
# GEOGRAPHY

## GEOGRAPHICAL FEATURES AND THE RISK OF LAND SUBSIDENCE IN HLAING THAR YAR

Hlaing Thar Yar Township is surrounded by rivers, low in elevation and has a high risk of flooding. When the cyclone nargis hit the area in 2008, the most part of the west side of the township were severely flooded. As the River stream from the east side to the Westside, the geographic location of the township and Ward 20 in specific make it more vulnerable to flooding

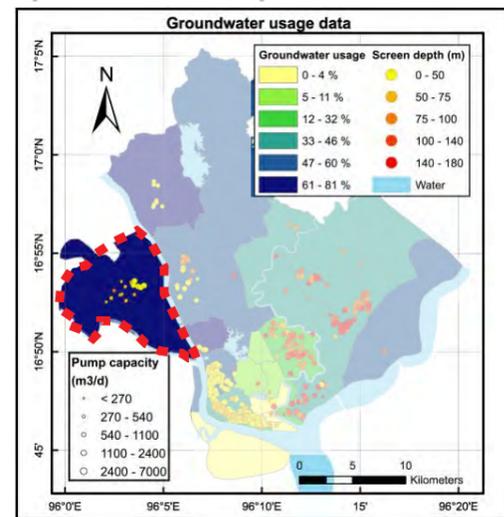
Groundwater use in Hlaing Thar Yar Township is 61-81%, which is relatively high compared to 0-4% for central Yangon (Horst et al., 2018). This implies that there is not enough water supply infrastructure in the Township. In addition, most of the water wells in the Township use shallow wells of 0 to 50 m, and it is concerned that groundwater contamination associated with industrial development.

Land subsidence has also been confirmed as indicated by the Map for annual vertical displacement rate. Land subsidence could be caused by multiple reasons such as excessive use of groundwater, decrease in earth pressure due to construction. In any case, this ground subsidence is likely to increase flood risk. Considering the rapid growth and the increasing pressure on underground water resources as they mark the main drinking water resource to many communities in the area and the lack of an effective mobilization of rainwater, geological studies show that there is a great potential for land subsidence to occur in Yangon if ground water supplies were unable to keep up with the demand from the growing population. (van der Horst et al., 2018)



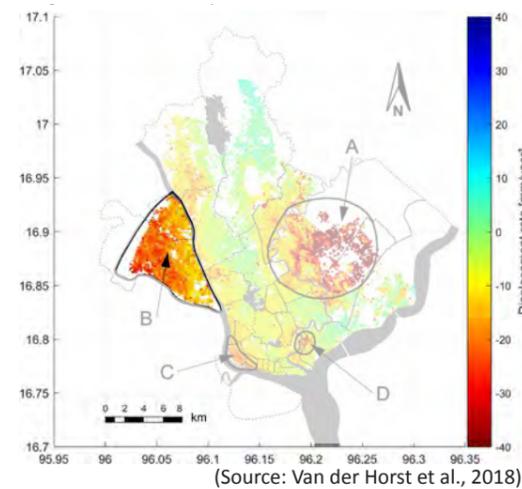
(Source: European Space Agency)

Figure 16. Flooded Area Affected by the Cyclone Nargis in 2008



(Source: Van der Horst et al., 2018)

Figure 17. Groundwater Usage



(Source: Van der Horst et al., 2018)

Figure 18. Vertical Displacement of the Land

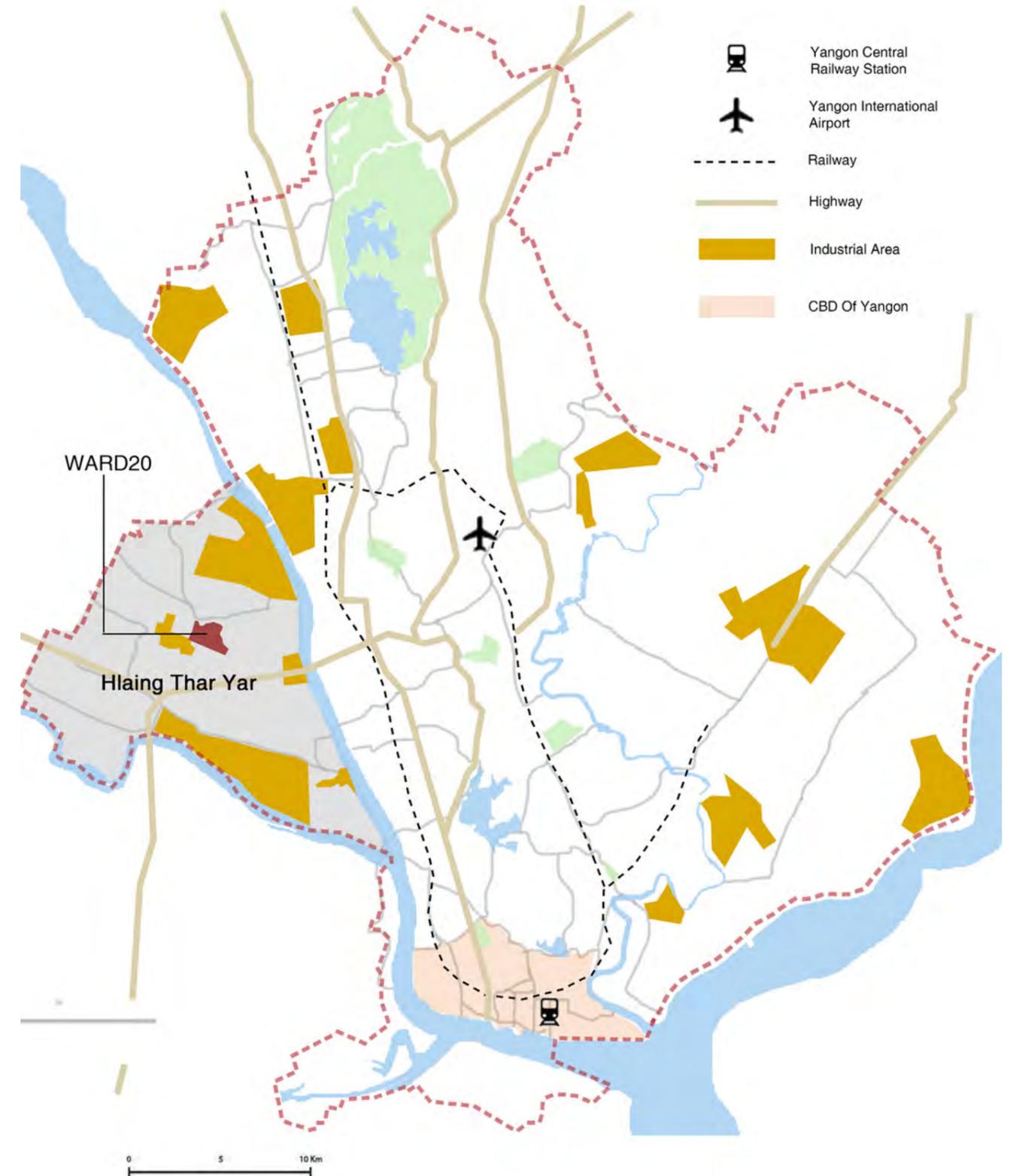


Figure 19. Location of Hlaing Thar Yar Township

# FUTURE PLAN

Since development pressure on Yangon has risen since democratization, YCDC has constantly updated development plans. In order to update the Strategic Urban Development Plan which was implemented by YCDC, the Project for The Strategic Urban Development Plan of the Greater Yangon have been implemented with the support of JICA, and the report was issued in 2014. In the project, it was proposed to transform the urban structure by the construction of the subcenter, the outer ring road, and Mass Rapid Transit. In this context, Hlaing Thar Yar is positioned as one of the most important areas for the development of Yangon. It is planned that MRT and the outer ring road pass through the center of the township, and is also proposed that Hlaing Thar Yar Sub Center will function as one of the five sub centres in the city.

Currently, the west part of the township is utilised for an agricultural use, and industrial zones are located in the north and south parts. Ward 20 is situated in the residential area surrounded by those agricultural land and industrial zones. According to the aforementioned project, the entire agricultural land in the township is planned to be built-up by 2040.

In addition, with regard to measures against disasters, a drainage development plan has been proposed in the SUDP. However, the plan is not covering the township and limited to the east side of the Yangon River. Therefore no drainage plan in Hlaing Thar Yar is currently available.

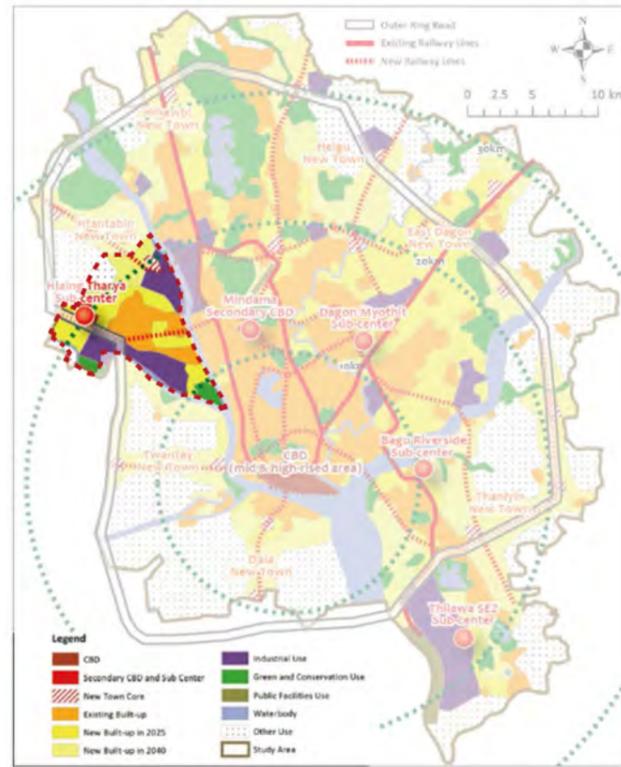


Figure 20. Master Plan of the Greater Yangon



Figure 21. Master Plan of Drainage Improvement

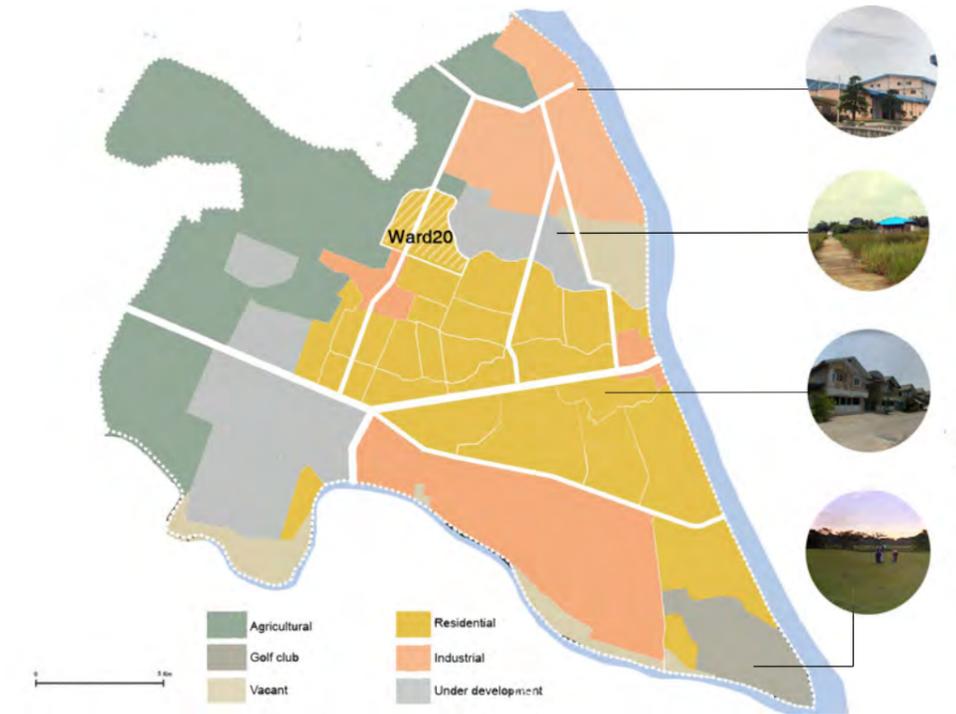


Figure 22. Land Use of Hlaing Thar Yar (Present) / Image source by our team

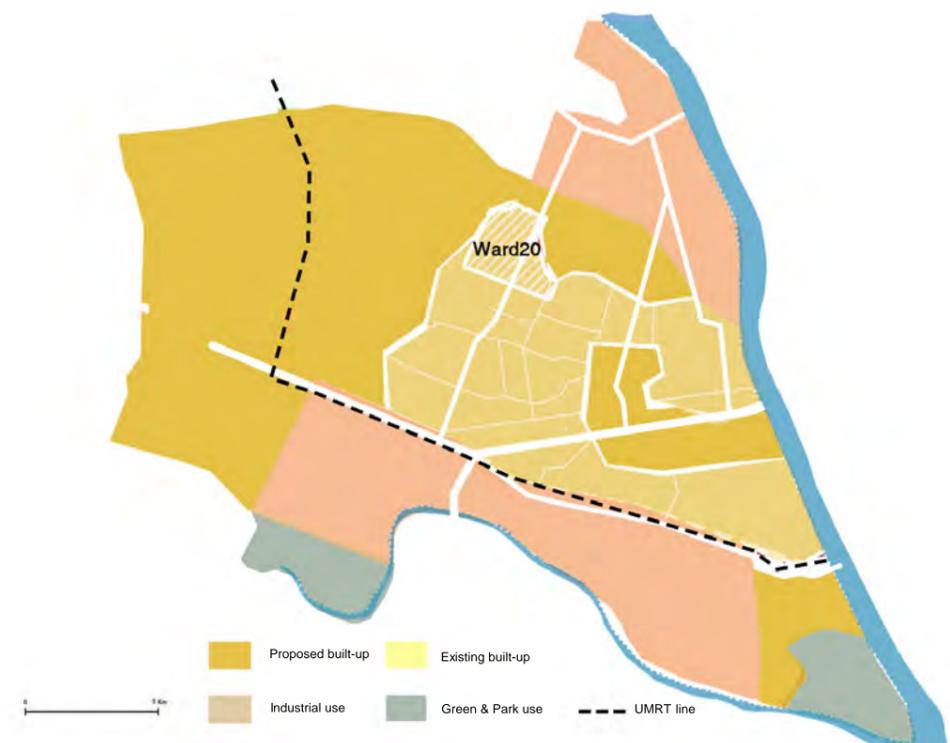


Figure 23. Land Use of Hlaing Thar Yar (Proposed by the JICA Master Plan)



FIELDWORK 1.

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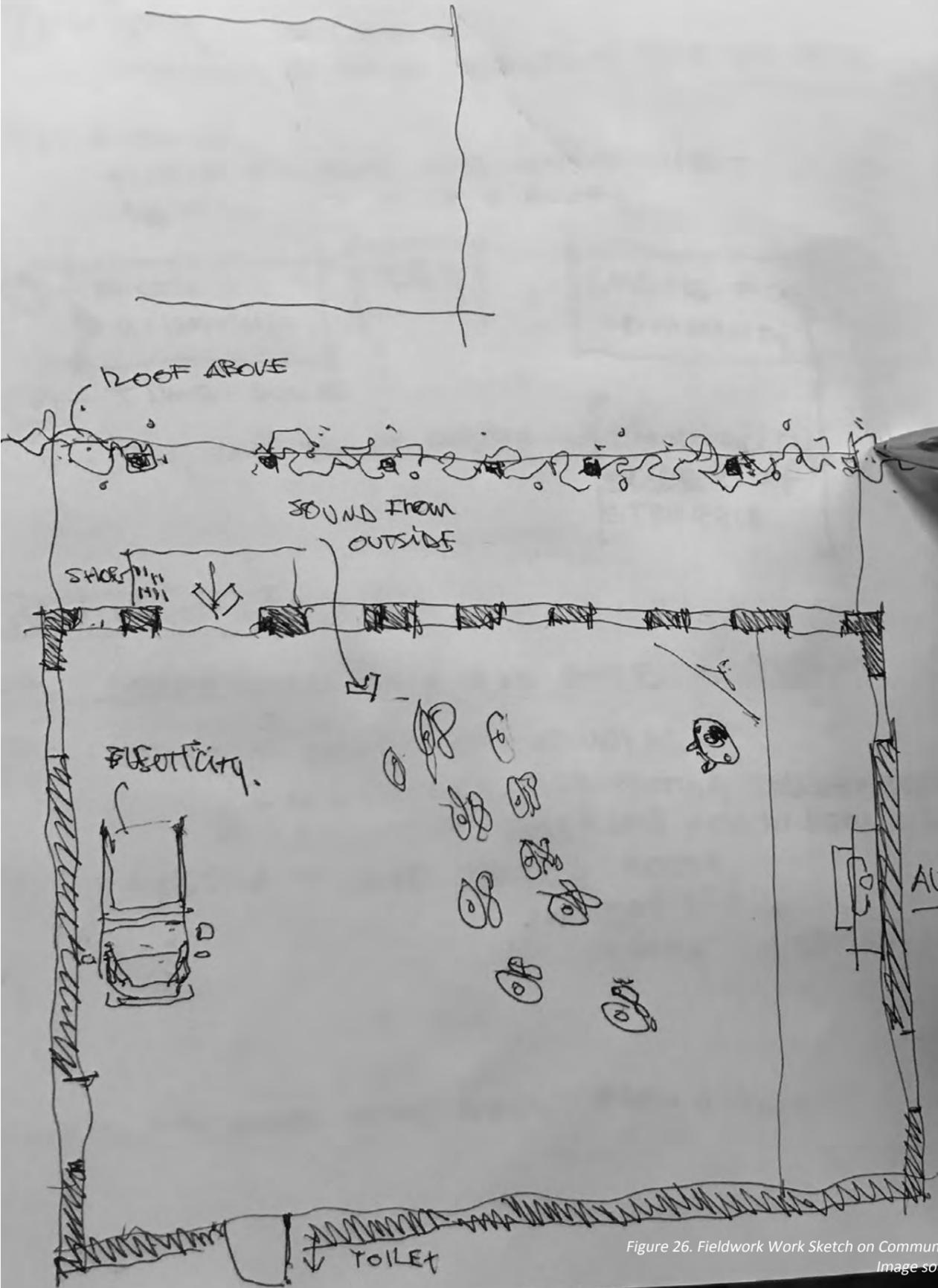


Figure 26. Fieldwork Work Sketch on Communities' Activities  
Image source: our team

**B. FIELDWORK**

### 3. FIELDWORK

Ward 20 is located in the northwestern part of Hlaing Thar Yar Township, bordering Yoe Lay Creek—divided into 10 sections and followed an orthogonal structure. It consists of a mixture of formal and informal settlements, and informal housing is mainly distributed on agricultural land by the river. The ward consists of approximately 3,832 families with a population of 22,832 (WFW, 2018). To the south of Ward20 is the famous industrial area of Yangon City, Hlaing Tharyar Industrial City, and the north is also close to another smaller industrial area. Therefore, many residents in ward 20 are employees in industrial areas.

The fieldwork investigates the question “To what extent could the scaling up of the existing Nahlemu practices contribute to risk mitigation and preparedness, leading to a more resilient Yangon?” the research question field investigation followed four main components; understanding and prioritizing the existing risk in the Ward through through the lens of the community. Second, identifying the main causes of these major risks and investigate the community’s coping capacity through individual and collective practice.

The fieldwork included secondary research and analysis in London, followed by a two-week period of field work to Ward20, Yangon, Myanmar that included site visit, engagement with local community, local university students, developing agencies, and state officials and culminated in post-fieldwork analysis and the production of strategies at community and city scale. Participatory methods were used on the field including transect walk, focus group discussions, community discussions, interviews, priority race, events mapping and community mapping at the level of the ward20; whereas for the township level we looked at the transformation and planning narratives and discourses around risk reduction and resilience, using quantitative data from the different state institutions, development agencies, and civil society.



# METHOD SUMMARY

## COMMUNITY BASED



Transect Walk

The walk through the ward20 accompanied by members of the community was a means to get acquainted with the area, notice what kind of risks the community was facing and observe their present living conditions and various daily practices which may lead to the risks.



Interview

The interview was done by focus group in order to gain the history of the community and to understand the relationship among the community. Also while listening to the personal stories of community members about risks they experienced before, we were building the trust among them.



Prioritizing The Risks

The risk race activity was to identify the different types of risk the community faces.

In the process, the community was asked to write down all the types of risks they face on a regular basis and also on a seasonal basis. Then the community was asked to place the risk they identified one by one on a scale of 1 to 5 (5 being the highest).

Through this exercise we identified that:  
 1. Flood and Road accidents were identified by the community as the biggest threat.  
 2. Fire, Storm causing damage to houses by heavy wind was also identified as threats



Spatializing The Risks

The risks mapping activity was to identify the spaces within the community which show where the risk accumulates and also the safe spaces within the community. The objective was to map the following things:  
 Safe spaces  
 Unsafe Space  
 Shelters  
 Social networks

For this exercise the community were divided into same groups. One group comprised of only community leaders and the other two groups were divided into three groups.



Analysing The Causes Of Risks

Group discussion for causes was to identify the causes behind the accumulation of different types of disasters in the community.

This activity was based on the top five disasters identified in the previous exercise. The community was asked identify the causes behind them through identifying the everyday practices and action that may lead to the increase in the risk.



Mapping Flow Of Events

Then the activity carried out was FGD for understanding the flow of events during each disasters .

The objective was to see how people prepare, cope and recover from the disaster. The 4 selected events were:  
 1. Flood  
 2. Fire  
 3. Storm  
 4. Drainage block

For this exercise the community were divided into groups. One group comprised of only community leaders and the other two groups were divided into three groups.



Discussing The Solution

Our group discussed more in depth about the flow mapping with the community to understand the following things:  
 1. Activities before, during and after an event.  
 2. Coping mechanisms  
 3. Involved actors  
 4. Community actions  
 5. Social networks

During the process, all the members were divided in the same groups of Day 2 this exercise and looked more in depth of the flow map produced on day 2.

After the discussion, a risk chart was also created for flood and fire summarizing all the risk and where it accumulates.



Photowalk

Based on the spaces of risk accumulation identified through the discussions. We went on a photowalk to see how the spaces are used and how risk accumulated in these spaces.

## 4. FINDINGS

The data gathered through the research and fieldwork framed our understanding of disaster risk reduction. Risk Accumulates in three dimension: physical, everyday practice and institutional structure. The accumulation of risk in space increases the community's vulnerability from hazards.

The synthesis of our findings follows the logic of the analytical framework shown in a Part A, where the level of risk is determined by the community's coping capacity and its vulnerability whenever a hazard comes. Therefore, the first group of findings include the main risks as defined by the community: flood, storm and fire, along with the causes of its occurrence. We have also identified the specific coping mechanisms of the community has, before, during and after a disaster, in order to understand the main issues leading to the risk accumulation.

## FINDINGS: RISK OF FLOOD AND STORM

Together with the community members in Ward 20, we have identified the main risks concerning the community. Flooding was listed as the most common and concerning risk which accrue annually during the rainy season. Furthermore, Cyclones and in specifically referring to Nargis Cyclone in 2008, Road accidents and diverse crimes where among the most common risks in the Ward.

Flooding is the primary concerning disaster in Ward 20, the map shown marks the main issues related to floods, such as drainage issues, blockage of drainage and waste issues. The continuous blockage of the drain due to the lack of responsibility and informality has led to a discontinues flow of water in the drainage system and significant areas with standing water across the ward. The main issues identified on the blockage of drainage are the houses extensions over the drainage and septic tanks designated areas. This, together with the high amount of waste spread in the ward and the lack of responsibility and maintenance.



