Summary

Rapid urbanisation confronts cities and their surrounding regions with major challenges due to the increasing consumption of resources and its subsequent impact, but also in terms of vulnerability to sudden changes/threats. To meet these challenges, e.g. with regard to adequate supply and disposal infrastructure (water, energy, "safe food", waste, wastewater), corresponding strategies and plans must be implemented in practice. emplement! aims to develop transferable methods and tools and the necessary capacities to enable administrations and involved actors in the city of Da Nang and the neighbouring province of Quang Nam (Central Vietnam) to translate relevant strategies and plans into practical, efficient and sustainable as well as resilient measures that work together in synergy - both on the planning and the practical level. It is important within the implementation approach to anchor aspects of sustainability and climate protection and to strengthen resilience through intensive cooperation in the urban-rural context.

For the R&D phase, implementation activities such as pilot projects will be carried out within four fields of action (Tourism, Agriculture, Industry, Built Environment). The pilot projects will be accompanied and analysed scientifically with developed or adapted methods, taking into account the conceptual and technical as well as trans-sectoral synergies between the four fields of action and in the urban-regional context. Based on the results, a comprehensive, transferable methodology will be developed for application in other Asian cities and contexts. The pilot projects are designed in such a way that they can be conceptually and technically networked with each other and transferred to other regional contexts.

Appropriate training and workshops will be conducted to meet the capacity development needs expressed by the Vietnamese side. The results from emplement! will be methodically processed and made available as toolbox.

The project thus makes important contributions in the areas of practical implementation processes (approach, problem analysis, speed, excellence of technical implementation, communication, involvement of actors, etc.), strengthening local competencies and general implementation research.

The German-Vietnamese team of researchers, practitioners and local authorities has already worked successfully together in the definition phase of emplement! and (partially) in the BMBF project Rapid Planning. It can build on the respective findings and experiences in the project area. The work packages and tasks in the project are well represented by the scientific background, know-how and experience of the interdisciplinary team.

Expected outcome from the pilot projects implemented in the urban-regional network will serve as a basis for further sharpening the methodology and defining major implementation activities in the four fields of action with regard to the NUR phase. UN-Habitat as project partner also ensures that the project is in line with the international agreements such as New Urban Agenda and the SDGs.

1 Introduction

In the course of the 21st century, the majority of the world population will live in cities. Asia has one of the highest urbanisation rates in the world, and Vietnam's cities are among the fastest growing in Asia. Cities embody some of the most pressing societal challenges: the provision of necessary and sustainable basic infrastructure and services, such as water supply, sanitation, waste management, energy and mobility (OECD 2018). Cities are facing increasing resource depletion - including land resources - and environmental degradation, often extending far beyond city boundaries.

In order to respond to these challenges, cities increasingly need to meet the requirements of sustainability and/ or resilience. Where sustainability aims to rebalance the world permanently, resilience looks for ways to cope with an unbalanced world. Accordingly, sustainability and resilience have to go hand in hand (Arup 2015).

Cities are often closely intertwined with the peri-urban and rural areas surrounding them, whether in terms of the flows of people, goods, products and information, or transport, the use of resources, or the problems caused by lack of sustainability and the associated vulnerability. This also applies to the resulting challenges:

- Scarcity and depletion of energy, water and other resources (requires sustainable and socially responsible planning and provision of technical infrastructure and measures focusing on resource efficiency)
- Increasing destruction of natural environment (requires sustainable and appropriate land use concepts)
- Climate change (requires mitigation and adaptation measures)
- Migration towards cities (requires appropriate infrastructure, housing)

In the context of rapid urbanisation, planning and implementation must be able to keep up with this pace, including and in particular as regards infrastructure. Not only the quality of infrastructure and services is important, but also the speed with which they are provided. It requires both forward planning and an appropriate understanding of the dynamics of urban development in order to avoid infrastructure decisions that force cities into inflexible concepts designed only to deal with short-term problems. Urban development that leads to sustainable, resource-efficient solutions requires cooperation across hierarchies, sectors, technologies and projects.

The OECD Policy Review Vietnam (2018) notes that Vietnam's urban population has almost doubled since 1990 mainly due to rural-urban migration. This also applies to the emplement! project area, the city of Da Nang (2018: 1.1 million inhabitants; 2030: 2.5 million) and the neighbouring Quang Nam Province (2018: 1.5 million) with the capital Tam Ky. The challenges posed by this rapid growth must be met by efficient planning. With this in mind, numerous strategies (green growth, resilience, etc.) as well as master plans for Vietnamese cities have been developed. Their often very ambitious designs and the adherence of rigid standards often lead to unrealistic, unaffordable concepts which are consequently hardly feasible (Vietnam National Report 2016).

Many international organizations support cities like Da Nang in developing strategies to strengthen their resilience or to promote a "green" economy. Within the framework of these strategies, many important goals are defined. However, in terms of practical implementation, e.g. with regard to the necessary technology setup or spatial-structural requirements, they usually remain unspecific. In this respect, the implementation of these strategies presents many cities with enormous difficulties.

This is aggravated by the fact that the technical skills often lack and also the know-how on how strategies can be translated into systemic/ synergetic planning and implemented effectively. In Vietnam the administration has made great progress in many areas in recent years, but the capacity development, required to cope with the planning and implementation problems, still remains an important task to be solved (Vietnam National Report, 2016). Capacity development at various levels is an indispensable prerequisite for cities to become more sustainable and resilient and to be able to incorporate integrated approaches, also with regard to the “urban-rural-region” system (OECD 2018).

2 State of scientific and technological development, own previous work and work and results from the definition phase

State of science and technology

Hameed and Nadeem already addressed the problems and challenges of implementing strategies and plans in 2008. They note in this context that "after the completion of a master plan, it is urgently necessary to focus on implementation tools for the plans, since the completion of a master plan for a city itself does not guarantee the implementation of the proposals or objectives contained therein”. WBGU (2017) takes up the issue as a commentary on the Habitat III Forum and states that the New Urban Agenda (NUA) also lacks practical guidelines for implementation and corresponding monitoring mechanisms.