Figure 29. Flooded Streets in Ward 20  
Image source by our team



Figure 30. Flooded House  
Image source by our team



Figure 31. Flooded Street Crossing  
Image source by our team



Figure 32. Flood Risk Map Generated with Community in the Ward 20

# FINDINGS: EVENT FLOW IN THE CASE FLOOD AND STORM

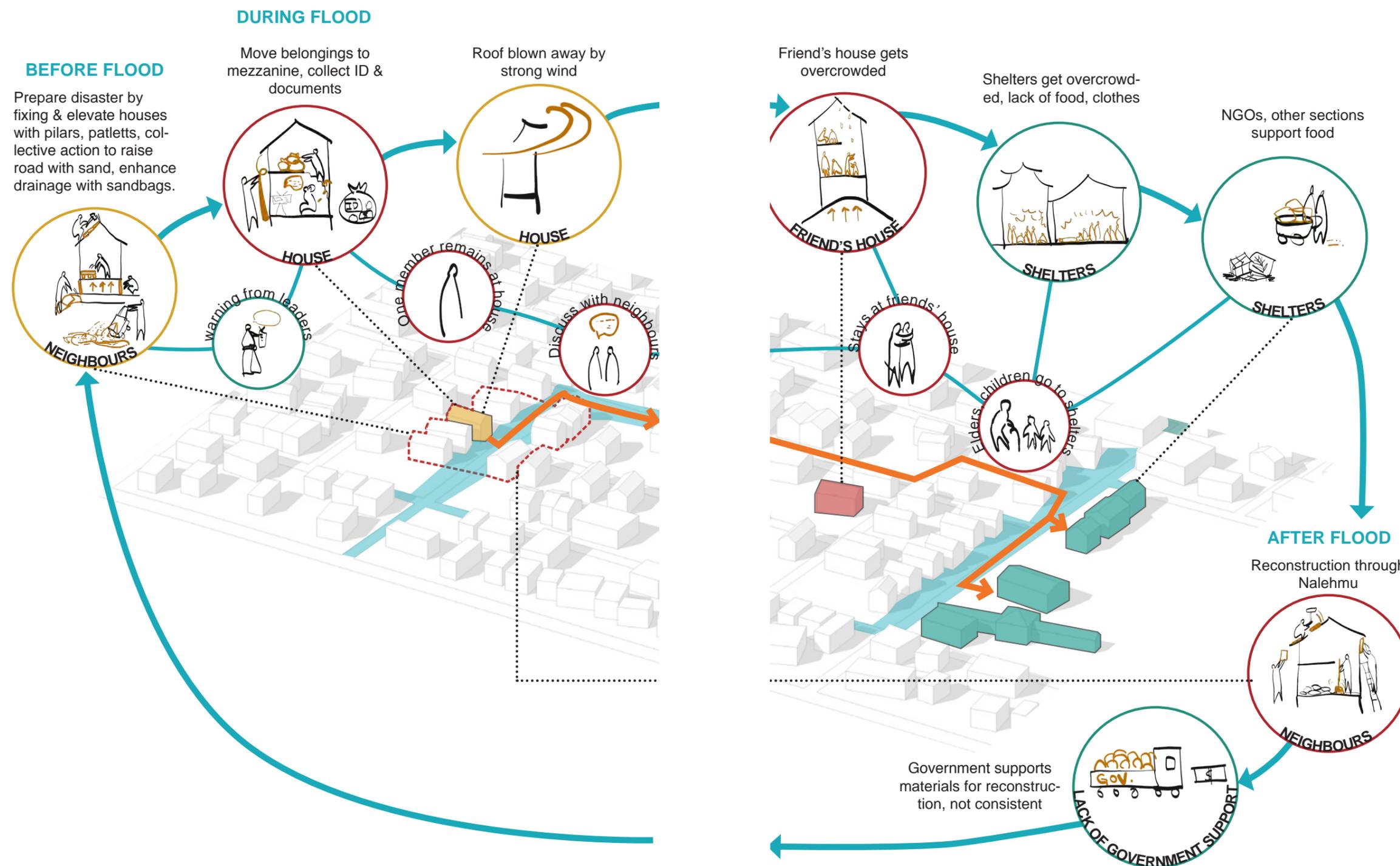


Figure 33. Event Flow in the Case of Flood and Storm

As analyzed in the risk accumulation mapping, physical characteristics of houses and infrastructures, everyday practices, and institutional gap have collectively resulted with bigger risk in the case of flood and storm in Ward 20. However, the communities in Ward 20 have been practicing collective actions to prepare for the flood as indicated the info-graphic above. In the case of events of hazard: e.g. flood and storm, community leaders inform the community members. Inhabitants quickly prepare their house and collect ID and documents, which are related to the notion of citizenship and further rights.

There are two types of evacuation: ones to shelters (monasteries, churches, schools, etc.), the other is based on the

Nalehmu practice (going to friend's or neighbor's house). Both have limitations on physical capacity and resources during the evacuation periods. Some NGOs support food and basic "goods" with its own limitation. The gap is filled with the Nalehmu practice, the other sections collect food and goods and support the affected section of the Ward. After the flood and storms pass away (generally stays for 3 days), inhabitants go back to their houses, clean and reconstruct. The government supports are limited, most of them rely on the Nalehmu for materials, however it can lead to having debts related to negative impacts of Nalehmu. The shortage on technical and financial support will lead to another cycle of risk, failing to breaking it.

## FINDINGS: RISK OF FIRE

The risk of fire in industrial areas and dumping sites were considered as a highly concerning risk; community members indicated that in early 2018 a devastating fire in one of the dumping sites took place which resulted in high pollution and number of deaths due to air pollution. The main issues identified around the risk of fire are the electric wires and the weak electric poles existing in the ward which increase the risk of fire and electroshocks in the area.



Figure 34. Weak Electric Pole  
Image source by our team



Figure 35. Overloaded Electric Pole  
Image source by our team



Figure 36. Electric Pole at Street Crossing  
Image source by our team

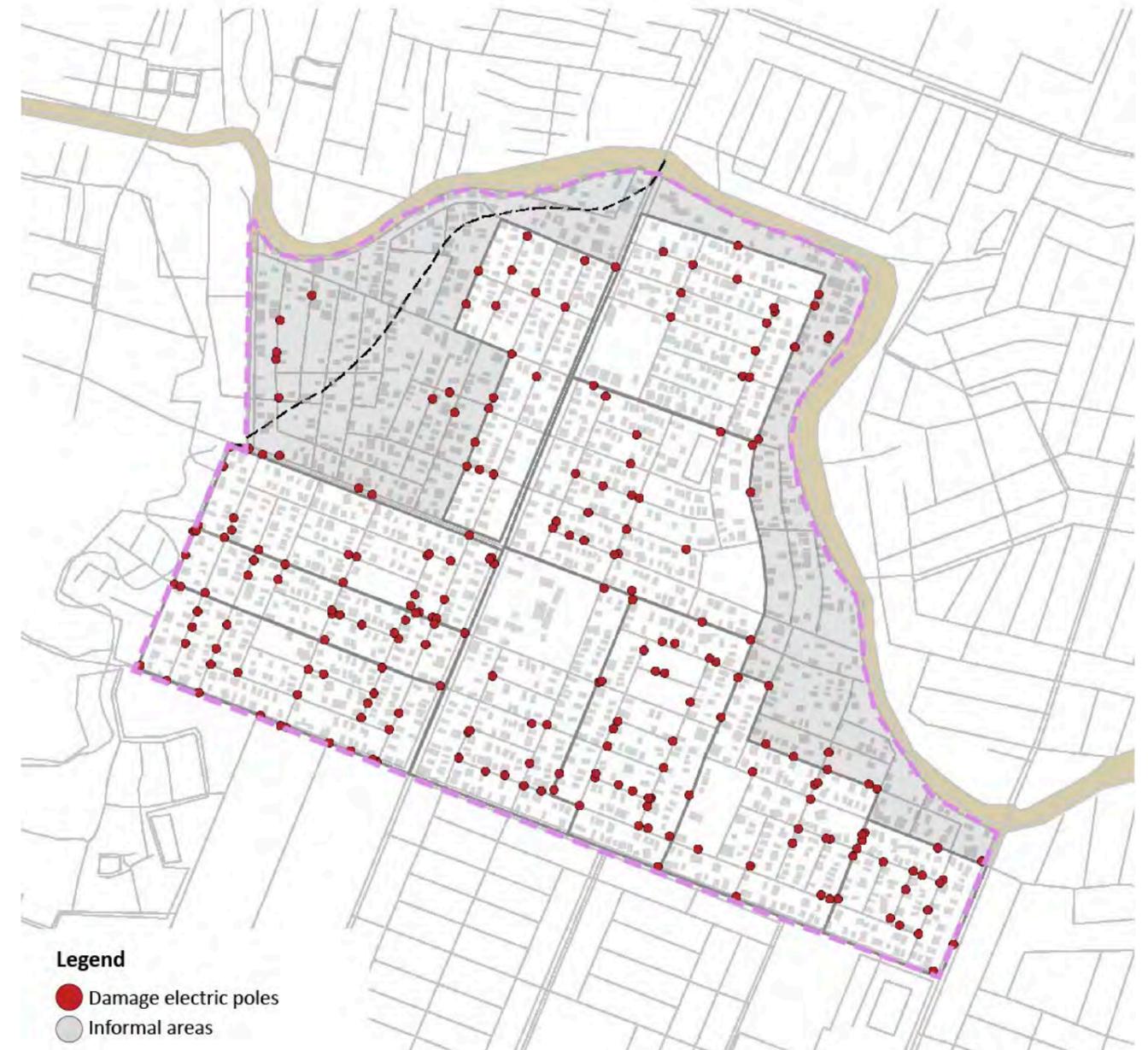


Figure 37. Fire Risk Map Generated with Community in the Ward 20

# FINDINGS: EVENT FLOW IN FIRE

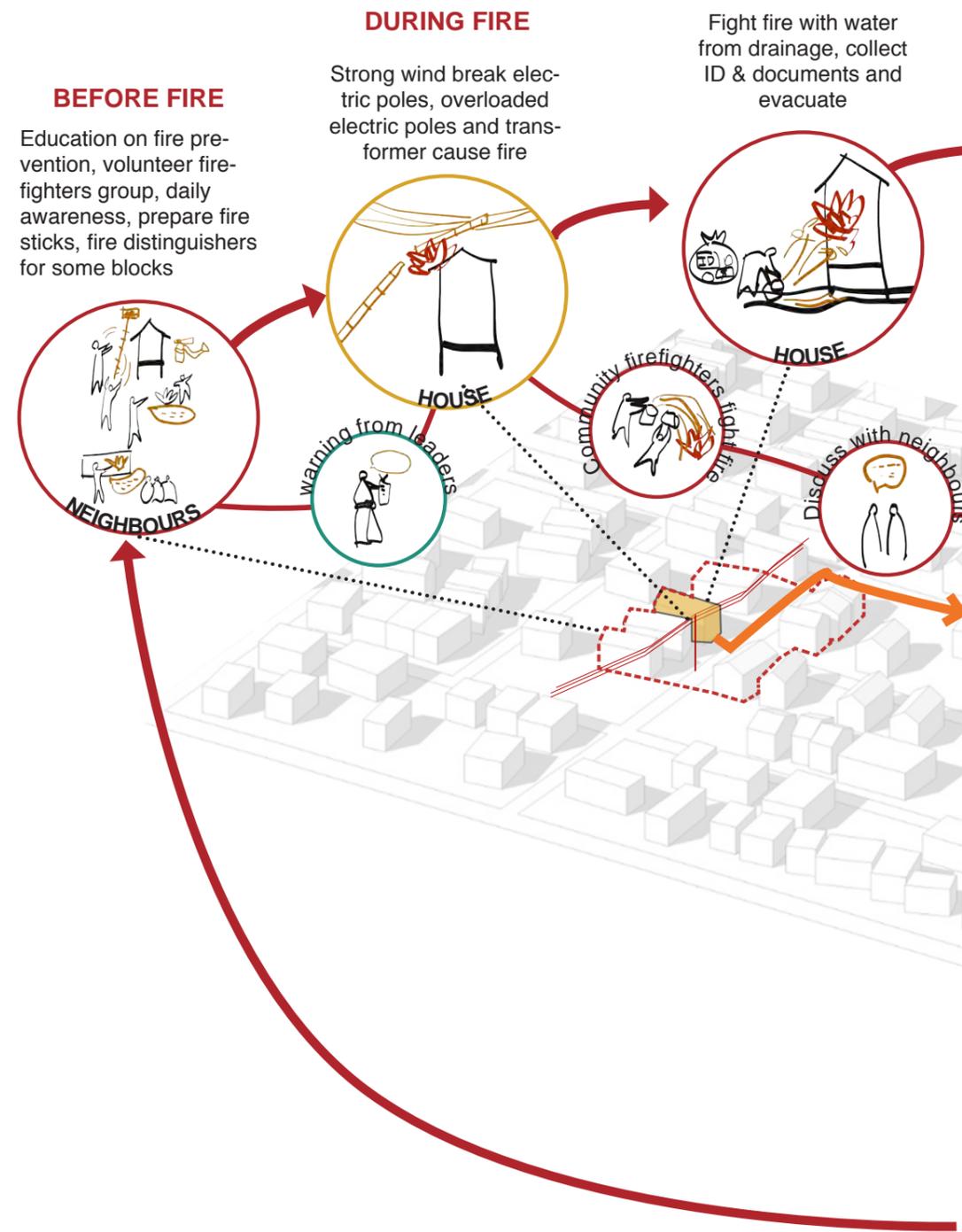
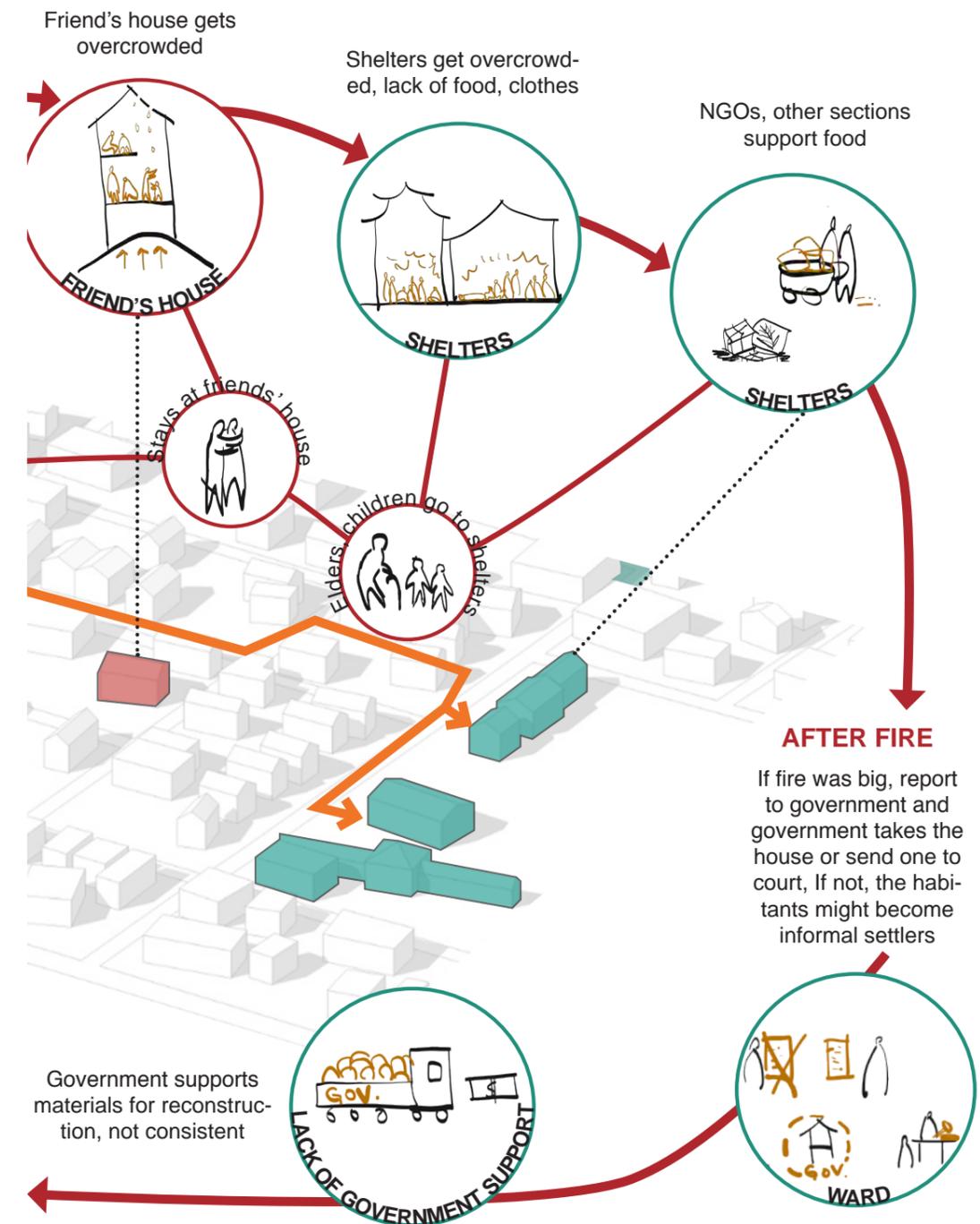


Figure 38. Event Flow in the Case of Fire

As Hlang Thar Yar township is highly prone to the risk of fire, the ward's residents tries to prepare for future hazard awareness, capacity building and organising volunteer firefighters. However, with regard to the necessary equipments that help managing small fires, the resources are very limite. On the house level, community members use an inflatable fire sticks and small sand bags to manage the fire. The insufficient supply of water in the ward eliminate the possibilities to develop fire extinguishers. Unorganised infrastructure especially overloaded electric poles with weak structures and transformer often become the cause of fire. Incase of fire, community evacuate in similar process as



and storm, however, after process differs. If the fire was relatively big, inhabitants are obligated to report to government, which results government taking the affected house, or inhabitants are obligated to attend a court, facing fines. Those processes make some inhabitants to not to report, which can lead them to become informal settlers, which make them more vulnerable. These administrative process and also lack of government support to recover lead to another cycle of risk.

## FINDINGS: SAFE AND UNSAFE PLACES

In case of disasters, the community indicated the most common spaces to seek shelter in the Ward. Monasteries, schools and community centers which are essential spaces of the everyday lives of people; they serve as safe places in the moments of need. It was highlighted that there are multiple volunteering groups who are organized by religious entities or civil society movements that help people to seek shelter in these spaces.

The map shows the safe and unsafe places marked by the community. As safe places, there are marked religious places, the community centres, schools and some of the houses use as shelters. The existing shelters locations are mostly in-reach for almost all areas in the Ward. Yet, there are many limitations facing the operation of these spaces due to the fragile structure, limited space capacity, limited services capacity and lack of resources to become more capable of accommodating a significant amount of people in the case of disasters.



Figure 39. A School used as Shelter in Case of Disaster in Ward 20  
Image source by our team



Figure 40. A Monastery used as Shelter in Case of Disaster in Ward 20  
/ Image source by our team



Figure 41. A Monastery used as Shelter in Case of Disaster in Ward 20  
/ Image source by our team



Figure 42. Safe and Unsafe Places Map Generated with Community in the Ward 20

# FINDINGS: RISK ACCUMULATION

When we were conducting a research with communities in the Ward 20, community members identified disaster as risk accumulation. Most of them were aware of which risk is leading to the other, and able to make a flow chart depending on different cases of disaster. Through transect walks, members pointed out each point which causes a risk (figure 56.1-3). Through flow chart (figure 57), members not only identified causes of risk, but also actors related to them. Furthermore, they were able to suggest solutions to tackle each flow associating identified actors.



Figure 43. Poor Building Material / Image source by our team



Figure 44. Flooded Road / Image source by our team



Figure 45. Laundry Point on the Street / Image source by our team



Figure 46. Risk Accumulation of Flood / Image source by our team

# FINDINGS: RISK ACCUMULATION CIRCUIT

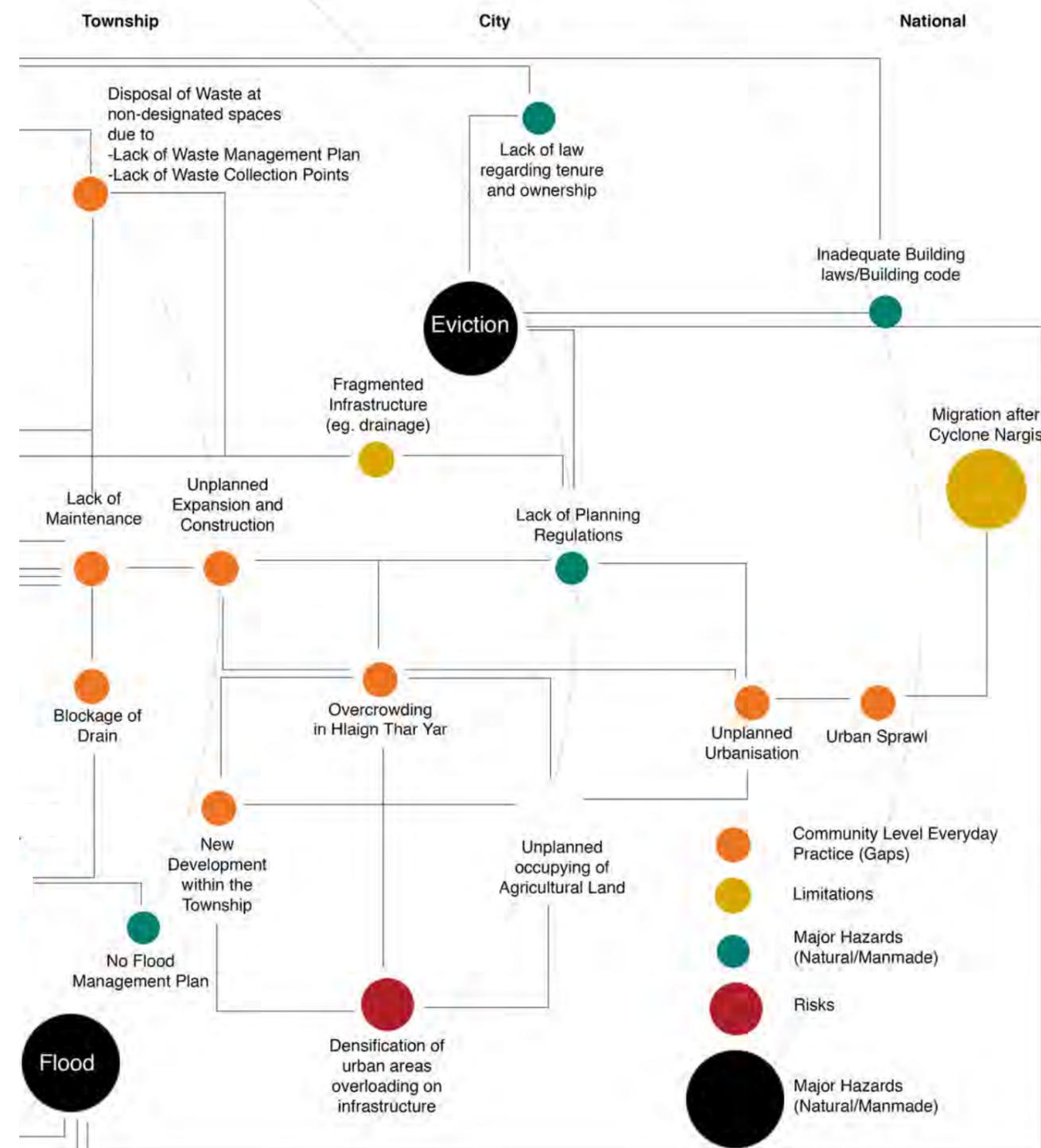
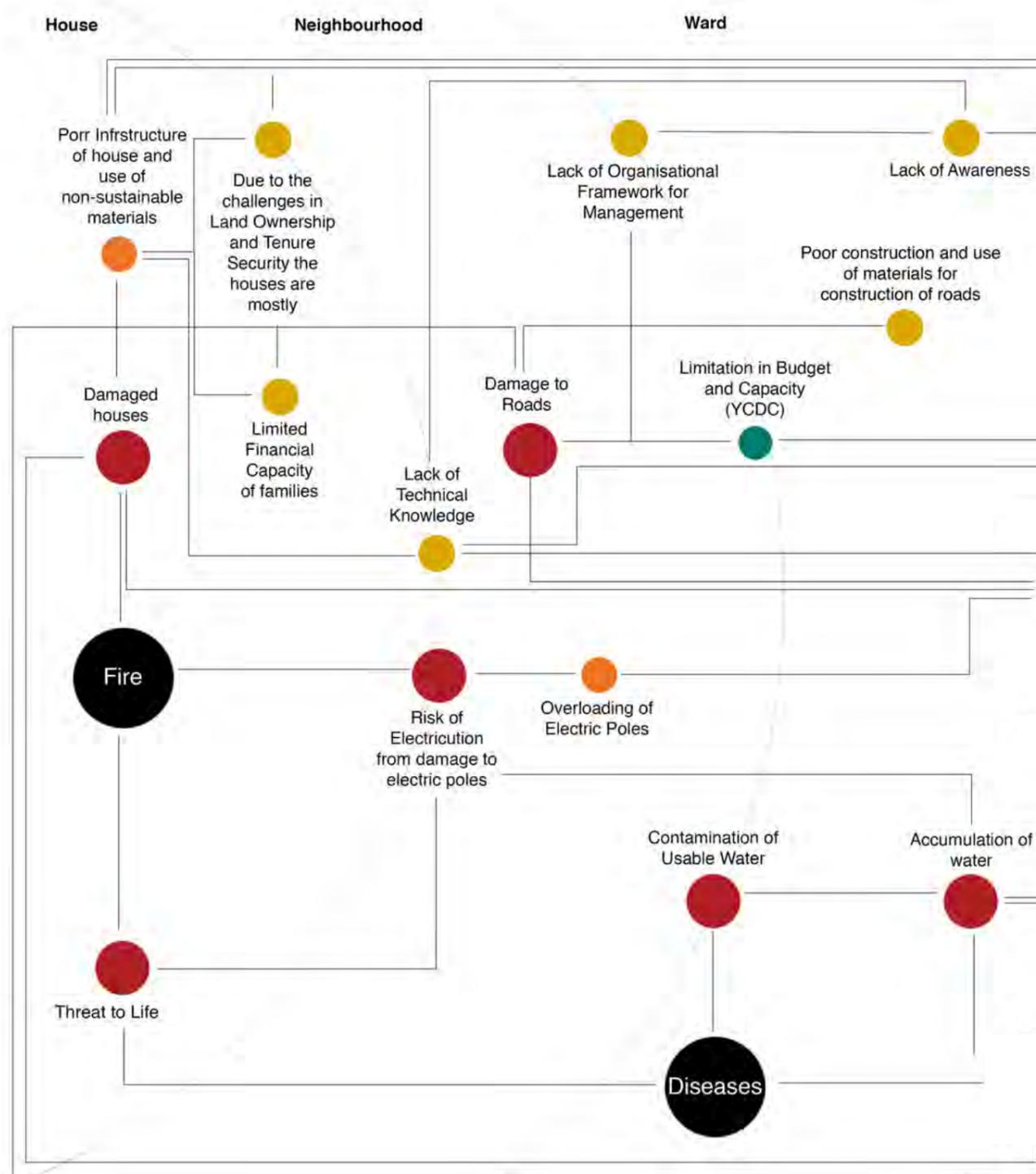


Figure 47. Risk Accumulation Circuit in Multi Scales

# FINDINGS: SUMMARY

## Building Material:

Most of the informal houses in Ward 20 are built with flammable and fragile materials including Bamboo with a roof of similar material or galvanized corrugated sheets. Furthermore, most houses have a weak-instable timber structure due to the lack of resources and technical knowledge; most roofs required continuous maintenance, and vulnerable to heavy wind and rain.

## Drainage maintenance and blockage:

The existing mix between formal and informal areas in the Ward have been reflected on the connectivity and flow of the drainage network, most informal settlements are located near the river. The drainage of these areas is limited to the main roads networks, some settlements have developed their drainage in terms of structure and maintenance, yet the majority of open drains get blocked regularly due to multiple factors such as; sputtering over drainage and septic tanks locations, this practice is carried out as a result of spaces limitation of the plot in the informal settlements. The high amount of waste that aren't included in the municipality waste collection plan is mostly being dumped in informal dumping sites between the sections of the ward on directly in the open drainage, the drainage blockage is caused also by minor landslides of the sides of the drainage due to the weak structure of the unit itself in some locations. Despite the existing individual and collective practices within the community to clean-up the drainage weekly, these actions have a limited impact on maintaining the water flow, as a result majority of the locations around the ward are covered with standing water which is highly contaminated and with a great impact on the spreading of diseases in the Ward.

## Nalehmu practices:

The community carries specific safety measures in the house levels and around the Ward, in preparedness for the rainy season, the existing practices could be based on exchange of services or goods, providing a favor that could be re-offered in the future or as a priced service or sold products. There are multiple trajectories of the practice among the community, most of them are positive and promising, yet, some of them are exploitative especially in the agreements made between the residents of formal areas and informal areas.

## Industrial areas:

The industrial areas surrounding the Ward are an essential motive of the increased number of population in the area, as many people squatter to these areas looking for job opportunities and access to basic services, in general the industrial parks existed during the pre-urbanization era which implies a notable lack of infrastructure and basic services in these areas. In Ward 20; people who live close to those industrial park is mostly vulnerable to pollution and industrial waste, beside annual natural hazards. Road crossings as risk accumulation points of junction: Based on our site investigation, we have focused on analyzing the road crossing; which for us demonstrate a clear example of how risk accumulate in space, we had identified that the main issues causing the most common disasters converge in these areas. The main reasons found where the lack of management, responsibility, maintenance and the overall limited technical and financial capacity among the community to improve their physical environment. Some of the risks found where the accumulation of significant amounts of waste, the lack of flow in the drainage due to the continuous physical interruptions and the weak electrical structures in the whole Ward. The lack of signage system and the densification of the use of these areas leads to a notable increase in accidents in these locations.



Figure 48. Risk Awareness Poster

# FINDINGS: SUMMARY

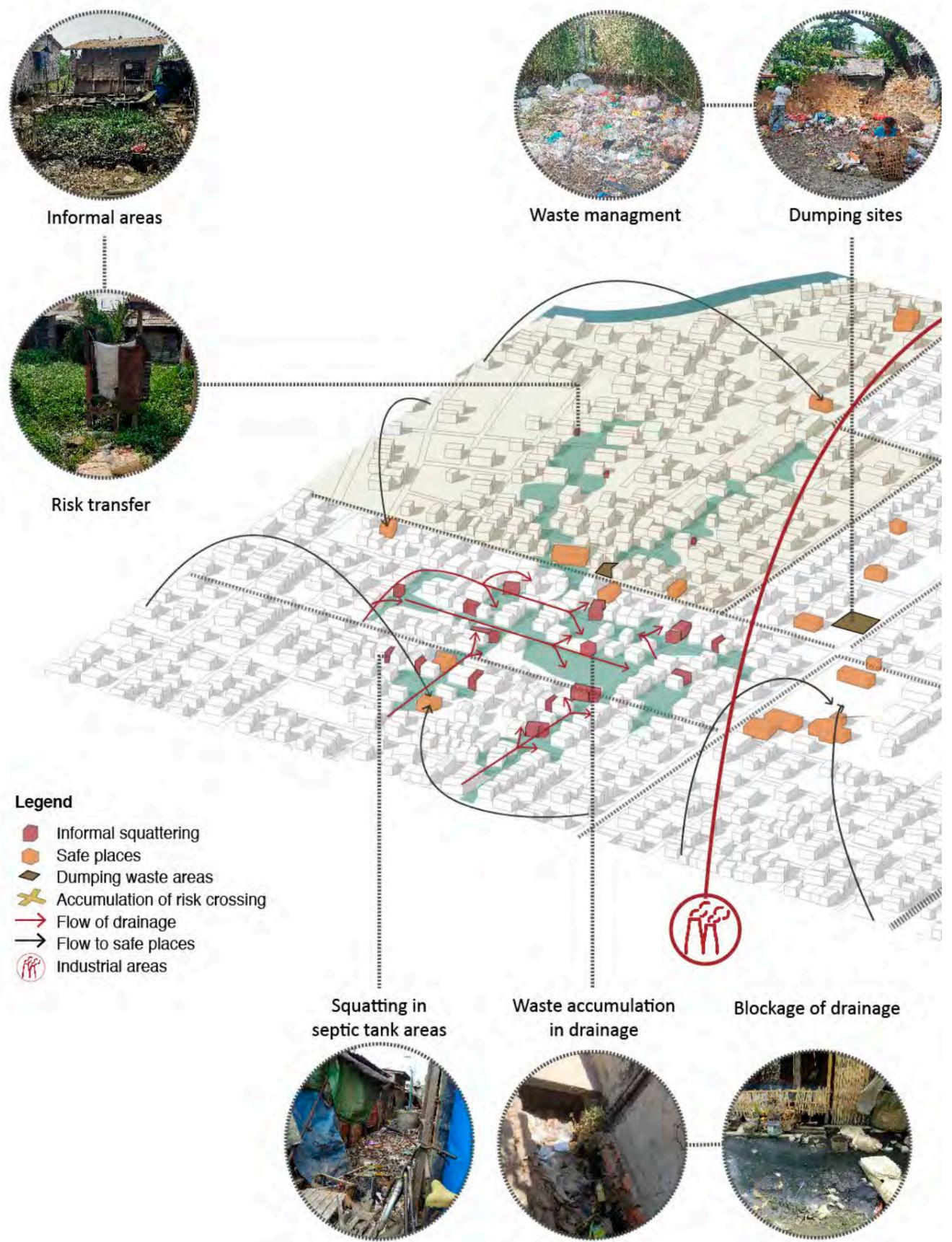


Figure 49. Summary of Findings / Image source by our team

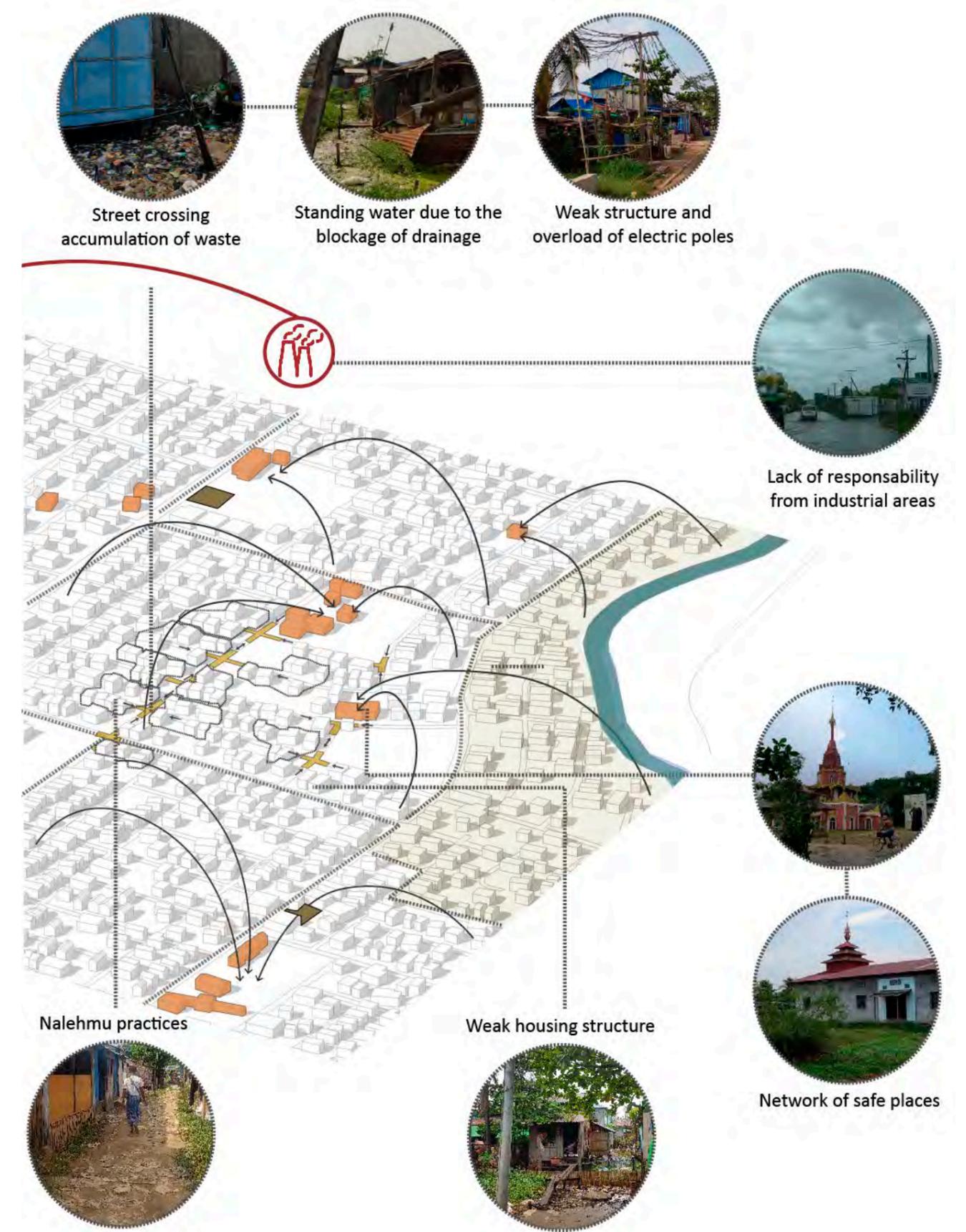




Figure 50. Discussion on Vision, Principles, Guidelines & Strategies / Image source by our own team

## C. POST-FIELDWORK

## 5. VISION, PRINCIPLES, GUIDELINES & STRATEGIES

Starting from our three main findings, we defined 3 main guidelines in order to organise our strategies throughout the different scales and dimensions. Each guideline tackles its corresponding finding, while each specific intervention tackles one of the specific (detail) findings (please refer to summary).

The finding/guideline boundary acts as a mirror: per each action or situation producing accumulation of risk, we propose an equivalent intervention aiming at accumulating resilience.

Despite each guideline can be associated to one spatial scale and one dimension:

1. Local/physical
2. Section, ward/social practice
3. Township/institutional

Many crossings and feedback loops are needed in order to make the system work as a whole. This is further explained in the spatial summary of guidelines.

**FROM ACCUMULATION OF RISK  
TO ACCUMULATION OF RESILIENCE:**

**TOWARDS A RESILIENT YANGON  
BY INCREMENTALLY UPGRADING THE PHYSICAL  
ENVIRONMENT,  
AMPLIFYING COLLECTIVE PRACTICES,**

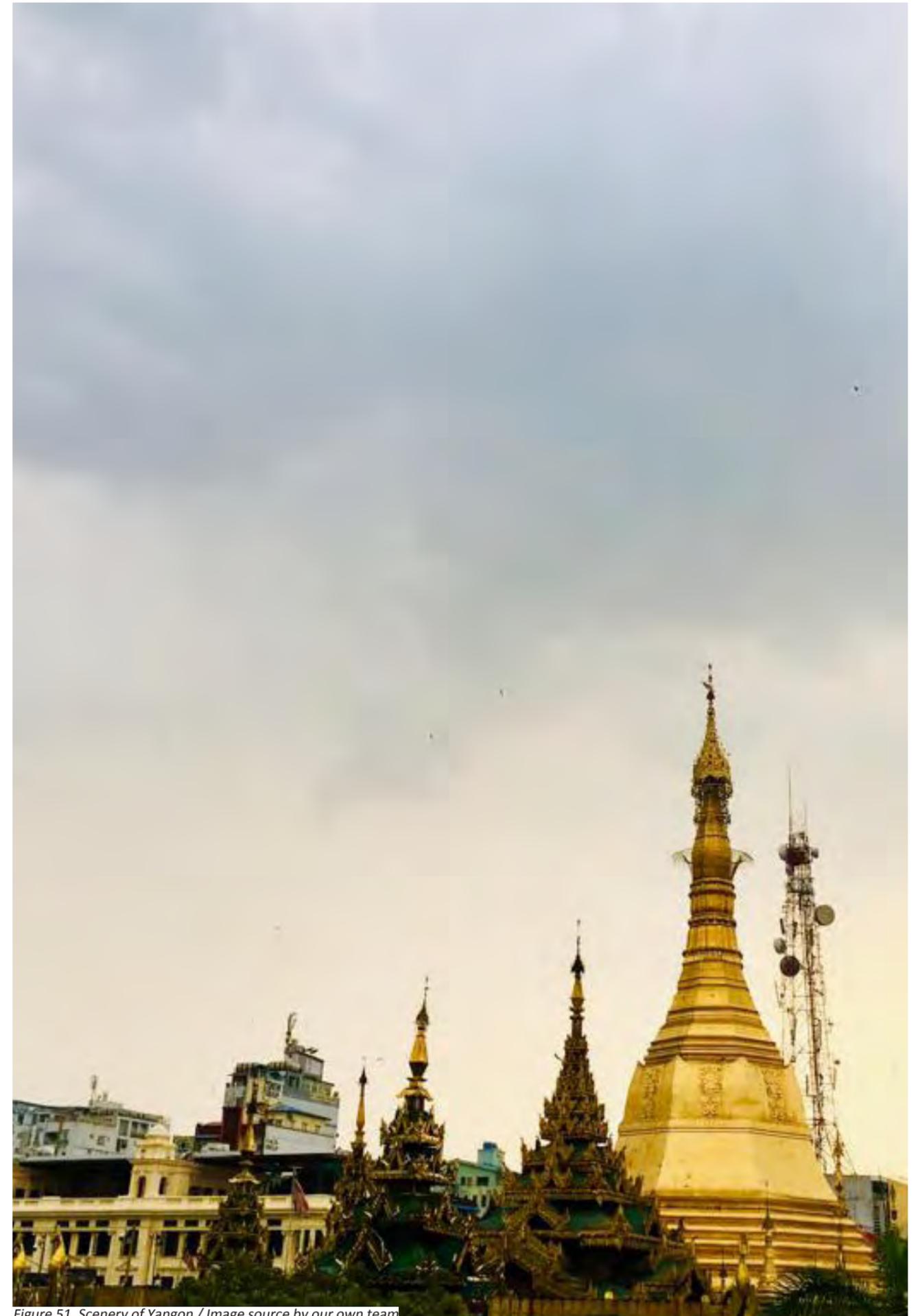


Figure 51. Scenery of Yangon / Image source by our own team

# PRINCIPLES, GUIDELINES & STRATEGIES

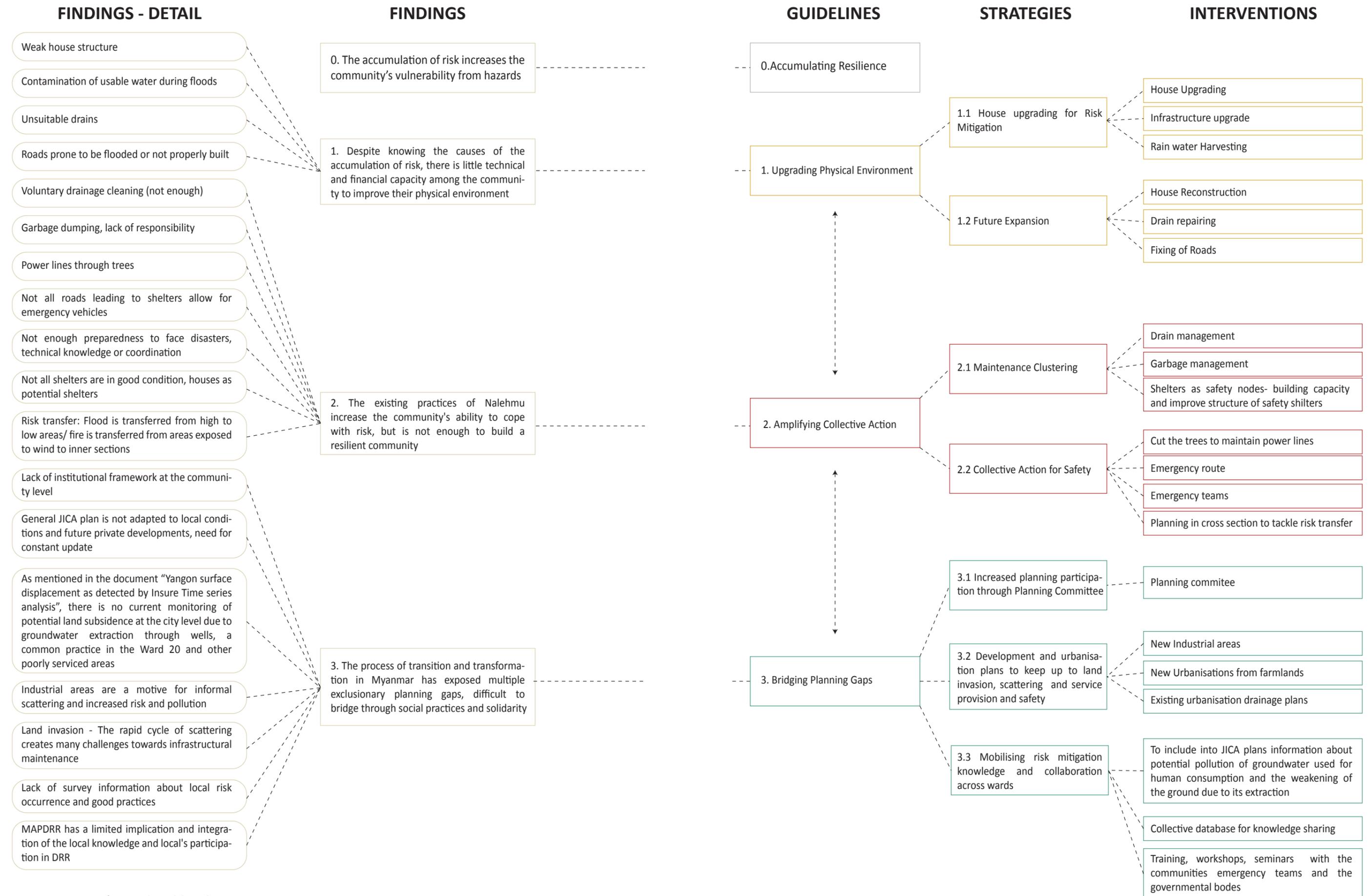
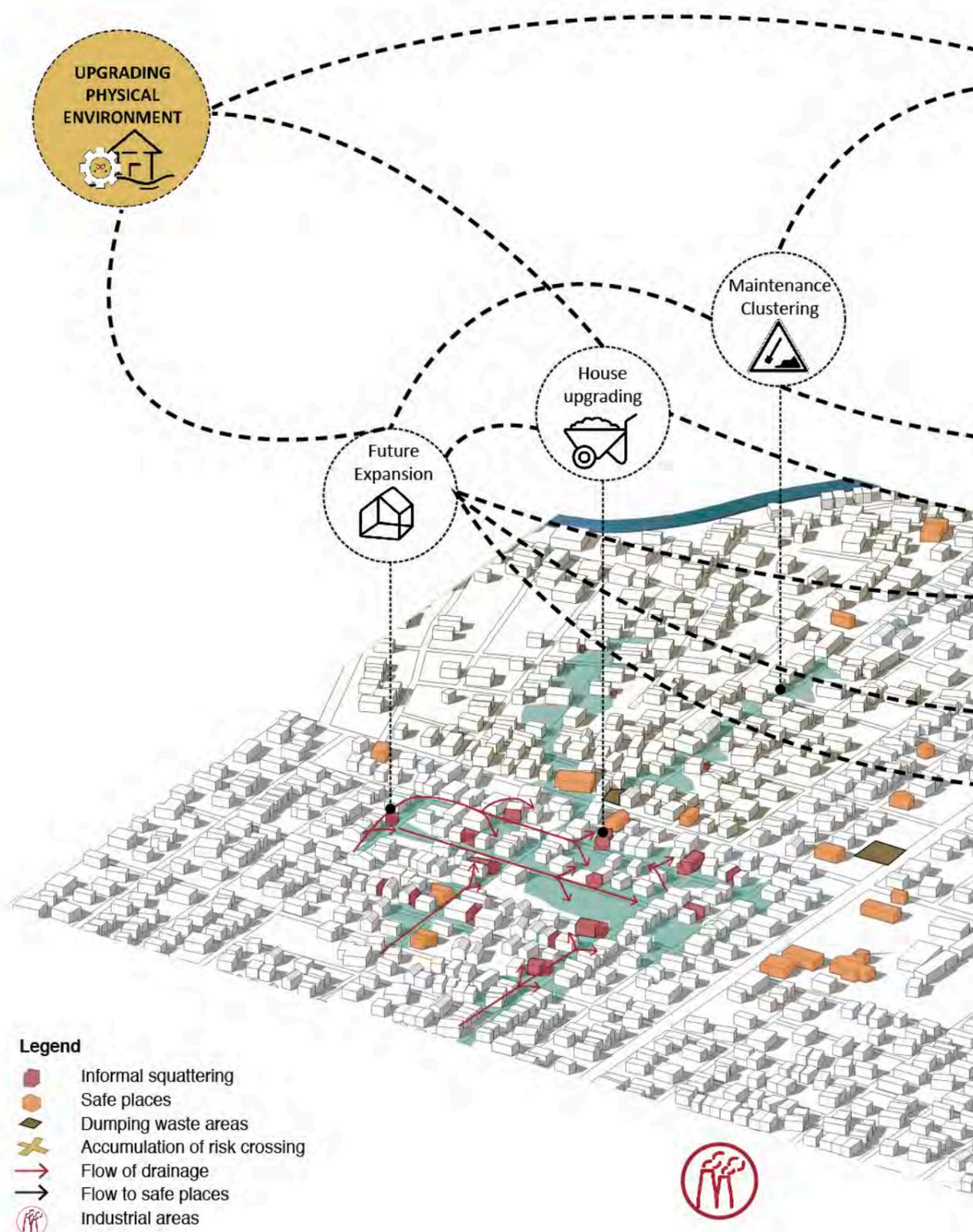