This is also reflected in the implementation of Vietnam's Green Growth Strategy for the "National Action Plan - Implementing the Agenda for Sustainable Development by 2030", which was accompanied by the adoption of a number of laws. Implementation is proving difficult, even for Vietnamese experts, because the action plans are not coordinated with one another and thus offer few concrete starting points for implementation. Another factor is the lack of qualified experts for the practical implementation of the Green Growth Strategy. Even if measures are implemented sporadically under the strategy, their indicator-based evaluation is limited because clear evaluation schemes are either not available or cannot be applied due to lack of expertise (v.Hauff 2020).

The need for capacity development both in the administration and at universities is a recurring theme in the context of workshops and meetings, also from the official side. For example, a lack of specialist knowledge at the technology level means that those responsible in the departments of infrastructure planning have problems in classifying and evaluating the suitability or usefulness of information, e.g. on technology systems, often provided by foreign companies or organisations. This considerably slows down the decision-making and thus also the implementation processes. Moreover, the lack of professional and technical know-how makes it difficult to develop synergetic, interdisciplinary and cross-departmental implementation options. Additionally, there are often obstacles at various levels (legal, spatial, infrastructural, etc.) that can only be overcome by cross-departmental cooperation. However, there are usually no appropriate mechanisms for this.

In recent years, some of the problems mentioned have been addressed through projects in Vietnam and also in Da Nang. GIZ implemented the program "Integrated resource management in Asian cities: the urban nexus", a multi-sectoral approach with a demonstration project with vacuum toilets

and anaerobic digestion in Da Nang. The BMBF-funded project Rapid Planning (2014-2021) is developing a methodology for trans-sectoral planning in the field of supply and disposal infrastructure. Methods (data generation/ computation) and tools for the analysis of material flows and the identification of trans-sectoral supply and disposal technologies will be made available.

Nevertheless, further research is needed in the area of capacity development. It is important to empower actors to identify and exploit synergies for the development of more sustainable systems, especially in the urban/ rural/ regional context. This is also the result of a recently completed project of UN-Habitat with Da Nang City in the framework of the Green Growth Strategy.

A profound technical education at universities and colleges is a prerequisite for the development of efficient solution options. However, the available study programs hardly deal with the possibilities of linking technologies from different sectors such as energy, water, waste and agriculture. Information on "intelligent" or "complementary" technologies can be found on various technology platforms, such as "E4C - engineering for change", "technology exchange lab", and "engineers without borders", etc., but here too: the ability to evaluate the technologies is a prerequisite.

Technologies are an important component in the context of implementation and thus also of a systemic implementation approach. For this approach emplement! develops or uses different methods in terms of implementation research. So far implementation research has been mostly applied in medical, educational and legal contexts. In terms of content, however, points of contact with implementation research in emplement! can be found in studies that deal with the problems of the practical implementation of laws, i.e. with the obstacles to the transposition of European law into national law (Ziller, J. 2007; Fuchs, M. 2011) or the implementation of political guidelines. According to Peters et al (2013), implementation research attempts to "solve a broad spectrum of implementation problems". In other words, it is the scientific analysis of implementation issues as an act of putting an intention into practice. The factors that influence implementation, the processes of implementation itself and its results, are the focus of the analyses within emplement!

Own previous work in relation to the planned research

The following previous work was carried out in the thematic context of emplement!

Work and results from the definition phase

Due to the good collaboration of the emplement! partners (German partners and UN-Habitat VN) also with the Vietnamese key actors, as the People's Committees Da Nang, Tam Ky and Quang Nam Province, as well as DISED, the work in the definition phase could be carried out in a goal-oriented and interdisciplinary manner according to the work program. In addition, further contacts relevant for the next project phase (universities, administrative departments, communities, etc.) were made in the project area. At the national level, coordinated by UN-Habitat VN, a multiplier network was established (Academy of Managers for Construction and Cities - AMC, the Vietnam Institute for Urban and Rural Planning - VIUP, etc.), supporting the visibility/ transferability of the project. On the German side, the project network was expanded by further experts, such as Prof. Michael von Hauff (economist, involved in the development of the National Green Growth Strategy for Vietnam) and the City of Frankfurt a. M., as well as the FrankfurtRheinMain Regional Association as an urban-regional reference area. For further expert advice and support in the R&D phase, an "Advisory Board" was established, including representatives from UN-Habitat/ Nairobi and the World Resource Institute/ Washington, which meets twice a year on the progress of the project with the emplement! coordination.

Excursions, expert discussions and workshops with Vietnamese partners and stakeholders as well as data and information generated from remote sensing formed the basis for spatial analyses of the project area, from which important thematic aspects for further sharpening the project key aspects for the R&D phase in the four fields of action 1) Tourism 2) Agriculture/ Forestry, 3) Industry, 4) Built Environment resulted. The findings from the first analyses of existing strategies and plans for Da Nang and Quang Nam were also incorporated in the considerations.

Together with key actors and relevant stakeholders in Da Nang and Quang Nam, implementation activities for the R&D phase were defined as small-scale, synergetic and transferable pilot projects

and spots for their realisation were already determined. The results of an interdisciplinary Summer School (at the Da Nang University of Architecture) with 42 students from four German and four Vietnamese universities were important input for the definition of the pilot projects. Ideas for integrated, transferable development concepts for sustainable, ecologically sensitive and culturally adapted tourism were developed, taking into account sustainable income generation for the local population. This resulted in thematic overlaps with the fields of action "agriculture/ forestry" (sustainable forest management and promotion of biodiversity) and "built environment" (adapted sanitation concept for tourist areas). The final workshop was also attended by representatives of the Da Nang city administration and the emplement! team was "officially" asked to present the developed concepts. A documentation of the summer school in English and Vietnamese (in process) is available. Furthermore, workshop/ training formats and methods for data collection and analyses were developed, with the help of which action plans are to be implemented in the R&D phase for strengthening sustainability and resilience in the fields of action "agriculture", "industry" and "built environment".