Figure 52. Structure of Principal, Guidelines & Strategies

# GUIDELINES & STRATEGIES SUMMARY



- Legend**
- Informal squatteries
  - Safe places
  - ◆ Dumping waste areas
  - ✕ Accumulation of risk crossing
  - Flow of drainage
  - Flow to safe places
  - ⚠ Industrial areas

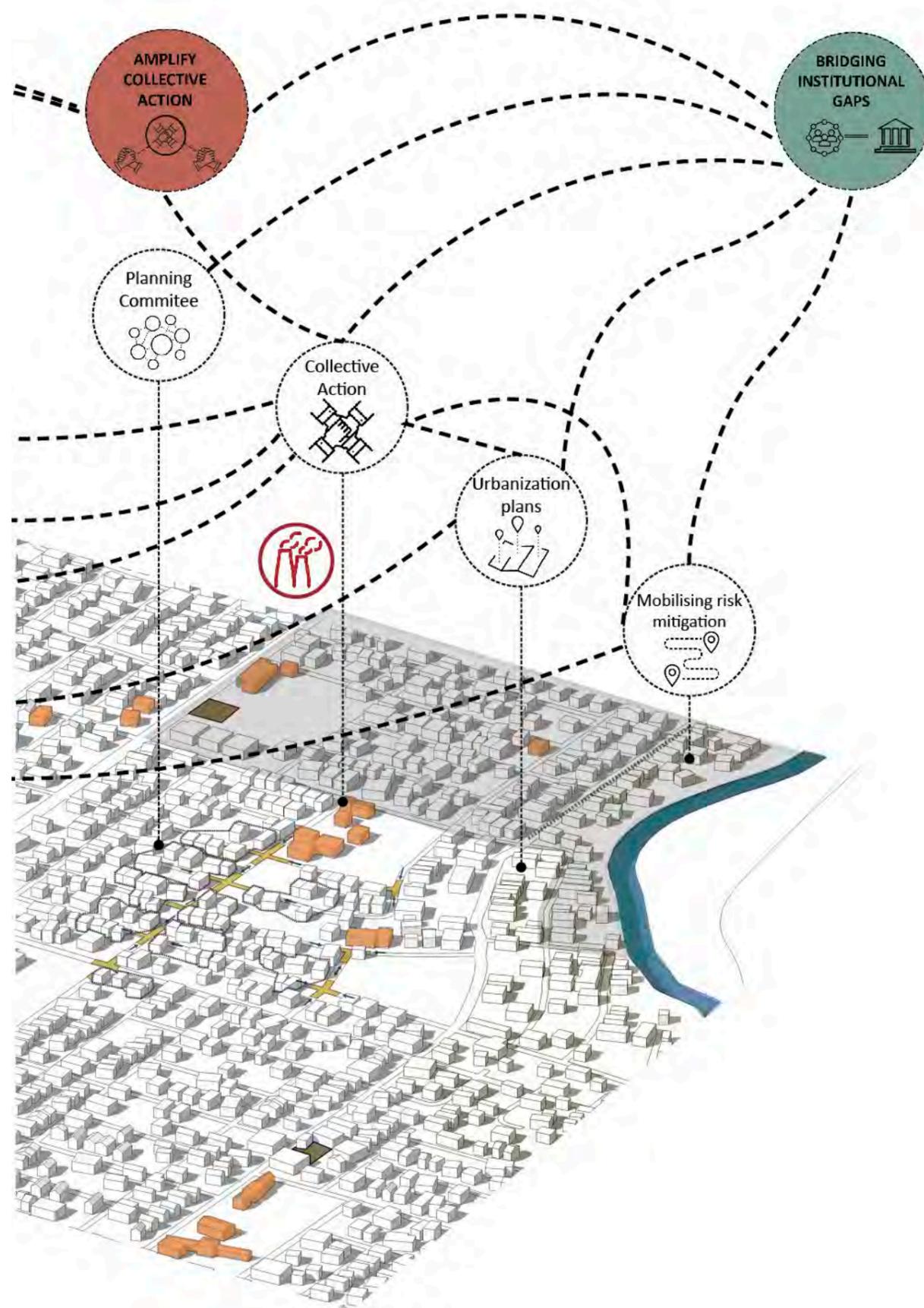


Figure 53. Guidelines & Strategies Summary

# 1. GUIDELINES: UPGRADING PHYSICAL ENVIRONMENT

## Relevance

It is based on the many findings regarding insufficient or unsuitable physical conditions at the house level and the services within the sections.

This is the first level where improvement can be done through individual action, with some help of saving groups, ngos or technical support from CBP, for example. It can be the first step in the process of de-accumulating risk and accumulating resilience.

This strategy is divided into two time scales: the first one is related with the short-term physical upgrade of the houses after the occurrence of a disaster (typically flood, but also fire and storm); and the second one is the potential long-term reconstruction within the existing ward, as seen in the Women for the World housing projects visited in Yangon.

## Objective

Improving the built environment, better physical aspect to cope with the disaster cycle (strongly connected with strategy 2.2), and also part of bigger upgrades, related with guideline 3. All this aims at the principle “physical infrastructure to provide safe living spaces”.

The main spatial manifestation is the house and its perimeter, along with the overall plot subdivision.

The corresponding strategies are:

### 1.1 House upgrading for Risk Mitigation

### 1.2 Future Expansion



Figure 54. Physical Improvement of House / Image source by our own team

# 1.1 STRATEGIES: HOUSE UPGRADING FOR RISK MITIGATION

As seen in the fieldwork, the most evident and widespread cause of accumulation of risk at the local level are the poor physical conditions of many of the households in the ward 20, not only in the informal but also in formal areas, to the extent that both spatial categories tend to merge, blurring the limits between each other.

Weak house structure and poor building materials, unplanned squatting, unsuitable facilities are some of the main physical aspects that are tackled through this strategy.

Small improvements on the house can be undertaken by the householders with the help or paid labour of other neighbours, making use of the existing building skills among many of the people living in the Ward, and creating livelihood improvement.

Most of the suggested interventions are improvements of construction methods seen on site or in technical reports from equivalent contexts in neighbouring countries.

### Joint Upgrading:

The common practice of strengthening the timber and bamboo structural joints of the house, is enhanced by using metal ties and straps to reinforce the connections between studs, rafters, plates and diagonal braces. This is particularly useful to increase the roofs' resistance to strong winds, when they tend to blow away.

### Plinth Reinforcement:

The need to increase the floor height during and after every flood is currently achieved by using timber battens and plywood boards, which is not a durable solution.

We propose to elevate the floor by adding to the existing soil ground an extra layer formed by a mix of concrete, brick chips and stones. This solution has a much longer life-cycle, being currently applied in other countries of the region.

**Flood Mitigation at House Level:** There are several intervention that can be done in the perimeter of the house to reduce the risk of flooding: planting water absorbent trees; digging trenches; and installing sand bags up to a safe level, according to previous years' floods.

It must be noted that this interventions require a certain amount of free space around the house, which can be negotiated among a cluster of houses (refer to guideline 2).

**Rainwater harvesting:** Rainwater harvesting is proposed on the house level in order to reduce the flooding, ameliorating the chances of land subsidence and domestic use as flushing water

### Future Expansion:

Long-term improvements of the physical environment should be achieved through more comprehensive reconstruction processes, specially in informal areas within Ward 20 or in future urbanisation of prior farmlands.

Reconstruction processes would allow to tackle many of the issues found on site, related with unsuitable public infrastructure, too rigid or inappropriate plot subdivision, pollution of drinking water, etc.

For this long-term strategy, a more comprehensive planning process and a wide range of actors is required, in order to implement improved house typologies that allow for vertical expansions and shared facilities, and a plot subdivision that takes into account the lessons from the existing urbanisations, such as the need for commercial expansion in front of each house, and the separation between vegetation and power lines.

This level of intervention can be further developed by linking with the type of incremental cooperation and managed depicted in strategy 2.1, being a requisite to achieve the institutional and planning bridging proposed in strategies 3.2 and 3.3.

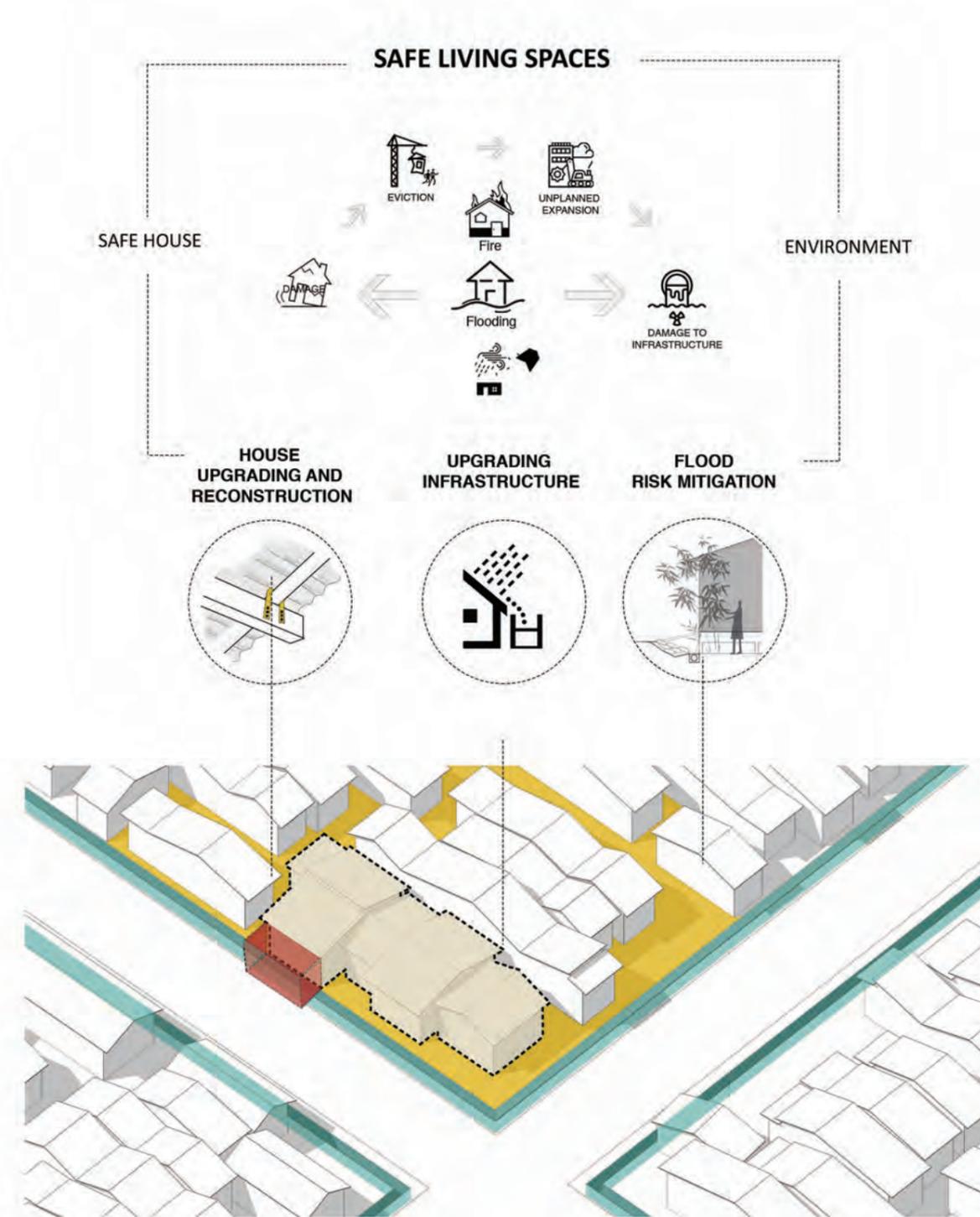


Figure 55. Upgrading the Physical

# 1.1 STRATEGIES: HOUSE UPGRADING FOR RISK MITIGATION

## 1.1 HOUSE UPGRADING FOR RISK MITIGATION

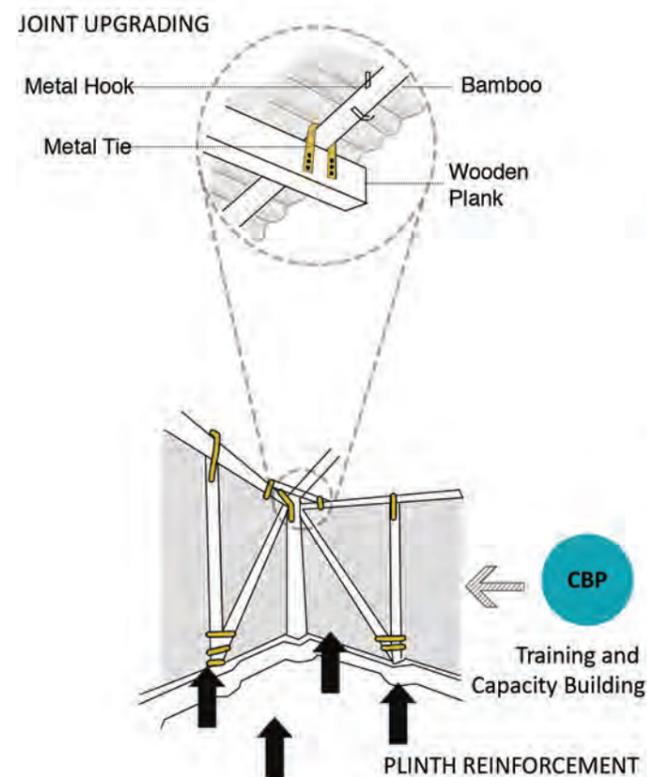


Figure 56. Joint and Plinth Upgradation for reinforcement

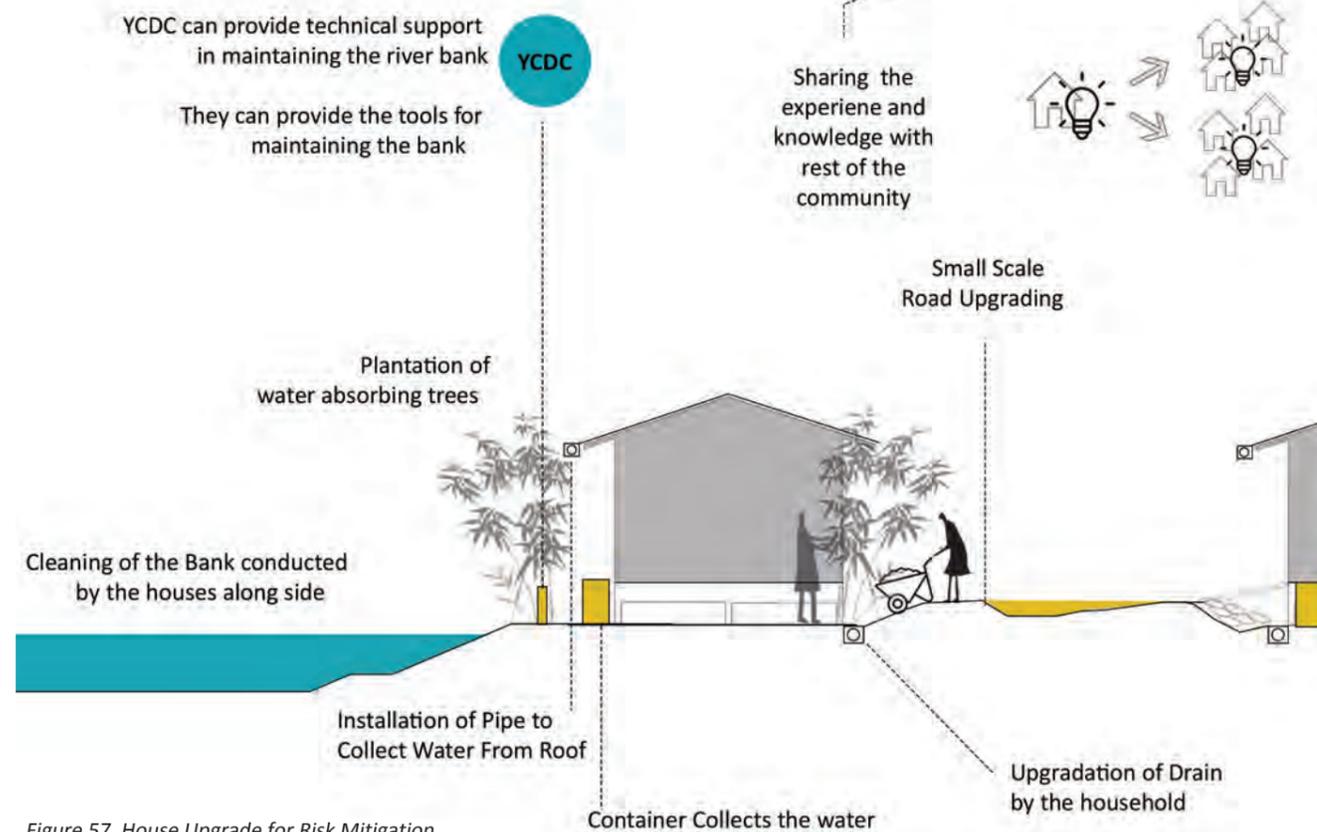
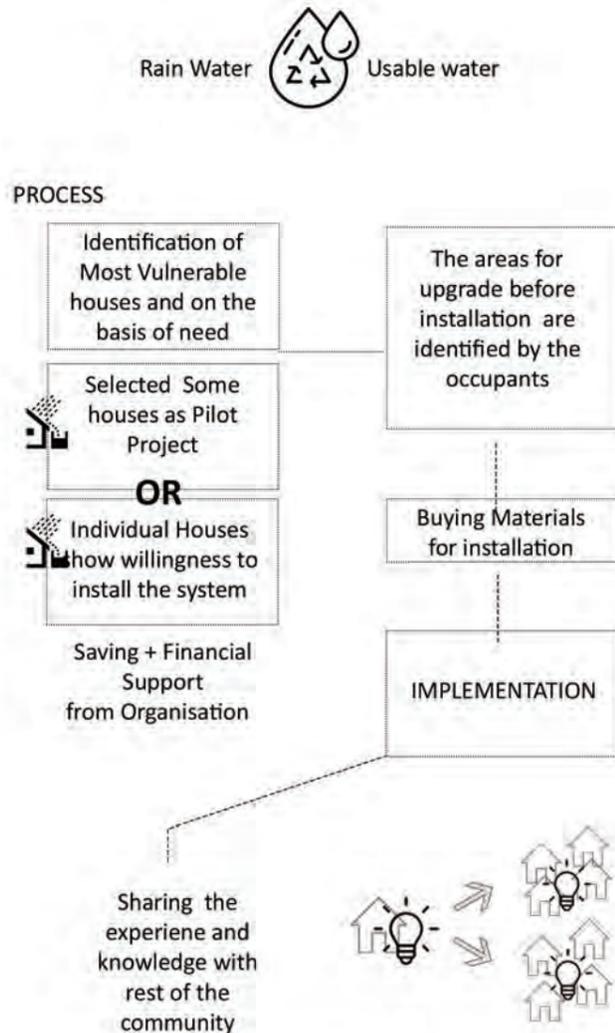


Figure 57. House Upgrade for Risk Mitigation

# 1.2 STRATEGIES: FUTURE EXPANSION

## RAINWATER HARVESTING



Small Scale Road Upgrading

Container Collects the water

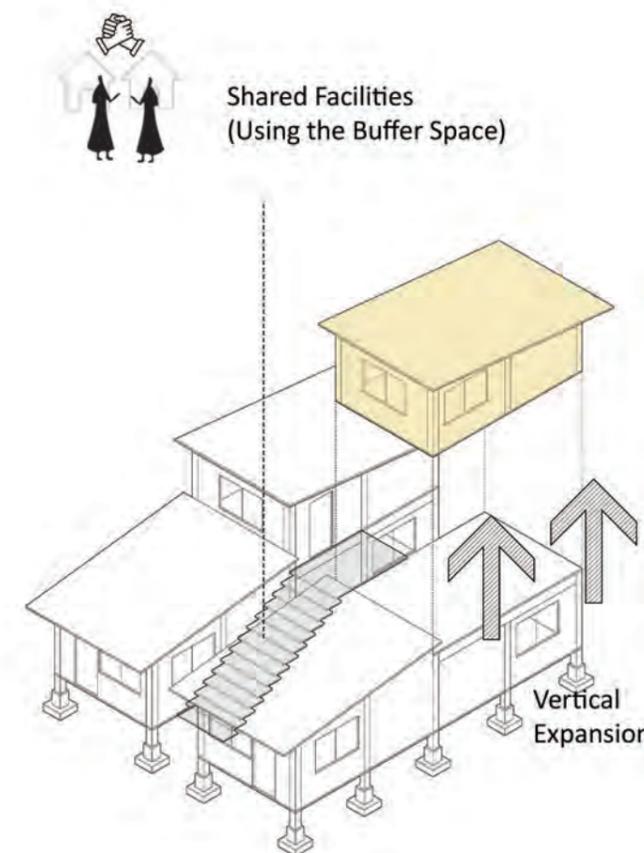


Figure 58. Vertical expansion

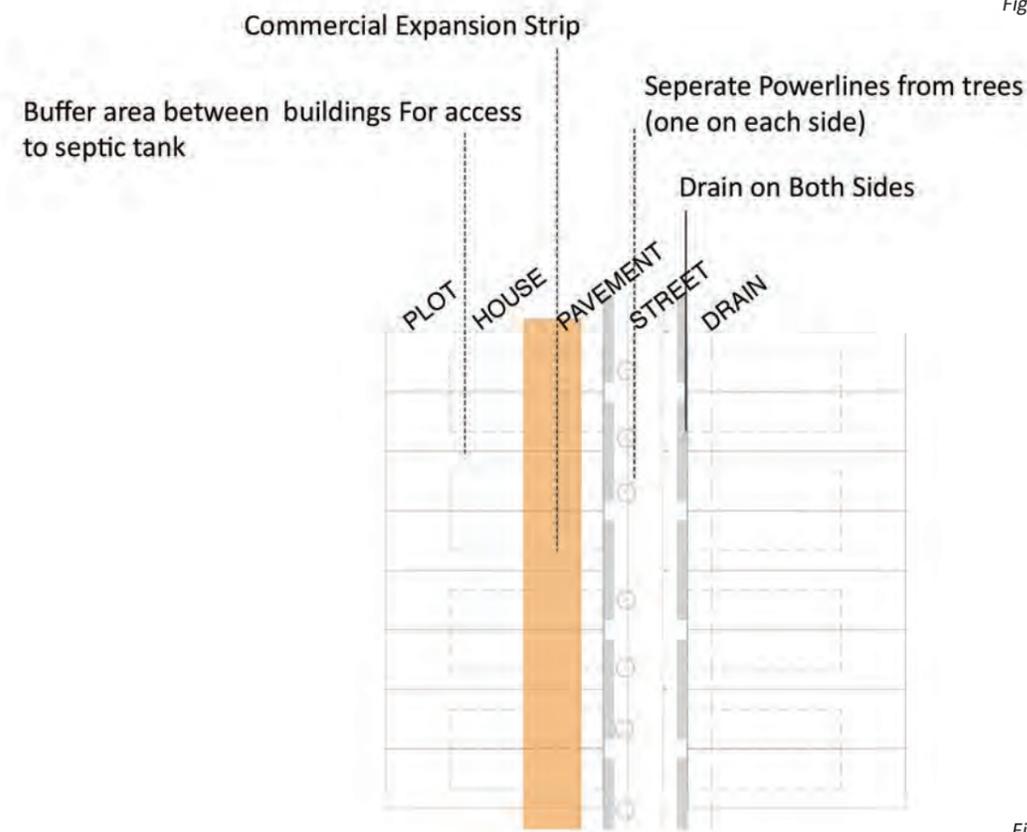


Figure 59. Future Expansion

## 2. GUIDELINE: AMPLIFYING COLLECTIVE ACTION

### Relevance

This guideline is based on the 2nd key finding as stated in the findings' summary: "The existing practices of Nalehmu increase the community's ability to cope with risk, but is not enough to build a resilient community".