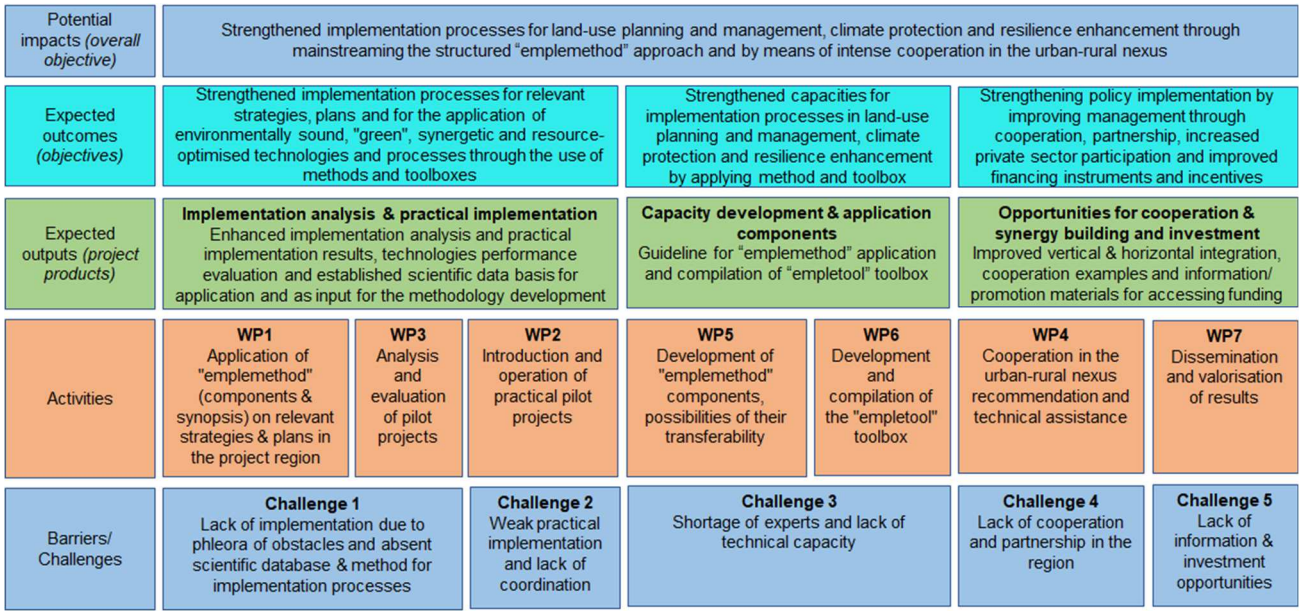
For the scientific monitoring of the implementation activities/ pilot projects in terms of implementation research as well as for the analysis and evaluation of the existing, main strategies/ plans, an analysis methodology with four main components was developed, which is as "emplemethod" available (in a first version) for application and further development in the R&D phase. The project was made visible through various channels (project flyer, web pages, film documentation, interviews, summer school brochure). Events such as the German Science Day in Hanoi or the networking meeting of BMBF projects Vietnam in Bonn were used to present the project and first results and to exchange with other projects/ researchers and other interested parties. The Vietnamese partners also presented emplement! in the context of workshops and discussed with the local stakeholders points of contact to existing and planned projects. The following university theses (Bachelor's and Master's theses) produced within the definition phase supported the project.

Partner	Typ	Titel	Autor	Details
U-HOH	M	Environmental Impact Assessment of Rice Farming in Da Nang -- Options for Sustainable Production Systems	Pansailom, S.	Institut für Agrartechnik, Universität Hohenheim,12/2019
FRA-UAS	M	Tourism as a tool for integrated & sustainable regional development - Connecting on a rural-urban scale in the provinces of Quang Nam & Da Nang in Vietnam	Dopf, M.	Frankfurt University of Applied Sciences & RheinMain, Hochschule & Geisenheim University 05/2020
Ostfalia	M	Entwicklung eines modularen Konzeptes für die semi-zentrale Abwasserentsorgung in touristisch geprägten ländlichen Regionen am Beispiel Hoa Bac [Da Nang], Vietnam	Möller, M.	Institut für nachhaltige Bewässerung & Wasserwirtschaft im ländlichen Raum, Ostfalia, Universität Hohenheim, 06/'20
U-TUEB	M	Satellitenbildgestützte Analyse der Küstenerosion an ausgewählten Flussmündungen in Zentral- und Südvietnam	Kaiser, B.	Geographisches Institut, Universität Tübingen, 12/2019
U-TUEB	B	Rekonstruktion der zeitlichen Entwicklung von Industrieparks in Da Nang und Quang Nam anhand sehr hochaufgelöster Satellitendaten	Gruschwitz, D.	Geographisches Institut, Universität Tübingen, 08/2020
U-TUEB	B	Landnutzungswandel in Da Nang und Quang Nam zur Erfassung räumlicher urbaner Entwicklungsachsen	Wernicke, K.	Geographisches Institut, Universität Tübingen, 08/2020
U-TUEB	M	Waldklassifikation und Bestimmung der forstwirtschaftlichen Nutzintensität des Waldes in Da Nang/Quang Nam	Schober, T.	Geographisches Institut, Universität Tübingen, 11/2020
AT-Verband	M	Development of a methodology to model current and future resource consumption patterns of land use classes in Da Nang/ Quang Nam Province, Vietnam	Fleckenstein, K.	Institut für Geographie, Universität Heidelberg & AT-Verband, 09/2020

3 Explanation of the objective and the approach pursued

Explanation of the objective and the approach pursued

Most strategies, also those on sustainability or resilience, describe "what" to do, but they contain few concrete approaches to answer the question of "how" to do it. In other words, they usually do not describe in detail the technical-practical implementation and the necessary prerequisites for this, e.g. in terms of suitable technologies, financial requirements, know-how or organisational structures. This poses great challenges for many cities - also in the context of new planning laws that have to be implemented - especially with regard to efficient land use planning and management. The overarching goal of emplement! is therefore to support cities by means of the structured emplement! approach and thus the provision of transferable methods and instruments in their implementation processes. And further, to anchor aspects of sustainability and climate protection and to strengthen resilience through intensive cooperation in the urban-rural-region context. The following figure shows the project logic structured according to barriers, activities, expected outputs, achievement of objectives and potential impacts.



With regard to the "how", in emplement! spatial, stakeholder, policy, technology and process-related components are systemically integrated into an applicable and transferable implementation approach, including necessary methods and instruments. The approach involves relevant stakeholders and is flexible enough to keep pace with a rapidly changing environment.

Given their economic and social importance for the region, the scope of emplement! covers the four fields of action: 1) Tourism 2) Agriculture/ Forestry, 3) Industry, 4) Built Environment (in our context: buildings and small-scale surroundings, open spaces).