We identified an enormous potential in the everyday practices assessed during the fieldwork on a Section and Ward scale, related with activities based on mutual solidarity, cooperation and verbal agreements. This kind of horizontal agreements tend to be well evaluated by the member of the community.

These practices can be identified during the disaster and reconstruction period, but they are usually absent on times of preparedness or as part of middle or long-term undertakings.

Thus, the positive aspects of Nalehmu seems insufficient to reduce the accumulation of risk in the long run, being usually only enough for short-term relief, and as such, as part of the risk accumulation cycle.

This is usually due to lack of finance, technical knowledge or lack of a comprehensive organisation within the Section and across Ward level.

### Objective

Based on the above mentioned, the main objective of this guideline and its corresponding strategies is to expand on the existing positive Nalehmu practices, and to make it work on a section and ward level, easing the process of cooperation through specific actions, related with reducing the risk accumulation and increasing the resilience accumulation.

This guideline's main spatial manifestations are the crossing, the shelter and the cross section.

The corresponding strategies are:

#### 2.1 Maintenance clustering

#### 2.2 Collective Action for Safety

#### 2.3 Collectively mitigate flood risk



Figure 60. Collective Action to Upgrade Infrastructure /  
Image source by our own team

## 2.1 STRATEGIES: MAINTENANCE CLUSTERING

This strategy is based on the street crossings, identified as hotspots of risk accumulation, the place where power lines get intertwined, drains get blocked and flood the roads, garbage accumulates, etc.

We propose to replace the current minimum management unit, consisting of 10 houses organised by blocks, for a crossing management unit, comprising the houses around it and the public space in between.

This is supported by the idea that the current block clustering leaves unattended the public space, creating a “grey area” of responsibility, a no-man's land. Instead, the new clustering incorporates a portion of public space, thus sharing the maintenance responsibility among specific householders.

Tasks such as garbage management, drain cleaning and tree branches cutting are tackled by this proposed minimum management unit.

Furthermore, this type of clustering is beneficial from a financial point of view, by sharing costs, generating extra incomes through recycling and extra jobs opportunities, as it will be further explained

This strategy is strongly linked with physical improvements suggested in guideline 1, while also filling institutional gaps by self-managing some of the YCDC tasks that are not currently being executed.

The formation of the cluster is based on existing practices of solidarity and cooperation, regarding waste management and drain cleaning. Most of these practices rely on voluntaries and therefore are insufficient to effectively reduce the accumulation of risk.

The cluster of houses and neighbours is formed with the help of section leaders and some support from existing or new saving groups. After maintenance actions are implemented, knowledge might be shared across sections, and institutional support should be looked for, for new waste collection points for example.

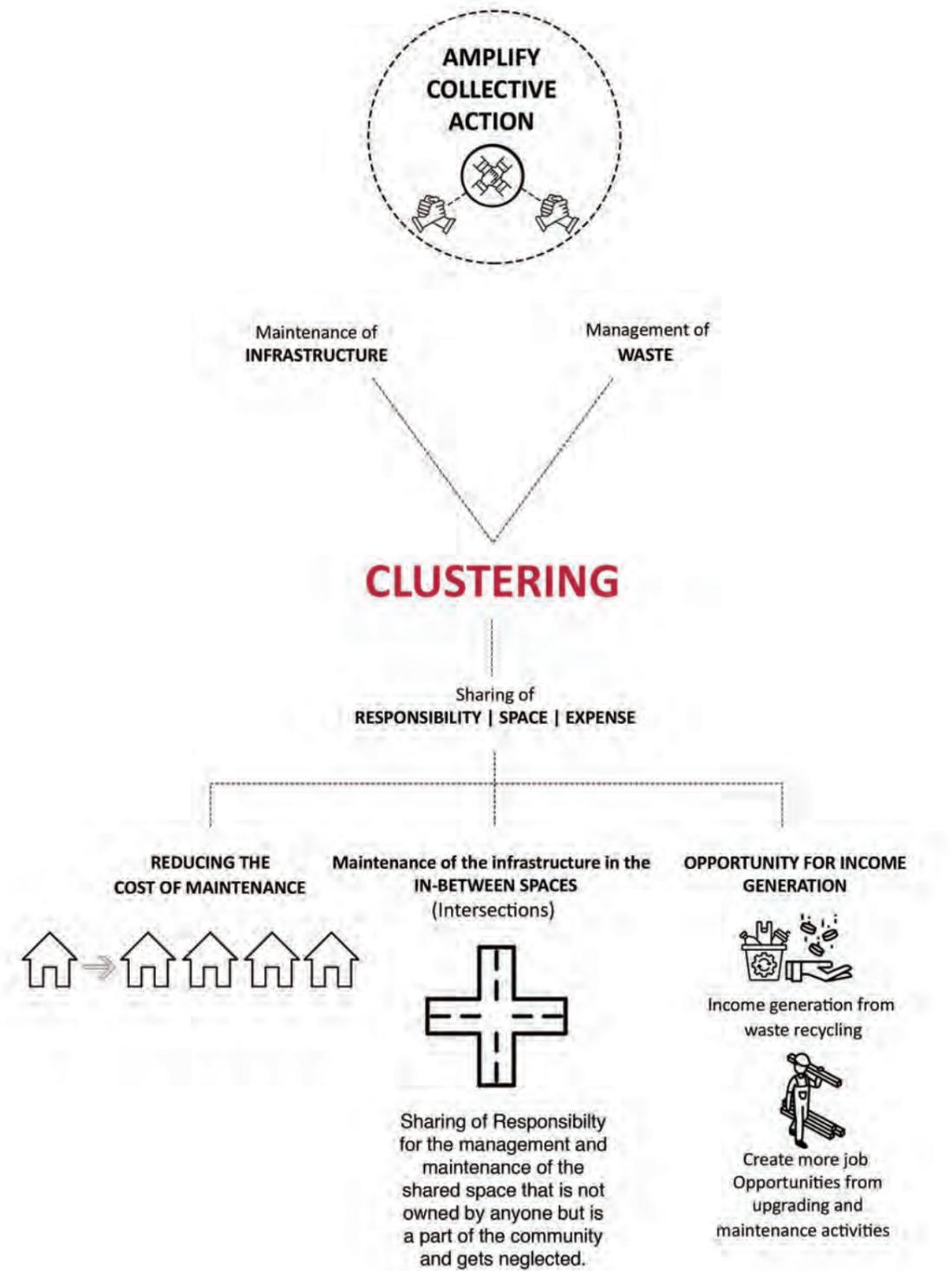


Figure 61. Strategy Rationale

## 2.1 STRATEGIES: MAINTENANCE CLUSTERING

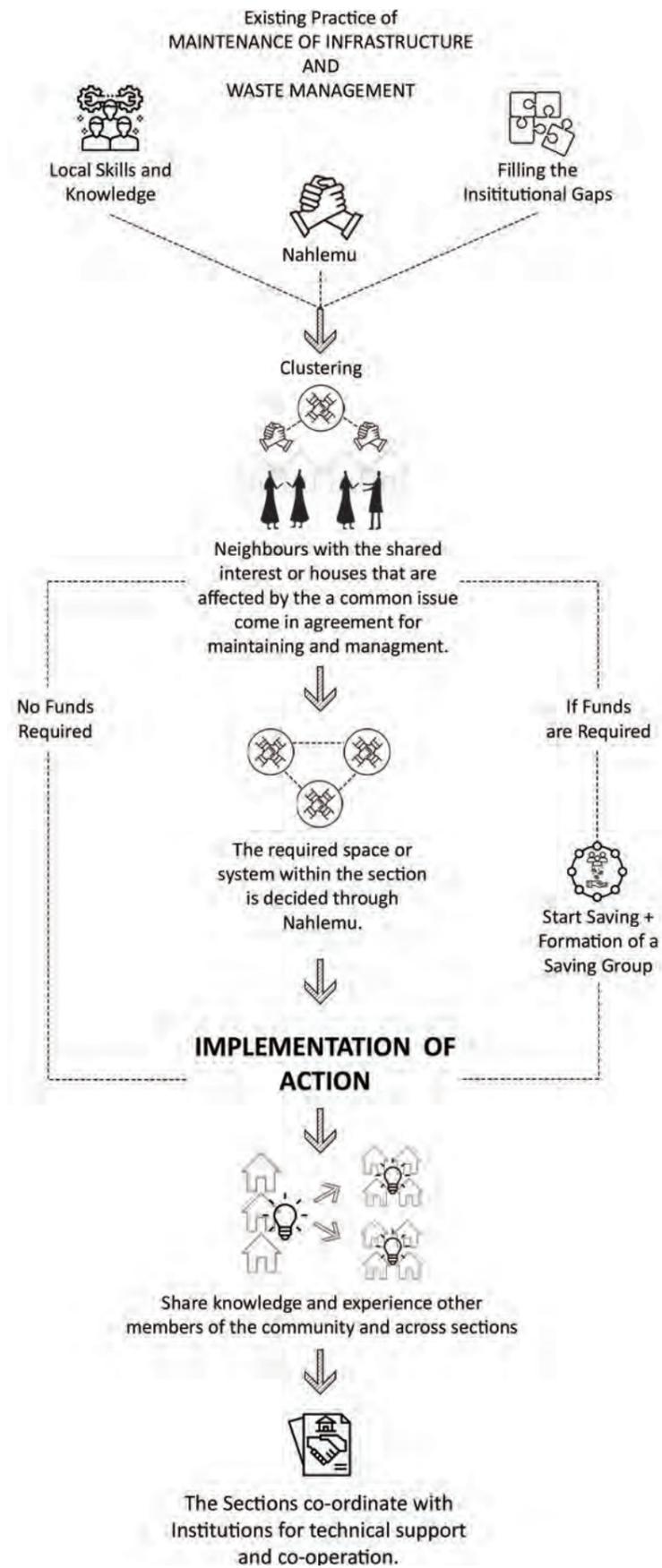


Figure 62. Formation of Cluster

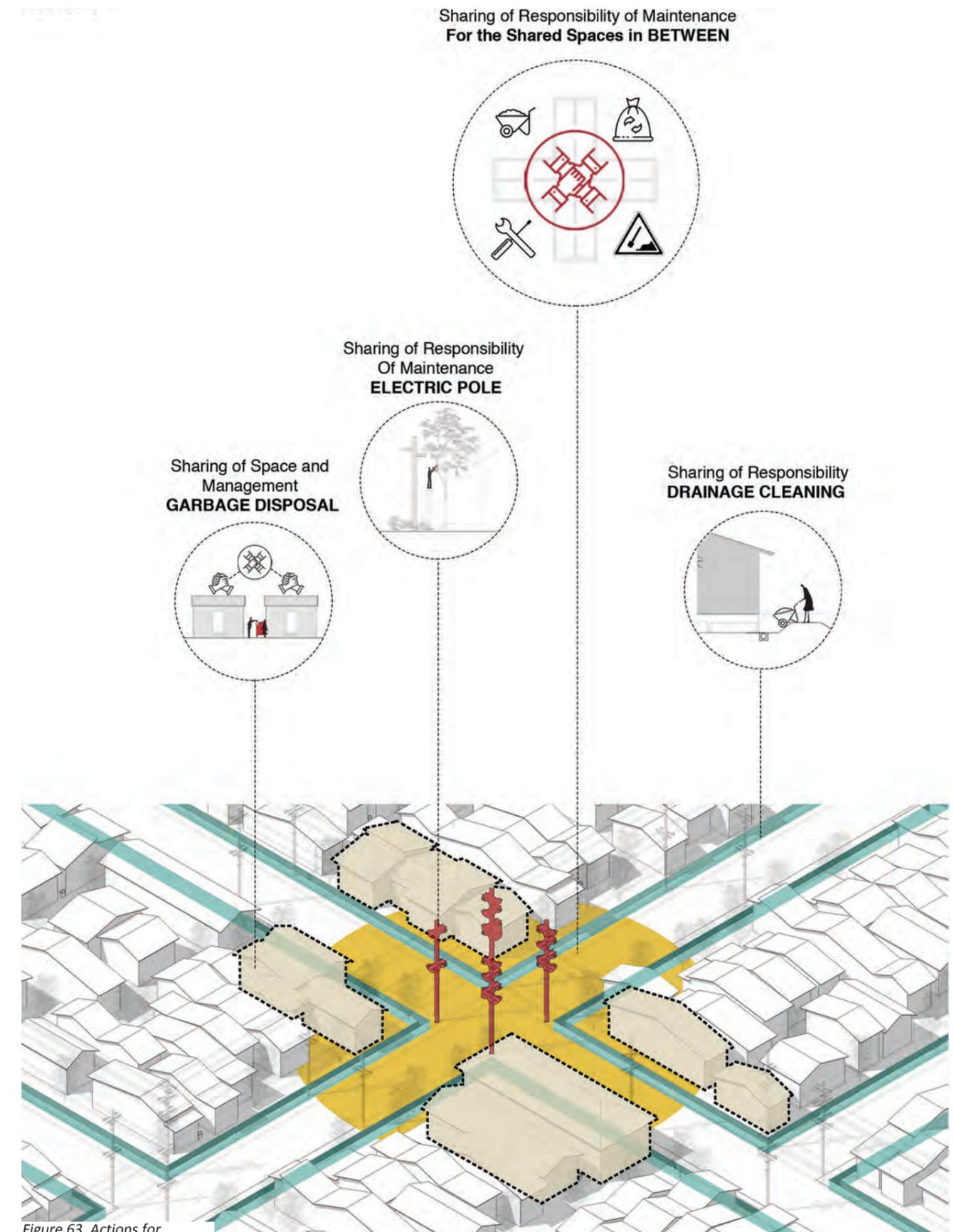


Figure 63. Actions for

## 2.1 STRATEGIES: MAINTENANCE CLUSTERING

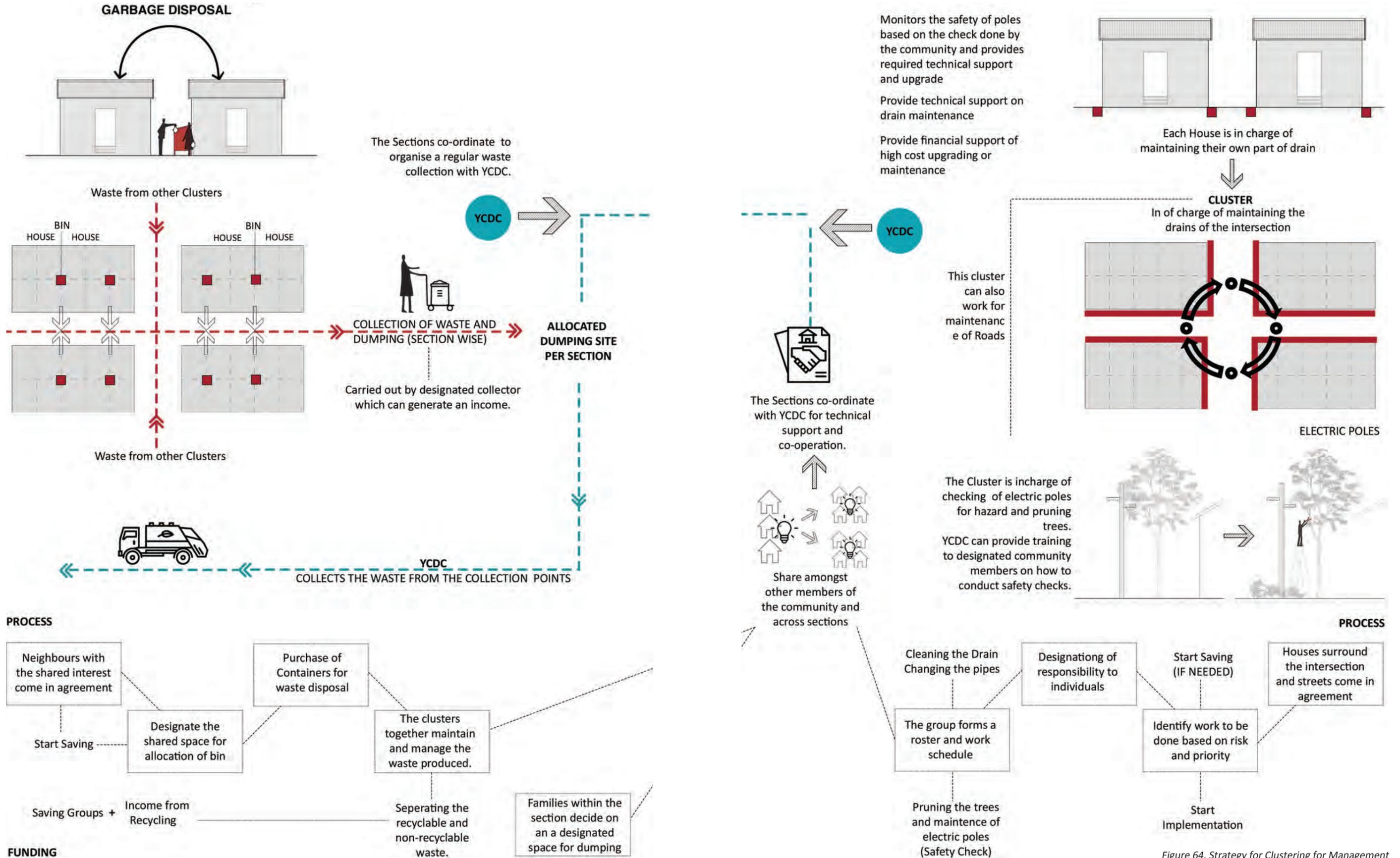


Figure 64. Strategy for Clustering for Management

## 2.2 STRATEGIES: COLLECTIVE ACTION FOR SAFETY

The second strategy builds on the previous strategies, this time on the ward level, and its main goal is to manage the disaster cycle: both through the spatialisation of emergency (emergency route); and across time: before disaster (preparedness), during disaster (relief), and after disaster (reconstruction).

This strategy relies on the findings described on the flow of events and the risk and safe spaces mapping (refer to previous chapter).

### Shelters as Safety nodes:

We propose to transform the numerous shelters and safe spaces, both official (community centers, Buddhist monasteries, schools) and customary (some houses or better built buildings), into nodes within the neighbourhood, not only as relief centres, but also as places from where to build capacity and share knowledge. Furthermore, we propose to connect them as a network in time of disasters.

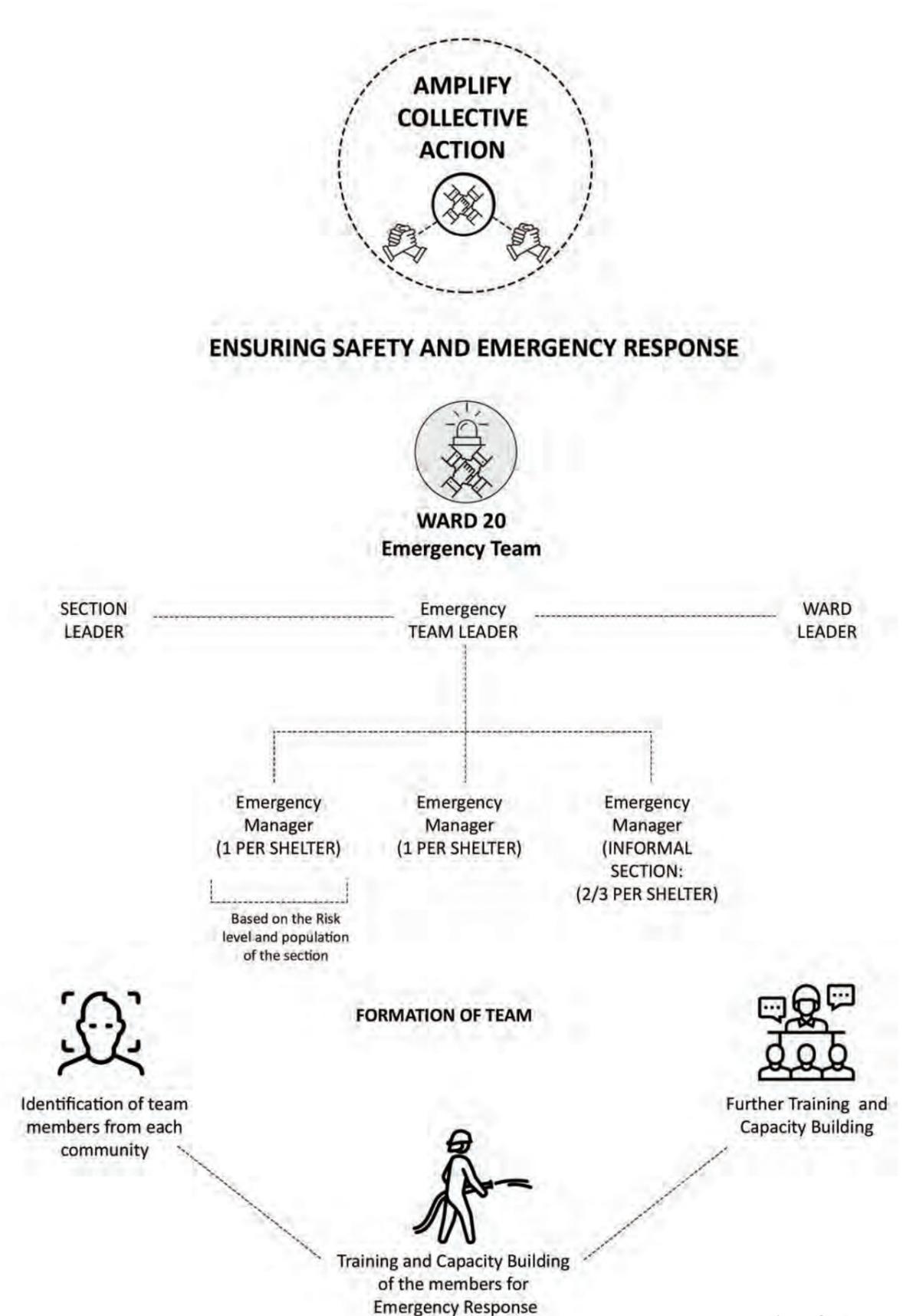


Figure 65. Emergency Team

## 2.2 STRATEGIES: COLLECTIVE ACTION FOR SAFETY

### Emergency teams:

Finding: Not enough preparedness to face disasters, technical knowledge or coordination

We propose to create emergency teams as a complement to both existing administrative structures within the sections and the Ward; and existing and potential saving groups. It will be formed by one or more manager per shelter, chosen from its recurring users, and one team leader per

Ward, to work in coordination with the Ward leader. This team will be further trained in emergency response and preparedness, with the help of the authorities or NGOs.

### Pre-disaster: Ensuring Preparedness

This stage is characterised by the definition of an action plan, risk and vulnerability assessment, and general awareness and capacity building activities. It is complemented by risk and infrastructure territorial mapping, which can be supported by NGOs such as WfW and CBP, and government agencies, and shared through platforms such as the one suggested in strategy 3.3

### During disaster: Emergency:

Two different scenarios are suggested: flood and fire. In the first case, seasonal floods typically last for three days. For fire, the response must be immediate, and the requirement of a quick, temporary shelter is mandatory.

### Post-disaster: recovery and reconstruction:

This stage is subsequently divided into short-term, comprising relief and livelihood support; and long-term, comprising reconstruction of houses and potential new urbanisations.

This stage has the potential to connect with both city level institutional support (guideline 3), and with the two levels of physical interventions of houses, as described in strategies 1.1 & 1.2, while creating new job opportunities for local people.

### ACTIVITIES OF THE EMERGENCY TEAM

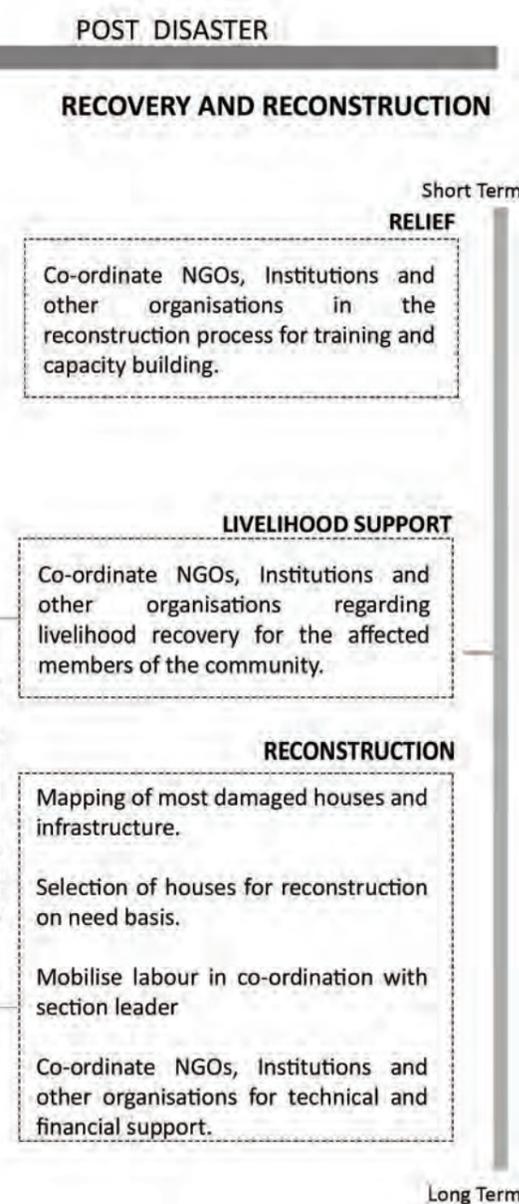
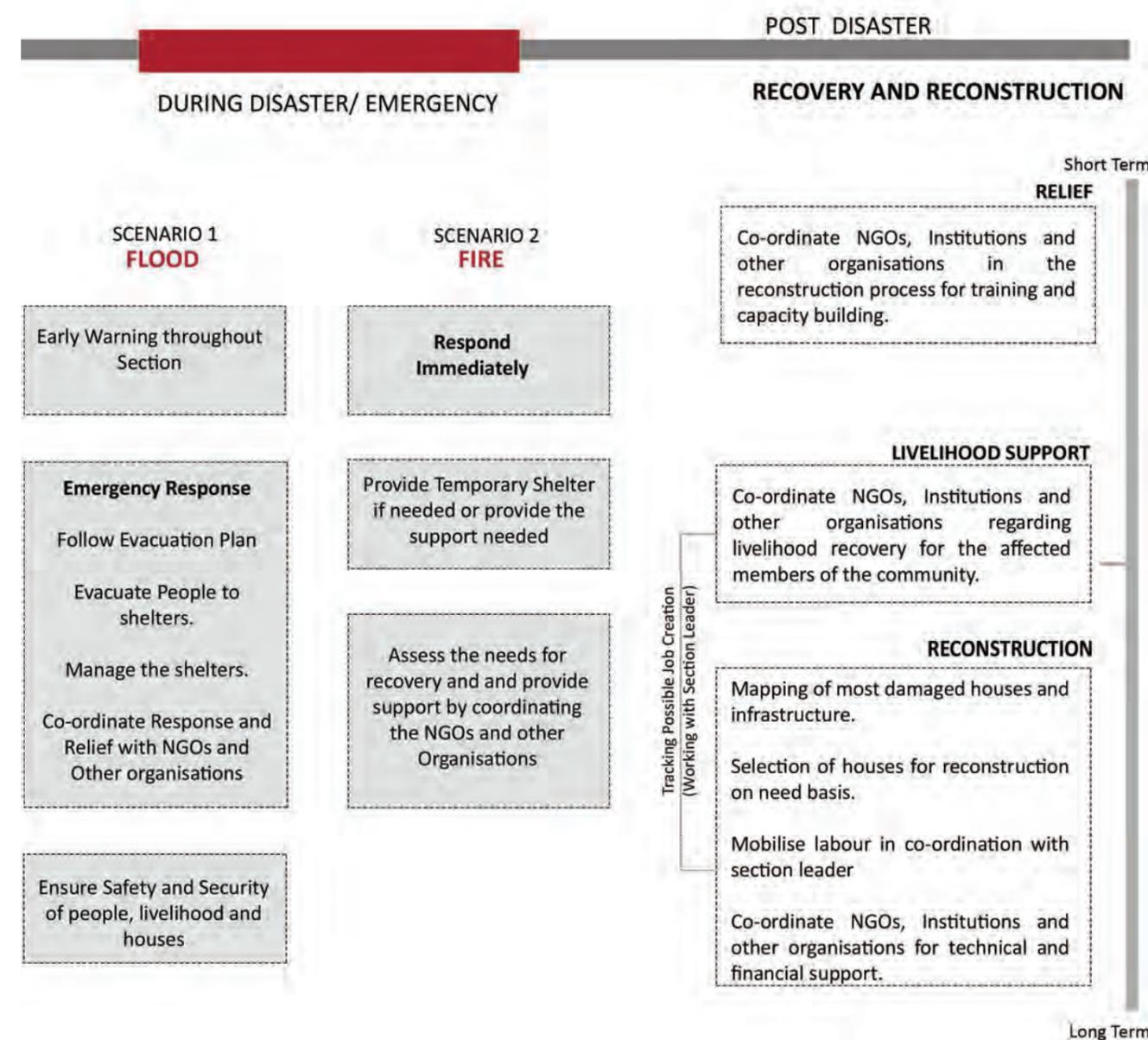
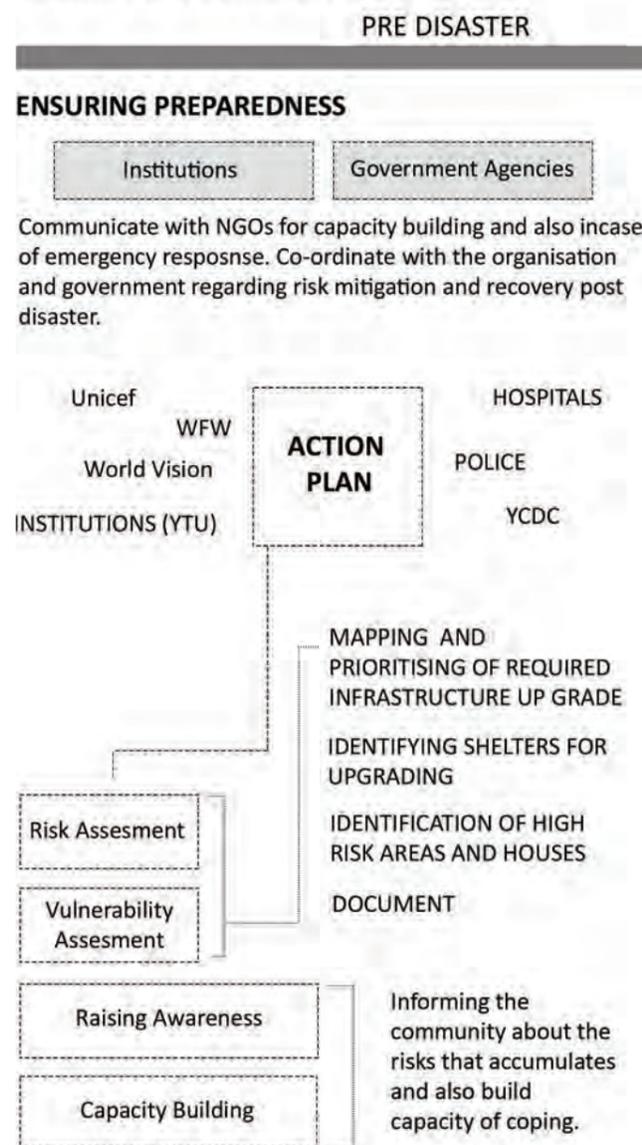


Figure 66. Activities of Emergency Team

## 2.2 STRATEGIES: COLLECTIVE ACTION FOR SAFETY

### Planning in cross section to tackle risk transfer:

Building on the fact that risk is transferred across sections (flood is transferred from high to low areas; fire is transferred from wind exposed areas to inner areas), we propose to assess risk accumulation and build resilience, using the cross section as an analytical and propositive tool that complements the plan view. Thus, surveying and modifying levels and topography can help in the process of working collaboratively across sections, between “risk origin” and “risk destination” zones, regardless of pre-existing boundaries.

This is further connected with the need to integrate local conditions to the general city plan, and the need for new developments’ liability regarding risk transfer and accumulation (strategy 3.2).

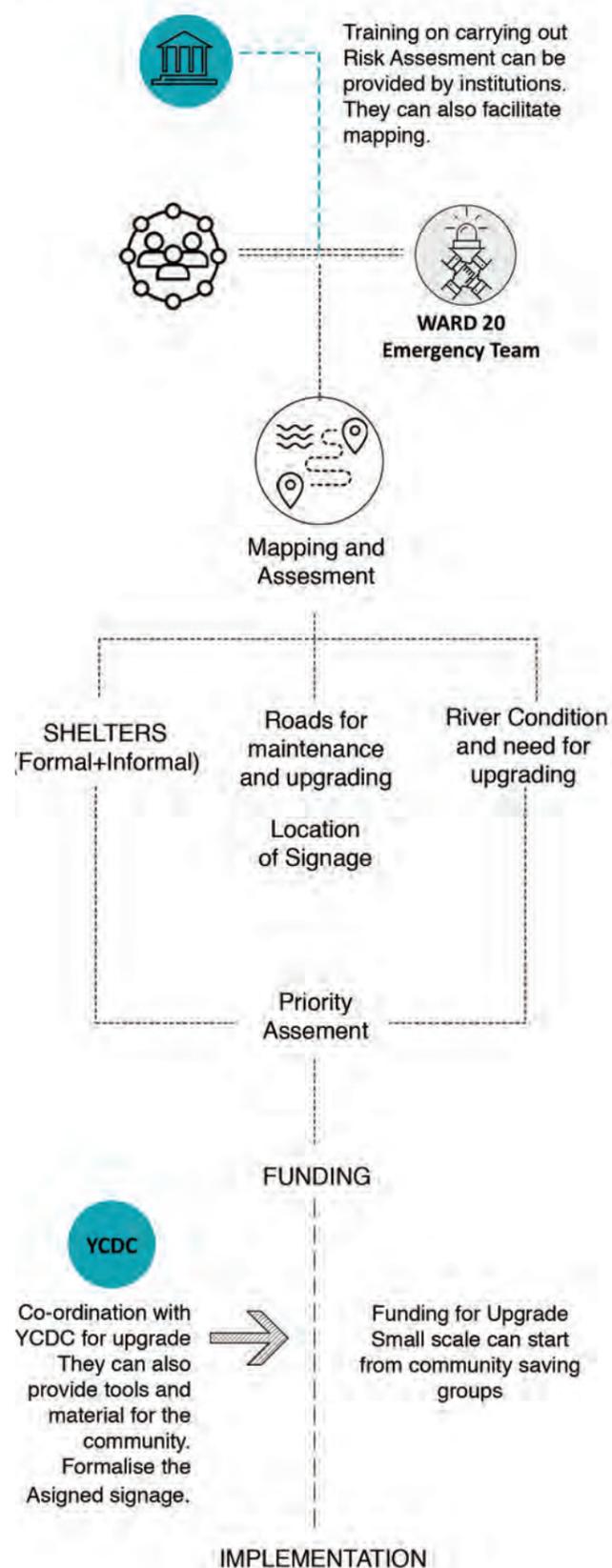
### Emergency Routes:

As assessed on site,, not all roads leading to shelters are suitable for emergency vehicles, or are safe in case of emergency due to flood. Furthermore, “informal” shelters such as houses are not fully integrated into the shelter system.

Based on this, we propose an emergency route that connects all the formal and informal shelter, and provides safe connections with the rest of the city, hospitals and fire stations. This will be achieved through participatory mapping (this can feed the database from strategy 3.3) demarcation of shelters, raising of road level and signaging.

The implementation includes strong commitment from the emergency team (see below), and cooperation from NGOs, but also physical improvements and local labour, as described in strategy 1.1.

### PROCESS FOR THE MAKING OF EMERGENCY ROUTE



### SPATIALISATION OF EMERGENCY TEAM LED ACTIVITIES

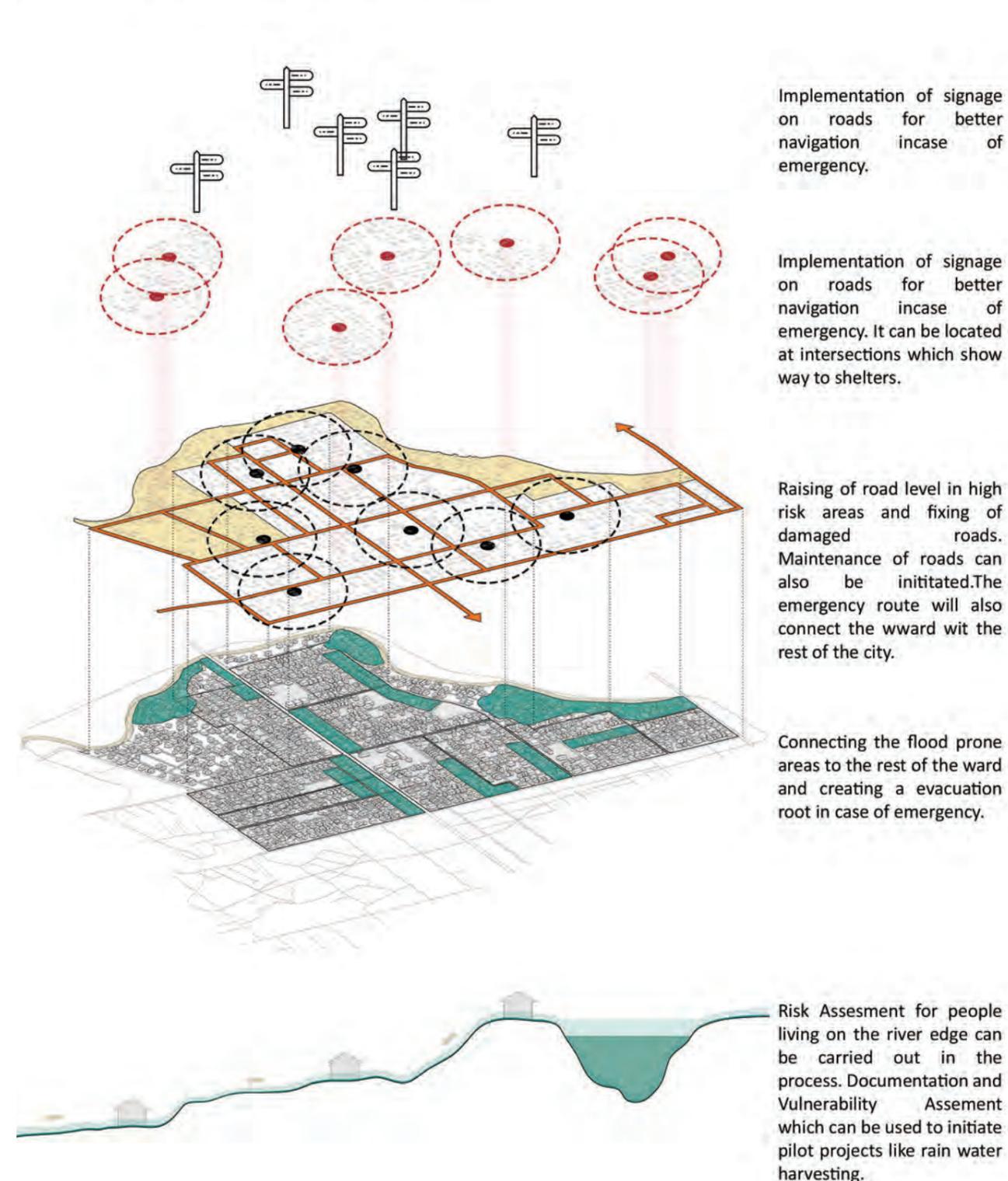


Figure 67. Spatialising the activities of Emergency

### 3. GUIDELINE: BRIDGING PLANNING GAPS

#### Relevance

We identified from site work and secondary sources research - in particular the updated JICA Plan for Yangon (2018) and the Drain Upgrade Plan (2014)-, a series of institutional and planning gaps:

There is a lack of planning institutions below the city level, resulting in non-existent participatory processes aiming at defining local areas.

Furthermore, JICA plan, despite comprehensive, it is not adapted to local conditions, and lacks tools and strategies for updating, as declared in the plan (JICA 2018, I 2-66). The rapid changes in land use, urbanisation of farmland, ever changing flood patterns make this plan incapable to adapt or to cope with the pace of the changes of the city.

Furthermore, increasing risks related with climate change, pollution of groundwater and risk of land subsidence are future challenges for planning of the city.

Concurrently, there are not channels to scale up local knowledge and practices based on previous disaster experiences into a comprehensive planning strategy.

#### Objective

This guideline aims at bridging all the identified planning, information, and institutional gaps between communities and authorities, being a fundamental extension and complement of the two previous guidelines, in larger spatial and time scales.

The strategies are:

**3.1 Increased planning participation through Planning Committee;**

**3.2 Development and urbanization plans to keep up with land invasion, squatting and service provision;**

**3.3 Mobilising risk mitigation knowledge and collaboration across wards.**



Figure 68. Building a Knowledge Sharing Platform / Image source by our own

### 3.1 STRATEGIES: PARTICIPATORY PLANNING

This strategy proposes to insert a new branch in Yangon’s planning institutional structure at the Ward level, to fill the gap between the local practices and the city level plan.

A new planning committee is included at the same level as the existing Development Committee.

It will include planning considerations from both formal and informal areas, allowing for more participation from local communities, and will allow to plan considering inter section components, such as the cross section strategy (refer to 2.2).

### INCREASED PLANNING PARTICIPATION THROUGH PLANNING

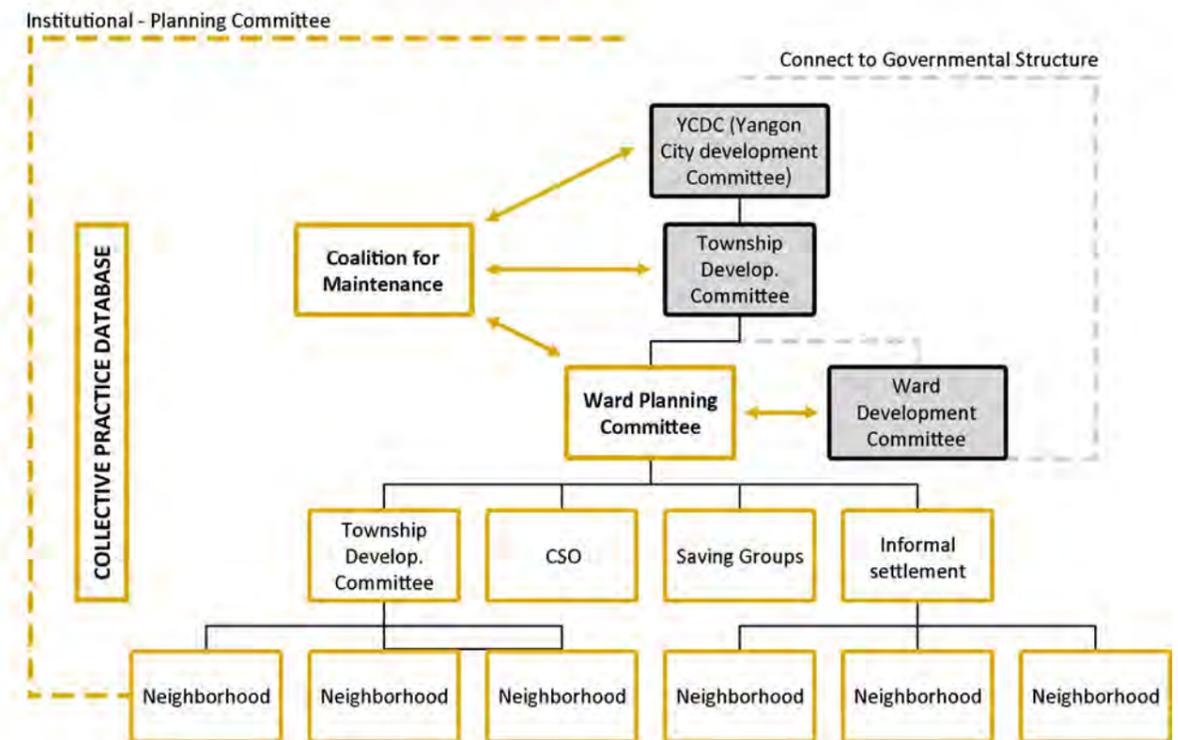


Figure 69. Coalition Platform

### 3.2 STRATEGIES: BRIDGING PLANNING GAP

As declared by the JICA plan, there is the need for constant update of the city plan, given the fast changes in land use. It is expected this incremental process goes along an equivalent process to achieve rights over land and citizenship. It will help in the process of assessment and absorption of negative externalities produced by new industrial and housing developments.