In the run-up to implementation activities in the 4 fields of action, it has been taken into account that these are not to be considered in isolation, but rather systemically in a field of tension. There is strong competition with regard to land, water, energy, mobility/ transport, labour or financial resources as well as with regard to the problem areas of wastewater and waste. In the project area there are major conflicts of use between agriculture, tourism development and industrial zones. On the other hand, positive interactions could be in place if synergetic, modular and flexible

technologies and processes were introduced, the demand for resources (e.g. water) was reduced or resources could be used jointly (renewable energy). Such a systemic approach not only helps to avoid isolated measures, but also takes into account the conceptual and technical synergies between the four fields of action as well as in the urban-regional nexus of the city of Da Nang and the neighbouring Quang Nam Province.

With reference to the fields of action, in a first step, the existing strategies are analysed and discussed in a goal-oriented manner with regard to their formulated goals, common features but also contradictions. The methodology developed in the definition phase (available as Vs1.0) was used for this analysis step which has already been initiated.

Based on these results, pilot projects were designed together with local stakeholders as further building blocks of the "how", to be implemented in the R&D phase. In an exemplary manner the pilot projects show technical and/ or conceptual possibilities for the four fields of action, which in their small scale meet the requirements of sustainability and resilience and which fulfil the specifications of the New Urban Agenda (NUA) and the Sustainable Development Goals (SDGs).

The pilot projects and their scientifically accompanied implementation result in analysed and tested, practically applicable modules that can be implemented in spatially different contexts in the 4 fields of action. These modules are designed for scalability and networkability, which will open up further possibilities for city-regional cooperation.

In order to strengthen cooperation in the project region across thematic, spatial and administrative borders, a platform will be built to provide specific information on the city/ region as well as on the pilot projects, and to simplify, promote and, if necessary, institutionalise the exchange of information through common points of contact.

Know-how and relevant expertise are fundamental prerequisites for the successful implementation of measures. Capacity development and empowerment of the participating actors at both the planning and the practice level are therefore central elements in emplement! This also includes the strengthening of the actors with regard to development of efficient and sustainable concepts also in terms of Public Private Partnership.

Development, implementation, analysis and evaluation of the pilot projects, which are carried out together with local stakeholders, are already designed as part of a practical capacity development and empowerment process. The consideration of networking opportunities of the pilot projects or individual modules also contributes to sharpening the systemic understanding of the stakeholders. The development, adaptation and application of methods and instruments for implementation support is carried out on three research levels:

- System level: analyses of strategies, plans, framework conditions; methods of data generation
- Technology level: Identification of suitable technologies; process descriptions; support of decision making
- Implementation level: identification of obstacles; implementation and scientific monitoring of pilot projects; research on implementation, change and down-to-earth financing models

Within the scope of the definition phase, an analysis methodology was developed, which is available as Vs1.0 and will be continuously developed and adapted within the R&D phase. The methodology, which consists of four parts, partly uses existing methods, e.g. the SWOT analysis (**S**trength, **W**eakness, **O**pportunities, **T**hreats), which evaluates strengths and weaknesses on the basis of internal factors as well as taking into account opportunities and threats from external factors, or PESTEL (**P**olitical, **E**conomic, **S**ociocultural, **T**echnical, **E**nvironmental, **L**egal), a method that focuses specifically on external factors. In the course of the development of the method, PESTEL for emplement! was extended to include the project relevant factors, stakeholders and planning, and is applied as a method component under the acronym STEPPLES. In addition, further, proprietary methods such as OBP (**O**bstacle **B**ased **P**lanning) are further developed in order to identify obstacles in the implementation process of strategies, plans and measures and to work out with local stakeholder possible ways to overcome them. In this context silo structures and encrusted thinking patterns are often to be overcome. In order to consider the type and depth of cooperation and potential synergies at different layers, political levels (vertical, horizontal), spatial or official-informal, the method component LOCS (**L**evel of **C**ooperation and **S**ynergies) was developed, which will be further developed in the R&D phase, thus completing the "emplemethod" methodology for implementation analysis.

All methods, instruments and materials (e.g. for capacity development) developed/ applied within the framework of emplement! as well as the modules generated from the pilot projects, are prepared, compiled in the "empletool" toolbox and made available to potential users.

Indicators for the (quantitative and qualitative) description of project success

Implementation processes of measures within the framework of sustainability and resilience strategies or master plans, etc. (but also the strategies and plans themselves), are highly complex due

to the many different causal relations. Not only from a technical and financial point of view, but also because a broad spectrum of stakeholders at various levels of politics, economy and civil society is (must be) involved in these processes. In order to be able to structure and analyse or evaluate these implementation processes, the “emplemethod” methodology has been developed.

When applying the methodology, the identification of obstacles to implementation and the investigation of cooperation and synergy potentials play a central role. In particular, these method steps (OBP and LOCS) actively involve all relevant stakeholders at all levels in order to jointly develop approaches as intermediate steps/ objectives structured in terms of time and logic to overcome the identified obstacles and to explore cooperation and transfer possibilities. The achievement of the defined intermediate objectives already represents measurable indicators (quantitative and qualitative) in the implementation process of measures to strengthen sustainability and resilience.

Dissolving e.g. administrative barriers (organisational change processes; change management), preventing the efficient implementation at city/ regional level, leads to a higher degree of cooperation and transfer between city and province. This change in cooperation/ interaction in the course of the project as of the status quo will be recorded and made measurable by means of suitable indicators. Contributions to sustainability and resource efficiency through implemented measures and synergies exploited in this context as well as potentials to be realised through future measures will be recorded qualitatively and quantitatively on the financial as well as material-energy level and presented in a comparable way. In order to methodically gather soft factors such as quality of life (environment, health, participation, etc.), appropriate procedures and indicators are developed together with local partners.

Indirect economic, social and/ or political effects

For Vietnam, there is insufficient coordination between different city and province related policies and, as a consequence, a lack of temporal, content - especially with regard to socio-economic and environmental factors - and spatial coherence in the respective strategies and plans. There is also a lack of incentives and mechanisms as well as the necessary tools to promote this coordination and to tap the associated economic and social synergy potentials. This is confirmed by the OECD in its Urban Policy Review Vietnam (OECD 2018) and is in line with the findings of the emplement! definition phase. OECD studies have also shown that metropolitan areas with fragmented, uncoordinated policies tend to have a lower level of productivity. Vietnam in particular could benefit economically and socially from increasing effectiveness and efficiency through the pooling of resources and better use of existing structures and capacities in cities and provinces.

This is exactly where emplement! ties up for the region Da Nang/ Quang Nam Province with the development of methods and tools that help to strengthen cooperation and transfer, bundle resources and use synergies in the implementation of strategies and plans. This supports those and, as a transferable blueprint, other regions in their economic and social development and the achievement of goals, e.g. SDGs within the framework of the New Urban Agenda.

At the political level, the project results are made available to regional and national government bodies (Ministry of Construction - MoC; Academy of Managers for Construction and Cities - AMC; Vietnam Institute for Urban and Rural Planning - VIUP, etc.). The results and in particular the

developed "emplemethod" methodology can provide an important, scientifically sound contribution to the further political discussion (policy recommendations) and to the development of future strategies and plans coordinated between cities and regions. The systemic cross-link of pilot projects/ modules contributes to the initiation of cooperation and, through practical application, to their continuous strengthening and making them visible in the region.

4 Relevance of the project to the eligibility objectives of the call

emplement! focuses on implementation processes in order to meet the requirements of strategies/ plans (green growth, resilience, etc.) through appropriate and locally adapted infrastructure, e.g. green technologies or processes/ methods in the areas of water supply, wastewater, energy, waste and "safe food" in the urban-rural network (urban region). emplement! put emphasis on a synergetic approach within the mentioned infrastructure areas, systemically applied to the 4 fields of action tourism, agriculture/ forestry, industry, built environment.

As an important project part, pilot projects in the 4 fields of action will be implemented jointly with local partners. Modular, scalable technologies are selected for this purpose, taking into account the local context and their synergy potential. The technologies should be resource-efficient, low-emission and counteract the increase in GHG - but they must also be financially viable and operational in the long term. In the structured implementation dialogue, it is important to find the balance between what is technically feasible and what reasonable. In addition to sustainability, resilience to drought, floods, saltwater intrusion, etc. must also be considered.

An important basis for the work in emplement! is the analysis and evaluation of the existing, framework-giving strategies and plans as well as the practical demonstration projects and technologies in terms of implementation research. For this purpose, the methodology developed as "emplemethod" (Vs. 1.0) is applied. The relevant indicators for the internal and external evaluation factors are defined in the R&D phase together with the local partners.

Important prerequisite for implementation measures is specialist knowledge, for which within emplement! materials for local experts and decision-makers are developed and made available in a user-friendly way. In addition to technical know-how, emplement! contributes to empowering stakeholders to identify possible obstacles to implementation (structural, technical, spatial, legal, social, political) and to overcome them in an implementation-oriented way. In this way emplement! enhances competencies not only with regard to practical-technical infrastructure planning and thus also resilience, but also, by equipping stakeholders with the necessary know-how and tools to efficiently carry out decision-making and implementation processes.

For the implementation of emplement! the intensive scientific exchange between the German and Vietnamese partners is an essential basis for the development of locally adapted solutions. For a sustainable implementation, however, the commitment and support of the local authorities and the People's Committees are indispensable, which is why decision-makers at different levels (national to ward) are involved in emplement! as important partners. Various groups in civil society that support and communicate decisions are also involved.

The individual project threads of emplement! are converged with the aim of providing modules for the analysis of strategies/ plans, for decision-making as well as the implementation of appropriate

technologies, which are also transferable to other regions and countries. In this sense, the existing networks, which will be further expanded in the R&D phase, will be used.

5 Description of the planned research activities and work programme

The emplement! work program is divided into work packages (WPs) and describes the corresponding tasks (T) to be carried out. The table (page 12) shows the assignment of the project partners, the person months (PM) to the activities and the planned periods for their execution. Important project meetings /conferences as well as milestones and main reports are also listed.

In WP1 the strategies and plans relevant for the area Da Nang/ Quang Nam will be analysed and evaluated with regard to administrative structures and stakeholders involved as well as with regard to the 4 fields of action. For this purpose, the "emplemethod" was developed in the definition phase, which comprises four components and is available in a first version (Vs.1.0) for practical application. Results and experiences from the R&D phase will be incorporated into the further development and completion of the methodology in WP5.

Based on the results of an interactive workshop with relevant actors from Da Nang and Quang Nam, a set of pilot projects could be defined for the R&D phase based on the formulated needs for the 4 fields of action, all of which can make a clear contribution to the implementation of the existing, relevant strategies/ plans (Sustainability, Green Growth, etc.). Within WP2 the pilot projects will be introduced and put into operation. In WP3 they will be analysed and evaluated with regard to the implementation process, energy and material flows as well as technical and economic performance. As a result, implementable and transferable modules for the selected fields of action will be available as a contribution to the practical implementation of the strategies/ plans.

In the definition phase, the further spatial analysis of the project area was started in order to get an overview of the specific conditions, especially with regard to the 4 fields of action (e.g. possible competition situations with regard to water, land). This analysis will be continued in the R&D phase in order to obtain a sound basis for thematic GIS layers (e.g. zones requiring protection, coastal changes, relation networks, etc.), which will support the pilot projects on the one hand, but also the stakeholder and expert discussions, and will also be used in WP4 to analyse cooperation possibilities for the city and province and the synergy potential coming with them.

In WP5 the results and experiences gained in the other WPs will be methodically abstracted and the "emplemethod" approach will be synthesized and made available for practical application as a result of the project. Analyses and information on the transferability of the approach to other application fields and geographical regions are also part of WP5. All working methods and materials necessary for the implementation of "emplemethod", such as questionnaires, surveys, data analyses, the application of the "emplemethod" itself, training and further education materials as well as other tools are part of WP6. In this work package, all materials, methods/ tools will be compiled, prepared and made available to potential users as "empletool" toolbox.

WP7 includes activities to disseminate information through the relevant channels of the project partners and generally increase the visibility of the project, also within the scientific community. Activities that link project activities with external funding opportunities will be directly incorporated into the corresponding exploitation plans of the project partners, if applicable.

WP0 Coordination

The aim of this work package is to coordinate the emplement! project activities of all partners and stakeholders - German project partners and subcontractors, UN-Habitat VN, local project management (LPM), Focal Points of Da Nang City and Quang Nam Province, local R&D partners and involved local stakeholders from administration, economy and civil society (Task 0.2, Task 0.3) (Task 0.1). The project coordination organizes the result-oriented and efficient implementation of the individual project tasks according to the work program in order to achieve the desired result. It is responsible for project meetings and workshops (Task 0.4) and for timely reporting (Task 0.5). This also includes communicating the progress of the project to the team, the project management organisation DLR or the BMBF, as well as to authorities and third parties involved.