It comprises three modes of upgrading: new industrial developments, new urbanisations from farmlands, and existing sections or neighbourhoods' upgraded plans, connecting with the strategy 1.2.

#### DEVELOPMENT AND URBANIZATION PLANS TO KEEP UP WITH LAND INVASION, SQUATERING AND SERVICE PROVISION

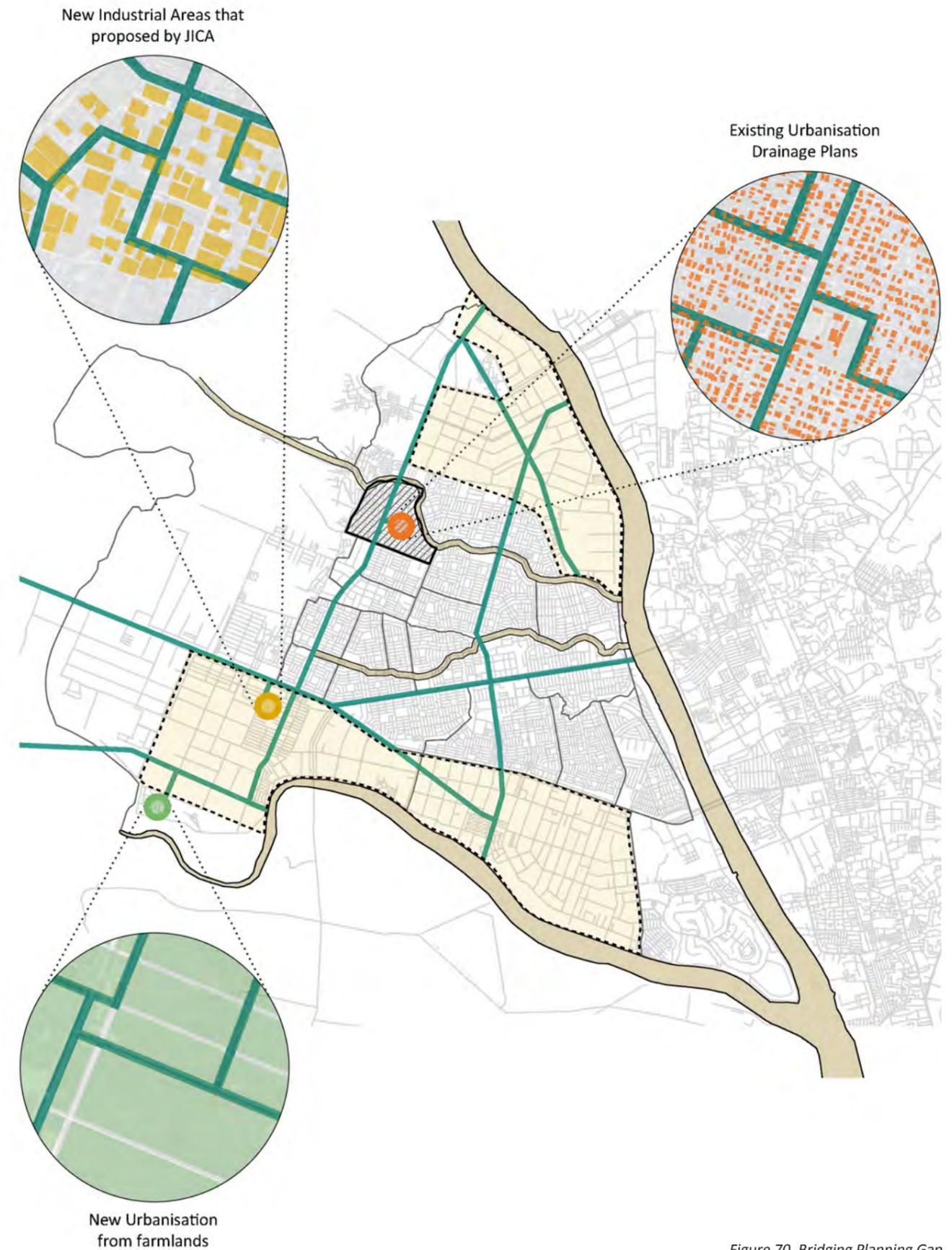


Figure 70. Bridging Planning Gap

### 3.3 STRATEGIES: MOBILISING KNOWLEDGE

This strategy includes the assessments of uncovered -but fundamental- knowledge gaps within the city level, such as the groundwater constant monitoring or the risk of land subsidence.

A second key aspect is the mobilisation and sharing of knowledge and practices, to be achieved through two activities: The first is the implementation of a collective database for knowledge sharing, that might work as a mobile app; and the second is through events such as workshops and seminars among communities' emergency teams and governmental bodies.

In this way, knowledge sharing becomes a powerful tool to reduce gaps between communities, authorities and actors.

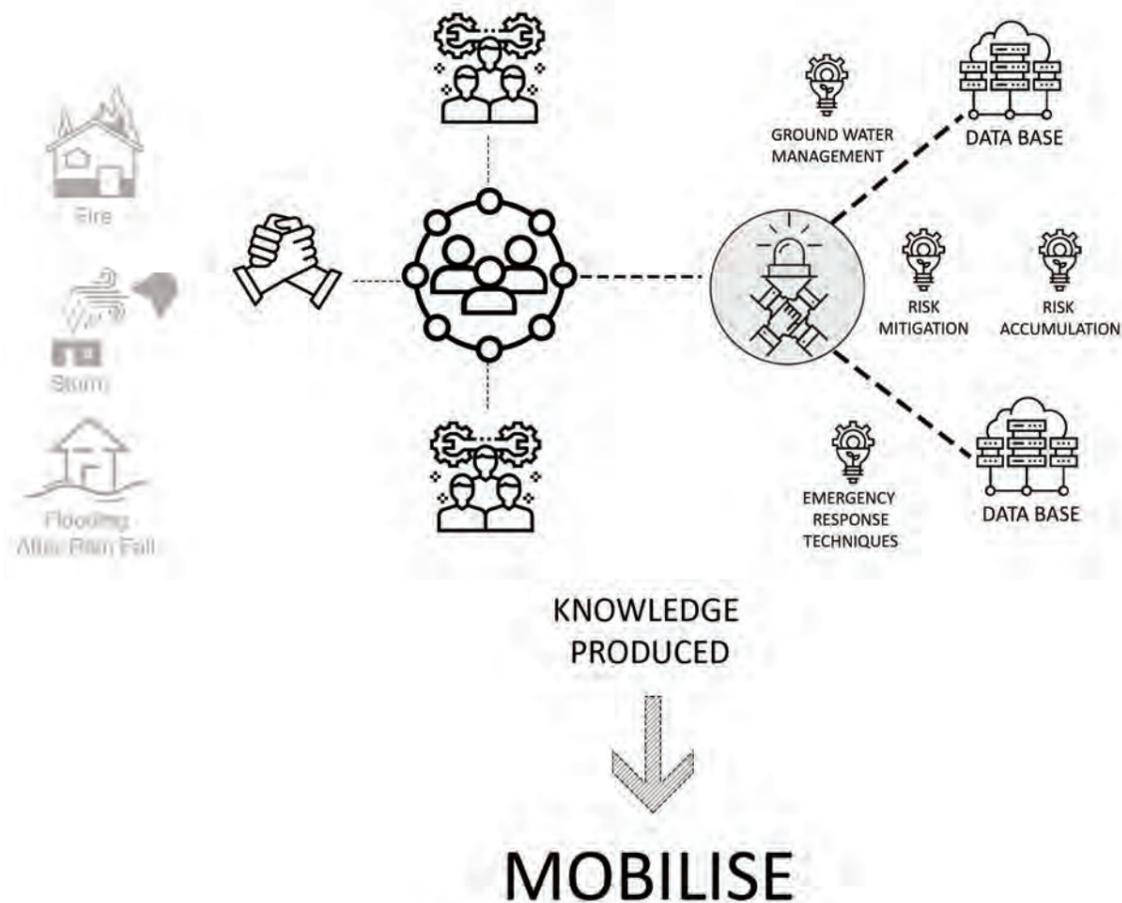


Figure 71. Strategy overview

### MOBILISING RISK MITIGATION KNOWLEDGE AND COLLABORATION ACROSS WARDS



Figure 72. Mobilising risk mitigation knowledge and collaboration across wards

## 6. CONCLUSIONS

This research was directed towards investigating multiple factors that roam around the general idea of Disaster Risk reduction in Myanmar. Throughout the research process, we have tried to unfold the multidimensional factors that lead to the accumulation of risk in the presence of a strong social contract embodied in the Nahlemu Practice and the continuous citizenship struggle of many people across the country. During the process of attempting to investigate a possible popositional answer to the main research question; “To what extent could the scaling up of the existing Nahlemu practices contribute to risk mitigation and preparedness, leading to a more resilient Yangon?”.

The question was shaped by our own understanding and definition of some terminologies that align with our research principles, the research started with building up a set of hypothesis around the notion of Nahlemu, Risk accumulation, transition in governance and Disaster resilience as a human right. These main concepts helped unfolding the complexity of the topic within the current reality in Yangon.

Our main finding from the field have supported our Hypothesis regarding the embedded Nahlemu practice as a solid base of a more effective community based collective action, yet, it was challenged with the limitations of the practice when scaling up due to corruption and exploitation of the most vulnerable. The analysis of the institutional structure has shown multiple planning gaps that create an adequate room for maneuvering especially with the support of NGO’s and civil societies organizations. Furthermore, we have investigated the process of risk accumulation on field with the support of the community, this process had a bigger implication than being a finding in the report that allowed it to shape our strategies of risk mitigation but also was an effective

tools to disseminate awareness and encourage collective action in Ward 20 during the field ward days of engagement.

The proposed strategies in this report were aimed at cover the institutional, physical and social aspects of collective actions towards risk mitigation based on amplifying the existing Nahlemu practice and the positive collaborations among people to be met with an institutional effort to support the process within an overall collective physical upgrading of the Ward.

Nevertheless, despite this strategies seem to aim at the right direction, covering all the complexity of risk accumulation and the political transition is beyond the physical interventions. The incremental approach towards risk mitigation as explained could have multiple trajectories on on crucial planning issues in the Ward and aims to recognition of the existing practices and promote the rights to an inclusive disaster risk reduction plan. That’s said; we acknowledge that the risk of eviction still exist in the area and the country’s vulnerability to climate change is still a huge challenge to be faces with multiple trajectories on drinking water resources, Land subsidence and other risks are a reality that requires a solid collective action to be faced.

We aspire to extend the discussion related to multiple topics that have been discussed in this report further towards a better understanding of the situation in Yangon. Despite the high level of complexity in the country; we believe that the process of transition provides a positive opportunity to reform the social contract between people and the government building on the existing cultural values (Nahlemu) and the mutual understanding of responsibilities towards resilience.

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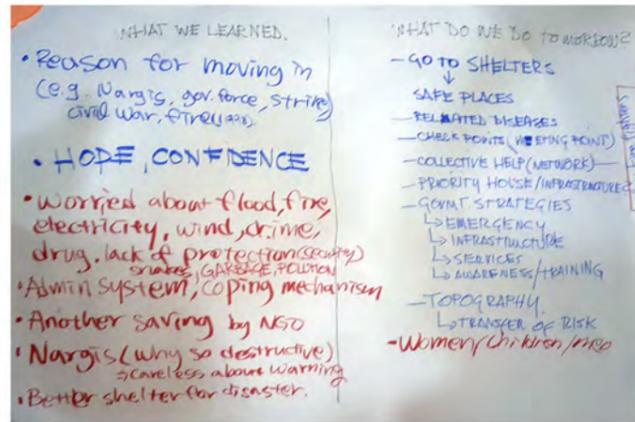
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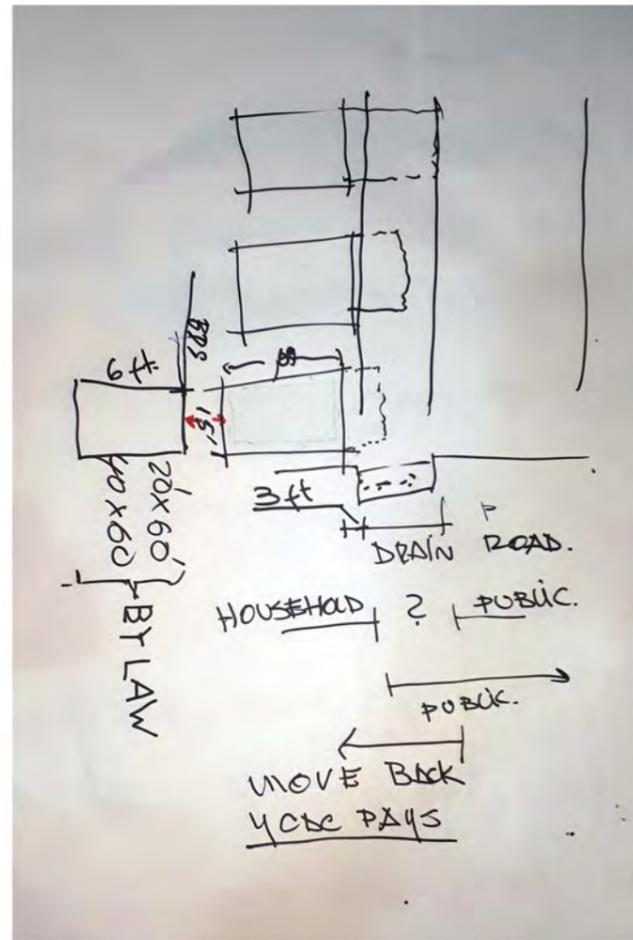
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# APPENDIX 1: FIELD TRIP OUTCOMES

## Field Trip - Day 1



Day Summary



Drain Scheme



Race

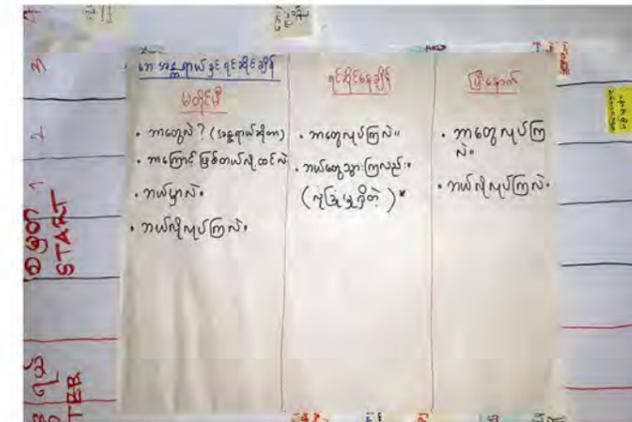


Risk Summary

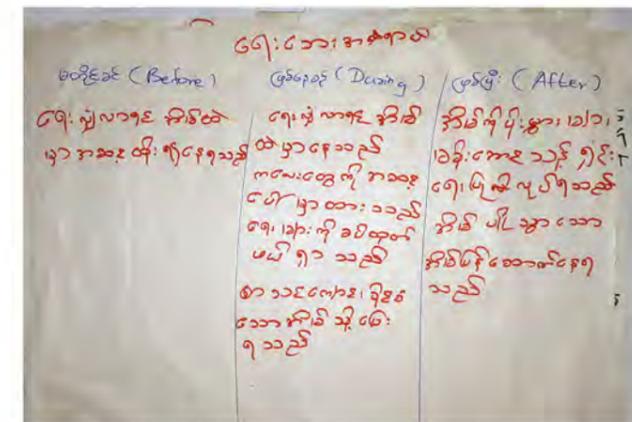


World Map

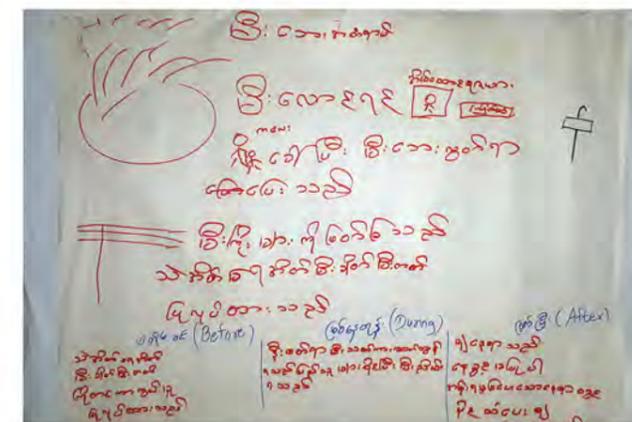
## Field Trip - Day 2



Agenda 01



Agenda 02



Electroshock Flow Chart

### 1. RACE

#### Objective

To identify the different types of risk the community faces.

#### Process

The community was asked to write down all the types of risks they face on a regular basis and also on a seasonal basis. Then the community was asked to place the risk they identified one by one on a scale of 1 to 5 (5 being the highest)

#### Outcome

Through this exercise we identified that:

- Flood and Road accidents were identified by the community as the biggest threat.
- Fire, Storm causing damage to houses by heavy wind was also identified as threats in the race.

### 2. Group Discussion for Causes

#### Objective

To identify the causes behind the accumulation of different types of disasters in the community.

#### Process

Based on the top five disasters identified in the previous exercise the community was asked identify the causes behind them through identifying the everyday practices and action that may lead to the increase in the risk.

### 3. FGD for understanding the flow of each event

#### Objective

To identify the flow of activities that take place during a disaster.

The objective was to see how people prepare, cope and recover from the disaster.

The 4 selected events were:

Flood / Fire / Storm / Drainage block

#### Process

For this exercise the community were divided into groups. One group comprised of only community leaders and the other two groups were divided into three groups.

### 4. Mapping

#### Objective

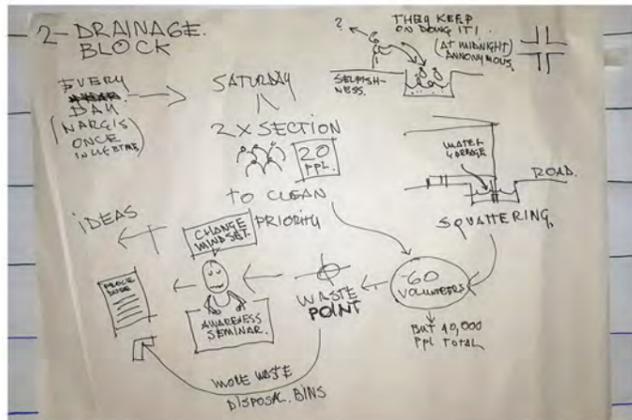
To identify the spaces within the community which show where the risk accumulates and also the safe spaces within the community.

The objective was to map the following things:

Safe spaces / Unsafe Space / Shelters / Social networks

#### Process

For this exercise the community were divided into same groups. One group comprised of only community leaders and the other two groups were divided into three groups.



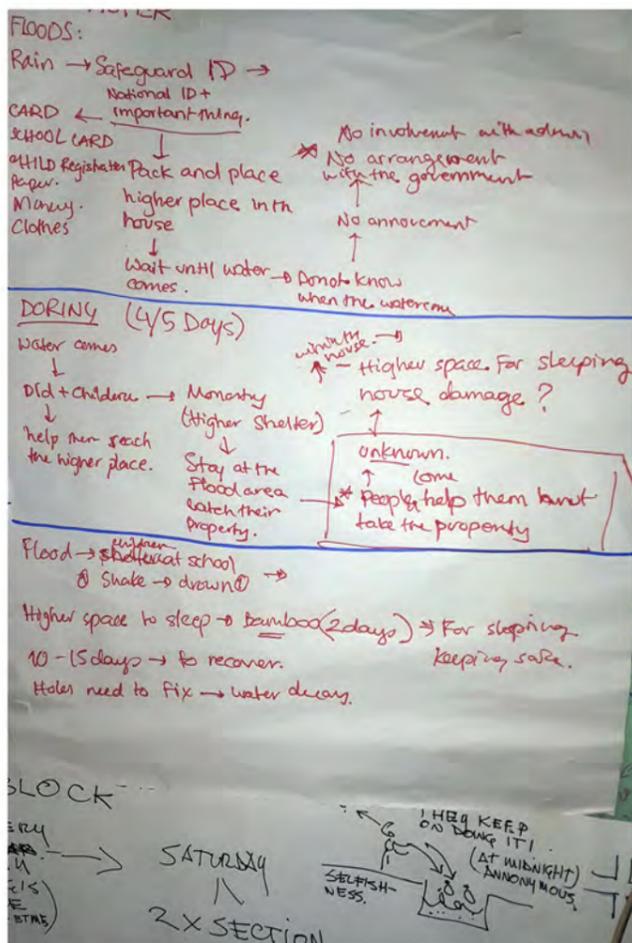
Drain Block Flow Chart



Mapping 01



Main Risks Scheme



Flood Flow Chart



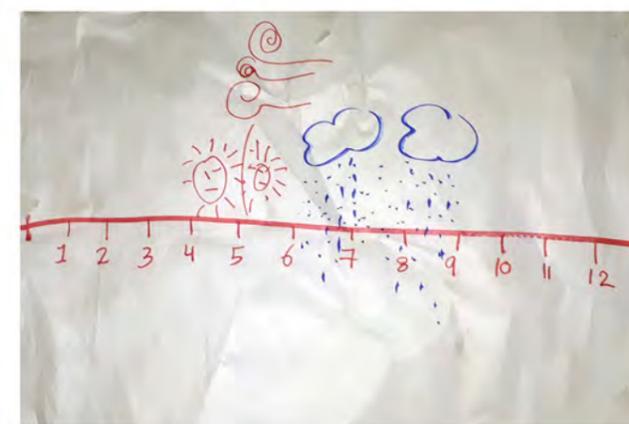
Mapping 02



Storm Flow Chart



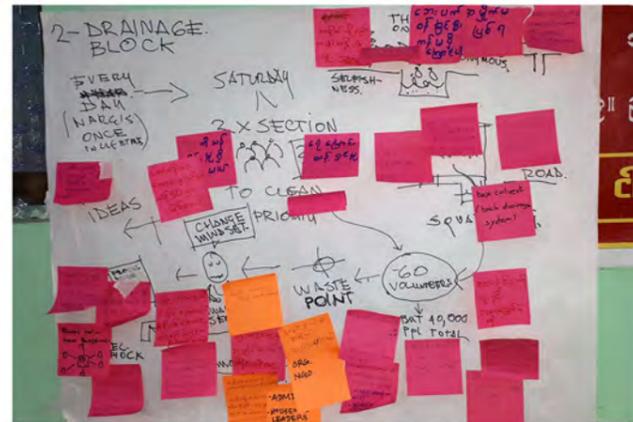
Mapping 03



Season Scheme



After Flood Flow Chart



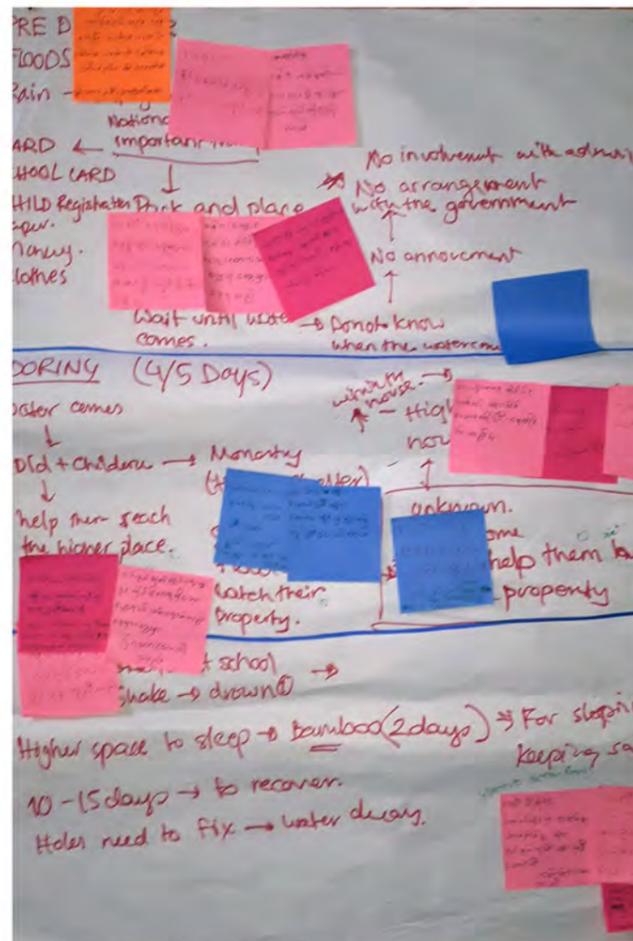
Drain Block Flow Chart



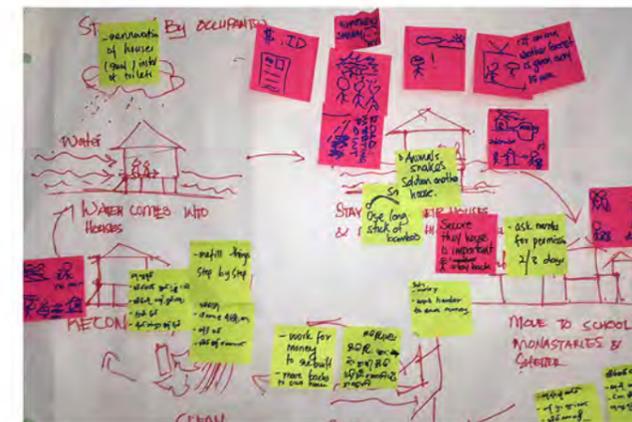
Fire Flow Chart



Flood Flow Chart 01



Flood Flow Chart 02



Storm Flow Chart / Community



Storm Flow Chart / Leaders

1.FGD

Objective

Discuss more in depth about the flow mapping to understand the following things:

- Activities before, during and after an event.
- Coping mechanisms
- Involved actors
- Community actions
- Social networks

Process

Divided in the same groups of Day 2 this exercise looked more in depth of the flow map produced on day 2.