WP1 Application of the "emplemethod" components to relevant strategies & plans in the project region

Targets: Application of the "emplemethod" approach (Vs1.0) for the analysis of strategies and plans, generation of information and data for further method development and support of the stakeholders in the working region in the implementation of their strategies and plans on the basis of the developed results

Working methods: SWOT, STEPPLES, OBP, LOCS methods, determination of suitable indicators for evaluation factors of the analysis methods, workshops, expert discussions, interviews, profitability/sustainability analysis, scenario development (if necessary for vague strategy content) and MFA simulations

In the definition phase, the theoretical/ scientific basis for the analysis was developed and compiled in a first version as "emplemethod" (chapter 3). In WP1, the methods included therein will be applied to relevant strategies and plans (e.g. Green Growth/ Sustainability/ Resilience, City Masterplan) of the project region. By applying "emplemethod", in Task 1.1 the strengths, weaknesses, opportunities and threats are analysed and evaluated using the SWOT analysis, in Task 1.2 especially the external factors are analysed and evaluated using the STEPPLES method. In Task 1.3 the obstacles to the implementation of strategies, plans and measures are identified and possible ways to overcome them are worked out with the local stakeholders (Obstacle Based Planning Method). To analyse the type and depth of cooperation and synergies at different layers, e.g. political level (vertical, horizontal), spatial or official-informal, LOCS (Level of Cooperation and Synergies) is used in Task 1.4. The concluding synopsis (Task 1.5) forms the basis for the structured procedure for practical and pragmatic implementation support of respective projects.

The activities comprise data, plan/ strategy analyses and, in particular thematic workshops, discussions, expert talks are carried out across tasks in cooperation with relevant stakeholders. The processed feedback is integrated into the methodology. Based on the results and experiences of WP1 (and WP3), the "emplemethod" methodology will then be sharpened and further developed in WP5. WP1 provides input to WP6, where the "empletool" toolbox involves the corresponding application tools and methods for implementation, further developed as "products" for users.

WP2 Introduction and implementation of practical pilot projects

Targets: Implementation of the pilot projects at the designated locations in the project area. Accompanying analysis in WP3. The results, in the form of implementable modules for the 4 fields of action, serve to show practical implementation options of the strategies/ plans

Working methods: Proof of feasibility for realisation, construction or other installations, developments according to planning, putting into operation and corresponding introduction to regular operation, training

While WP1 analyses the relevant strategies and plans of Da Nang and Quang Nam Province with regard to their implementation using the "emplemethod" approach, WP2 and WP3 concentrate on the practical implementation activities jointly developed by the German and Vietnamese project partners. In WP2 the pilot projects will be introduced and implemented in practice (Tasks 2.1-2.10) and in WP3 they will be accompanied scientifically on the practical implementation process using the "emplemethod". The two WPs are carried out synchronously.

In the definition phase, small showcase projects were already initiated. Based on these and the work carried out on site, the German and Vietnamese project partners developed the showcases further into pilot projects for the R&D phase. As a result, 10 pilot projects were defined for the four fields of action tourism, industry, agriculture/ forestry and built environment. Each of these pilot projects is independent, but they are designed in such a way that they can be linked into a network at different levels (thematic, spatial, etc.). For example, tourism-related conceptual projects can be interwoven with activities relating to the built environment, agriculture and forestry as well as to wastewater/ solid waste concepts in one location, but also regionally, to form a larger whole. In the pilot project "f.r.u.i.t.s.", all 4 fields of action are accordingly linked to each other with the aim of a synergetic, sustainably efficient use of resources at one location.

Field of action - Tourism	
Development towards a sensitive/ ecologically compatible tourism that is oriented towards local dynamics, avoids the excessive consumption of natural resources, offers local communities the opportunity to improve their socio-economic conditions and increases the resilience of local (eco)systems. To this end, previously isolated tourist villages (in Da Nang and Quang Nam), which form the corners of a triangle that also includes the My Son and Hoi An World Heritage sites, will be conceptually linked. The pilot projects also stimulate sustainable tourism activities in the mass tourism centres of Hoi An (Quang Nam) and Da Nang, where severe environmental damage is already occurring.	
Pilot project	**1. Tourism concept for the Cu De river valley (Task 2.1)** The concept focuses on the preservation of local cultural traditions and the protection of the environment. It supports community-based tourism development that comes along with socio-economic improvements and a resilient infrastructure. The approach is supported by wastewater, agriculture and forestry projects developed under other tasks of this work package. The approach includes connectivity and interconnection of the communities located in the region to promote cooperation and the development of a circular economy system. **2. Regional sustainable tourism network (Task 2.2)** Several potentially touristically interesting loop trails have already been identified. This task includes the conception and realisation of connected nature and culture paths/ loops for tourists and people seeking recreation. Conception and planning of sustainable tourism activities within the implementation measure "Sea - Dunes - Sea loop" as a blueprint and with connectivity to other sensitive areas (e.g. riverbank projects in Hoi An and Da Nang). The concepts also include supply and disposal solutions adapted to local context.

Field of action - Agriculture and forestry

The agricultural area (Quang Nam/ Da Nang) is shrinking, while the demand for locally produced "safe food" is growing. Often due to unawareness, fertilisers and pesticides are used in excessive quantities, while on the other hand production is below the actual potential, resulting in low income for smallholders. The traditional way of cultivation (which is also an eye-catcher for tourists) must be made more productive and also more efficient in terms of reducing greenhouse gases (rice cultivation). Considerable post-harvest losses due to inadequate treatment of the products are a contributory factor to the low productivity and low income of farmers. Forest management methods - deforestation of entire parcels - tend to bring only short-term profits and increase soil erosion (sometimes very steep slopes). Here, new approaches to forest management, including increasing biodiversity, are being developed and tested

Pilot projects

1. **Production and certification of safe food (Task 2.3)**
   For the more traditional form of farming, training units are developed to sensitise farmers to the careful use of resources, fertilizers and pesticides in order to create the basis for the production of "safe food" (workshop). Together with the stakeholders, a concept for the production and certification of "safe food" is being developed for which broad market exists. By means of a solar dryer, the quality of the harvested products is also significantly improved. In the R&D phase, guidelines are therefore being drawn up on how such a technology can be successfully implemented and which criteria and conditions are crucial for its introduction by farmers.
2. **Sustainable forest management and promotion/ preservation biodiversity in Cu De valley (Task 2.4)**
   Stakeholders have already expressed strong interest in the issues of regional forestry with a focus on resilience (erosion/ flooding) and tourism development. This pilot project concentrates on an alternative approach to sustainable forest management that ensures long-term income for the inhabitants and increases biodiversity in the forest ecosystem. Thematic forest tours for tourists will also generate income (medicinal herbs, mushrooms, etc.) for the communities. Biodiversity is to be studied with the help of hyperspectral remote sensing techniques. Satellite images from the Landsat archive provide information on the intensity of deforestation. Estimating the erosion potential will be derived from high-resolution data from UAV missions.

Field of action - Industry

Although frequently addressed in strategies, efficient resource use and environmental aspects still play a rather minor role in the local industrial sector. In addition, the employees of the industrial parks mainly migrate from Quang Nam to Da Nang, with corresponding problems with housing on the one hand and the abandonment of part-time farming in their home villages on the other. The individual traffic to large industrial parks must be questioned from an environmental and sustainability perspective.

Pilot projects

1. **MFA analysis & data management as basis for improved reuse, recycling & disposal management (T 2.5)**
   This pilot project deals with data generation for sustainable material flow management, establishment of an MFA system, introduction of a German waste management tool in companies in an industrial zone to raise awareness of data collection on waste generation and disposal safety. Development of action plans for industrial parks to improve sustainability in terms of water, energy consumption, waste and wastewater generation.
2. **Public commuter transport system concept for an industrial park (Task 2.6)**
   For a selected industrial park, the commuting patterns of employees are analysed. In addition, sustainability indicators are defined for means of transport used and plausible alternatives to be implemented in the selected area. For sustainable commuter traffic concepts, existing plans are reviewed with regard to the needs of commuters, which are determined through interviews, surveys and spatial analyses.
3. **Social dimension in industry parks (Task 2.7)**
   Generation of spatial and social data to describe the social needs of employees for a defined industrial area. Integration of the identified needs into the development of a Sustainable Industrial Area (SIA) concept.

Field of action – Built environment

Built environment refers to buildings (housing, tourism, commerce, public, industry), the spaces created between buildings and the corresponding infrastructure. The approach of this field of action is to reduce the consumption of resources (energy/ water) in buildings and to make the space between buildings multifunctional, e.g. adapted urban greenery for recreation, as an infiltration area (flooding) and for shading (urban "cold islands" - contribution to reducing the need for air conditioning).

Pilot projects

1. **Adapted, modular, de-/ semi-centralised technical sanitation concept for tourist areas (Task 2.8)**
   Development of a suitable set of sanitary-recycling-disposal technologies for tourist areas. Introduction of a wastewater/ solid waste disposal system in Cu De Valley and transfer to Tam Thanh/ Dinh Huong Tra Village (Tam Ky). The sewage system is planned as an anaerobic baffled reactor with constructed wetland. The approach also includes the transfer of know-how and the necessary training material.
2. **Management and monitoring of consumption and generation patterns in buildings (Task 2.9)**
   Development of a practical procedure for the analysis and monitoring of flows (energy/ water/ wastewater/ waste) according to national/ international standards in e.g. administration buildings, resort hotels, residential buildings etc. Identification of improvement potentials (energy saving systems, shading measures, solar energy potential etc.) as well as corresponding technical measures, also taking into account aspects of resilience (infiltration areas etc.). The aim of the pilot project is (1) to derive a practical and comprehensible manual/guide for planners and facility managers; and (2) to implement an adapted technology concept for an improved material flow management in a homestay in Hòa Bắc as a blueprint for similar accommodations.

Cross-sectoral and synergetic combination of all fields of action	
f.r.u.i.t.s. is a pilot project that brings together topics from pilot projects 1-9. It stands for a holistic pilot project in which cross-sectoral and synergetic measures are bundled in order to meet the challenges with regard to material flows, (environmental) process technologies, business development, stakeholders and general implementation obstacles. The focus of f.r.u.i.t.s. is on cycles in connection with the production of goods. The approach includes different processing stages for fruits, the use of residues and renewable energies for production as well as sustainable solutions for waste water and waste. The aspect of biodiversity is also part of the concept. The f.r.u.i.t.s. overall concept consists of an almost closed, symbiotic cycle with integrated systems such as fruit cultivation - collection logistics - distillery - cosmetic oil - dried fruit - edible mushrooms - compost - biochar - energy crops. Such a holistic approach is not common in Vietnam, so f.r.u.i.t.s. offers a practical example of material interrelations, cycles and technologies. The f.r.u.i.t.s. centre is designed to be attractive and informative for interested visitors. Possible location for the step-by-step implementation would be a village in Quang Nam (near My Son), which is specialised in fruit growing.	
Synergetic Pilot Project	**1 f.r.u.i.t.s. - Sustainable, climate-neutral production centre with closed cycles and optimised value chains for complete fruit utilisation (Task 2.10)** – Synergetic and holistic consideration of the fields of action (agricultural cultivation, industrial processing/ production, technologies of the built environment, tourism marketing) – Synergetic, cascade-oriented use of material flows (i.e. from the fruit via kernel/ kernel residues, seed with the stillage as substrate for mushroom production, which after harvest is processed into compost and returned to the "field" (cultivation, collection/transport scheme, production/ processing, product refinement, marketing) – Synergetic technology application (use of renewable energy smart/ dumb cooling options, use of treated wastewater, treatment/ recycling of solid waste (organic matter, nutrients)) – Marketing concept that considers tourism and internet trade as primary sales opportunities. Development of further markets within the project phase.

For the pilot projects "Adapted, modular, de-/ semi-centralised technical sanitation concept for tourist areas" (Task 2.8) and "f.r.u.i.t.s.". *(*Task 2.10), (structural) modules can be scaled up during the implementation phase of the NUR programme, when qualifying accordingly.