Outcome

A risk chart was also created for flood and fire summarizing all the risk and where it accumulates.

2.Photowalk

Based on the spaces of risk accumulation identified through the discussions. We went on a photowalk to see how the spaces are used and how risk accumulated in these spaces.

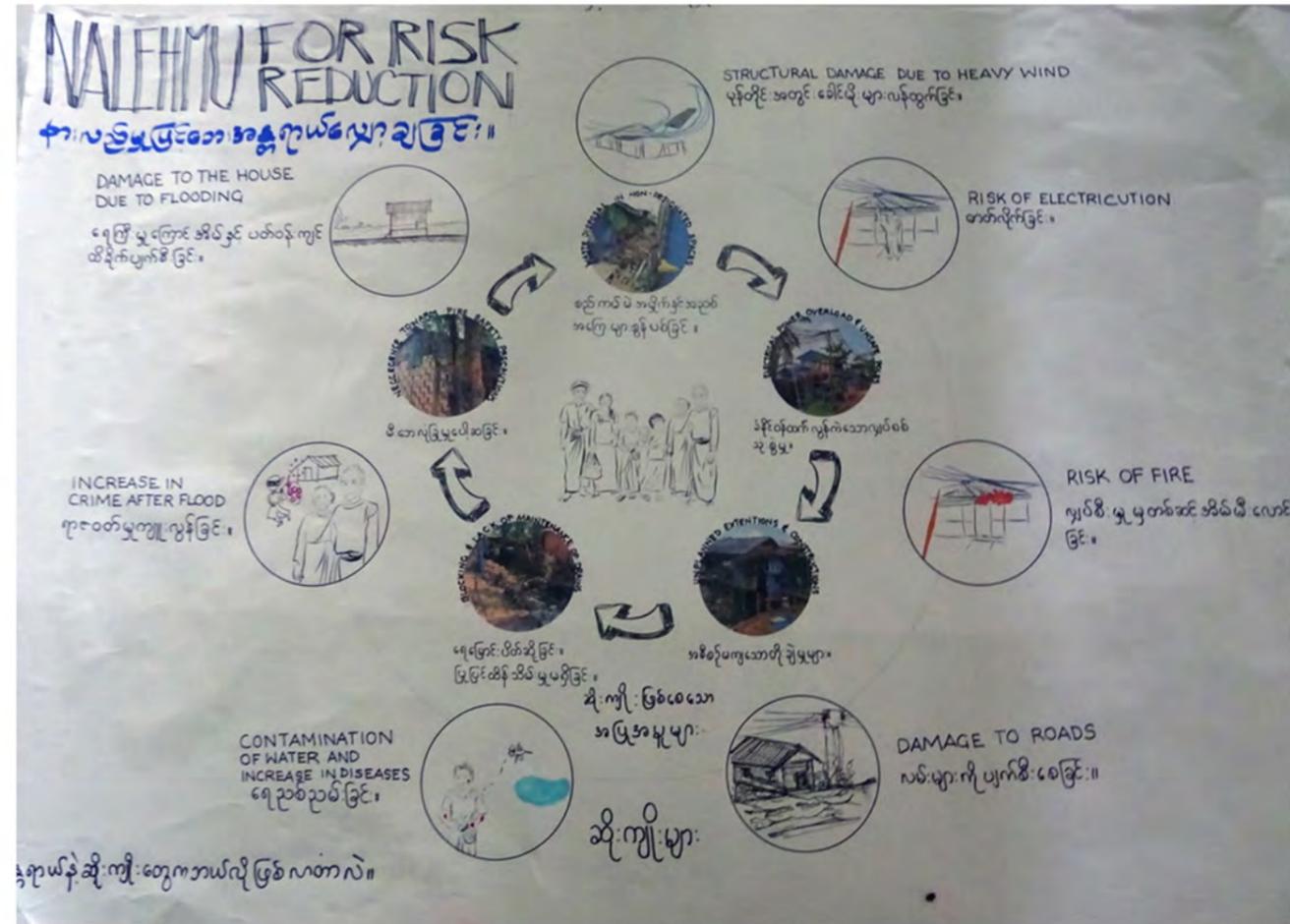
## APPENDIX 2: GROUP ACTIVITIES PHOTOS

Group Activity



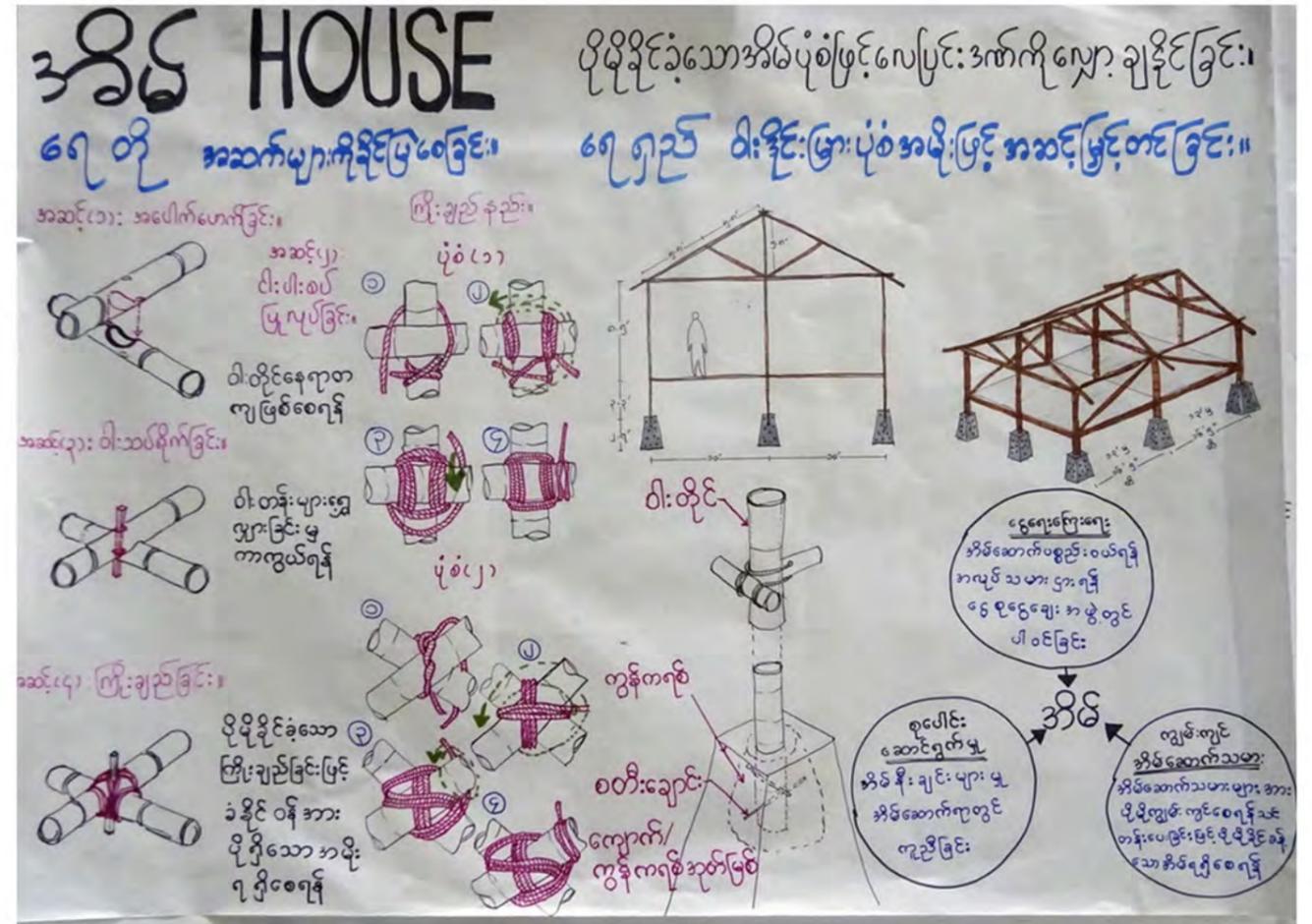
# APPENDIX 3: PRESENTATION FOR COMMUNITY

W20 Presentation

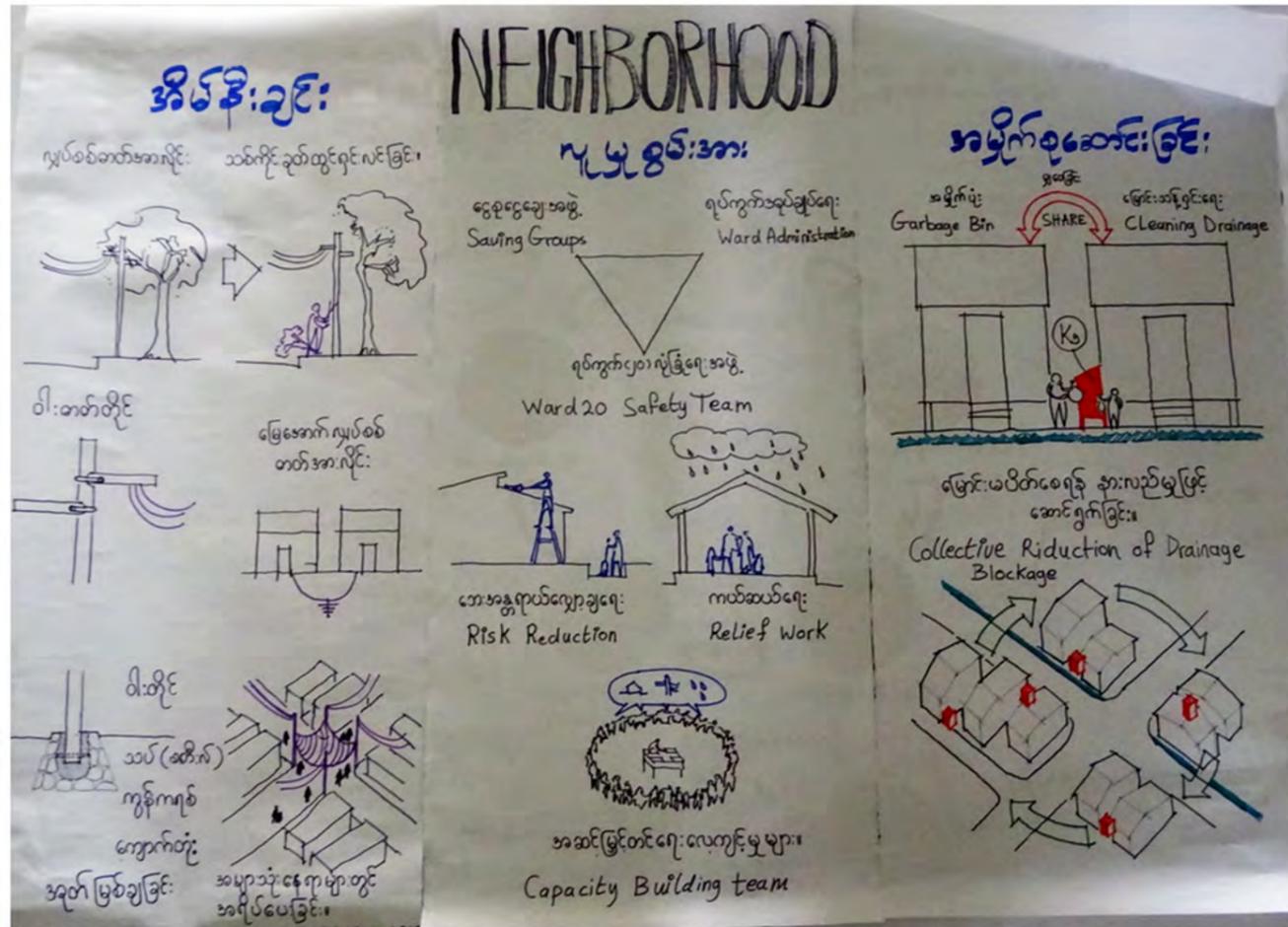


Board 01

W20 Presentation



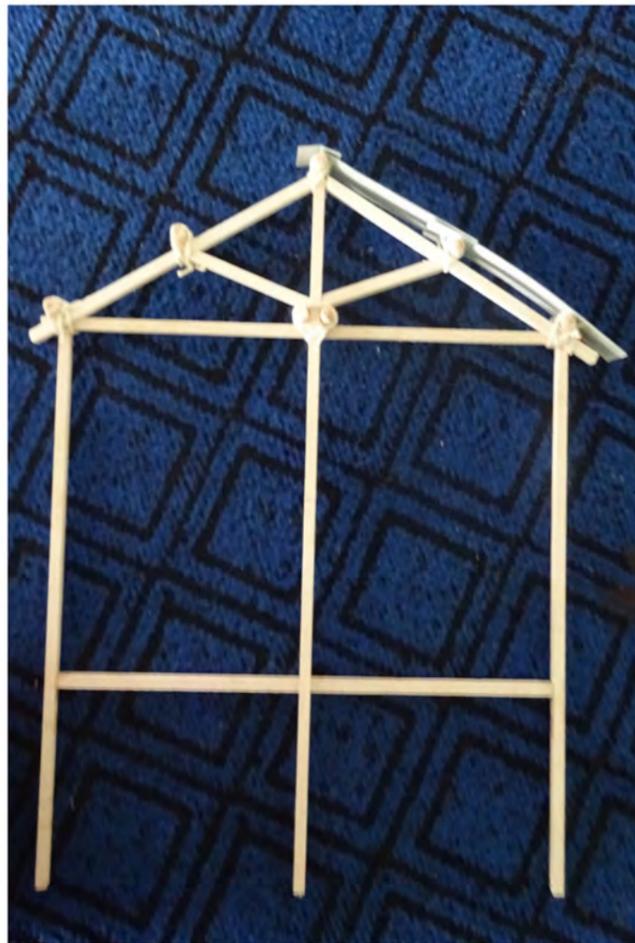
Board 02



Board 03



Board 04



# APPENDIX 4: FIELD TRIP SKETCHES

Sketches

Sketches

**MTSH**

drainage  
water level below floor  
water level yearly  
Nalehnu

**MTSH**

pump driven by a hand shake  
underground water  
risk higher chance

**MTSH**

sheet  
garbage drainage  
no drainage block  
build house  
people  
no time for garbage  
knowledge  
easy to throw it waste place  
plastic get money from garbage  
mosquito

**MTSH**

fire risk bamboo  
garbage blocked  
10'

**Five** car court reach  
→ water from drainage just dirty/blocked

water reached  
Sant  
lower place  
Proc. 911

lower place

Rainy season → section 7  
strong wind  
roof blown

plastic tent as a wall

run to the religious center (Damao)

water basket  
for fire  
few places  
many unit housing  
data from friendship

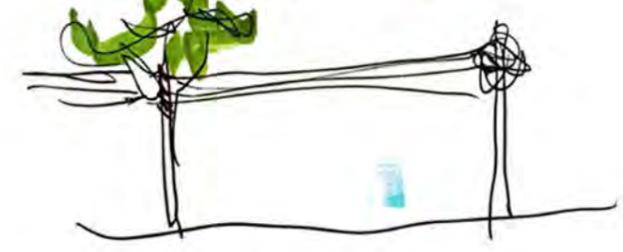
zinc roof  
bamboo weak for wind  
leaf fire  
Wind → construction method  
Bamboo < y bar  
zinc  
y bar structure + truss  
bamboo for elec pole  
no trees

- New building code include disaster - e.g. materials  
- long-term strategy

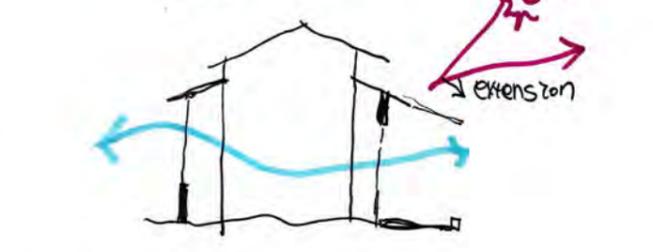
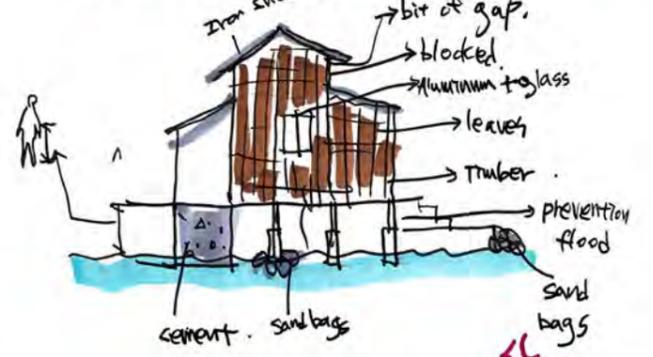
**APR. 2019 TUE. 09:30 ~**

introduction  
tentation Bina Marina  
on. Member get into the group  
group intro,  
transect walk  
- lunch  
- group work

water space management  
Drainage - road - flood  
waste  
elec wires fixed to trees



• WFW → connection to Nalehnu Myanmar  
**28 APR. 2019** WFW. welcoming



- same structure  
- extension by themselves  
- W. Saving Group #1 housing : 6 months  
#2 land. look for  
• selection process  
com. price  
team

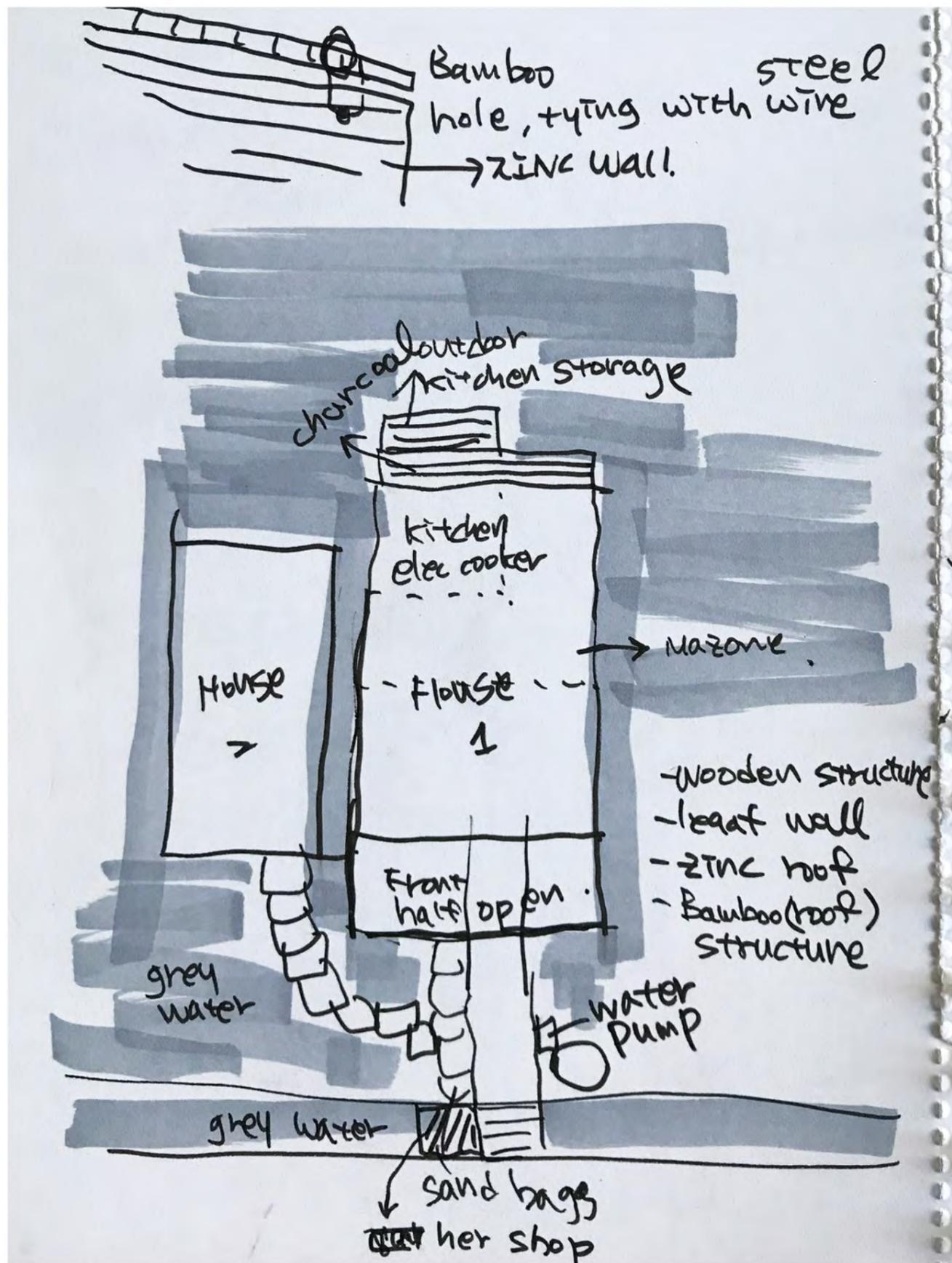


Figure 73. Children in Ward 20 / Image source: our team



**SPECIAL THANKS**



Figure 74. Group Photo of Our Team including Myanmar Members and Community Members / Image source: our team

- Min Khant (Student Architect-YTU)
- Aung Zaw Moe (Architects)
- Htet Yadanar Htun (Student Architect - WYTU)
- Phyo Thura Han (Student Architect - YTU)
- Ye Htet (Student Architect - YTU)