Tasks	
	Tourism concept for the Cu De river valley
	Regional Sustainable Tourism Network
	Efficient safe food production and certification
	Sustainable forest management and biodiversity promotion/ preservation in Cu De river valley
	MFA & data management for improved reuse, recycling, disposal
	Public commuter transport system concept for an industry park
	Social dimension in industry parks
	Adapted, modular, de-/ semi-centralised technical sanitation concept for tourism areas
	Management and monitoring of consumption and generation patterns in buildings
	f.r.u.i.t.s. - Sustainable, climate-neutral production centre with closed cycles and optimised value chains for complete fruit utilisation
Deliverables (drafts and final versions)	
	Reports on the execution planning, implementation, start of operation, functional testing of the pilot projects (Month 17, 29, 41)

WP3 Analysis and evaluation of pilot projects

Targets: Scientifically accompanied implementation of the pilot projects; analysis, proof and evaluation of function (or non-function) and performance as well as further development/ transferability of the individual projects. Experiences/ findings from the project analysis serve the further development/ improvement of the "emplemethod" methodology

Working methods: Accompanying implementation research within the framework of the pilot projects according to "emplemethod". Scientific analysis program regarding implementation process, function and performance of the pilot projects (before, during and after starting operation). The analysis program includes methods such as: material flow analysis (materials, energy), laboratory and field analysis (quick tests), economic and sustainability analyses, interviews, app applications for data collection, questionnaires, remote sensing and GIS methods for applications and data availability, workshops, capacity development, etc.

In WP3 the pilot projects will be analysed in close cooperation of all project partners throughout their implementation using the "emplemethod" (Task 3.1). For this purpose, the pilot projects are analysed and evaluated with regard to their internal strengths and weaknesses as well as various external impact factors (SWOT, STEPPLES). The use of the Obstacle Based Planning component

(OBP) promotes practical implementation processes by identifying and resolving obstacles by means of clearly defined sub-goals and resulting action plans for parts of the project or the entire project. The analysis of the pilot projects regarding cooperation and synergies is carried out with LOCS. This is done in close cooperation with activities in WP4.

After reaching first stable project and process phases in the pilot projects, orienting analyses of energy and material flows (Task 3.2) as well as technical (Task 3.3) and economic (Task 3.4) performance are carried out. The pilot projects will also be analysed and evaluated for their scalability, transferability and networking possibilities and the resulting potential synergies (Task 3.5). Finally, the pilot projects will be subjected to a sustainability assessment, their adaptability to climate change, their contribution to climate change mitigation and the strengthening/ promotion of biodiversity will be evaluated (Task 3.6). The analyses provide important indications for technical operation and will be used in the further course of the project to improve processes and procedures.

WP3 (as well as WP1), with the corresponding findings from analyses and procedures as well as methods and tools used, makes a decisive contribution to the sharpening and further development of the "emplemethod" methodology within the framework of WP5. Through the corresponding development or modification of application tools for implementation, which are used during the introduction and analysis of the pilot projects, the "empletool" toolbox in WP6 will be filled with the corresponding "products" such as methods/ tools/ capacity development measures and made available to potential users.

Tasks	
	Analysis/ evaluation of the implementation process applying "emplemethod"
	Analysis/ evaluation of material and energy flows of the pilot projects
	Analysis/ evaluation of the technical performance of the pilot projects
	Analysis/ evaluation of the economic performance of the pilot projects
	Assessment of technical synergy potential, scalability and practical networkability
	Assessment of sustainability, contribution to climate change mitigation and adaptation, resilience and biodiversity
Deliverables (drafts and final versions)	
	Aggregated reports for the analysis and evaluation of the pilot projects (reporting on the pilot projects is organised by the task leaders) (Month 19, 31, 43)

WP4 Cooperation in the urban-rural nexus

Targets: Analysis of the state of cooperation between city and province, identification of further cooperation possibilities and potential synergies as well as potential competition

Working methods: Accompanying implementation research to realise potential synergies according to "emplemethod". Implementation of workshops, expert discussions, interviews, economic and sustainability analyses, scenario development (if necessary), MFA simulations, remote sensing methods for spatial analyses, identification of resource competition, app applications, GIS methods for applications and for data availability

The different possibilities of cooperation between Da Nang and Quang Nam are the central topic of WP4 which covers cooperation on different political and administrative levels as well as cooperation on economic or civil society level. Formal as well as quasi-formal and informal cooperation are subject of the considerations (Task 4.1). By means of well-founded spatial analyses - a continuation of the work from the definition phase - on the basis of existing maps, remote sensing methods, surveys/ fieldwork, the specific terms and conditions of the project area will be analysed and thus the basis for thematic GIS layers will be created (e.g. settlement and open space typologies,

protected areas, centres and regional "highlights", connections and networks of relationships etc.). These spatial analyses are also an important basis for stakeholder and expert discussions with regard to cooperation possibilities between city and province and the related synergy potential.

The topic of land use and the associated potential competition for resources between the four fields of action and within the urban-regional structure will be continued in the R&D phase. For this purpose, the script/ tool developed in the definition phase (master thesis) for linking land use and resource consumption (water, land use) will be extended by additional aspects and optimised.

By means of stakeholder workshops and expert discussions using the OBP component, obstacles to cooperation are identified and, at the same time, starting points for their resolution are developed. In addition, further possibilities for cooperation and the associated potential synergies will be explored (Task 4.2).

The pilot projects are designed in the sense of "transferability and connectivity" and will be analysed in Task 4.3 with a focus on their spatially overlapping cooperation possibilities within the project region. This is done in close coordination with the stakeholders from Da Nang and Quang Nam Province. The results form the basis for the development of a regional cooperation platform Central-Vietnamese Spatial Decision and Cooperation Platform). The aim of scientific support during the development/ implementation of this platform is to create a user-friendly, low-threshold structure in order to minimize the obstacles to using the platform (Tasks 4.4+4.5). If the platform is to contain, manage and make accessible not only information but also planning-relevant data (e.g. GIS, etc.), the legal framework conditions will be clarified.

WP4 concludes with recommendations for cooperation between city and region, including trans-sectoral cooperation in the water, wastewater, energy and waste sectors (Task 4.6). All methodologically relevant information and results from WP4 will be incorporated into the continuous development of the LOCS component of "emplemethod" (see WP5).

Tasks	
	Analysis of general cooperation activities in the urban-rural-nexus Da Nang city/ Quang Nam province
	Analysis of the cooperation in the 4 fields of action
	Analysis of cooperation possibilities with regard to the pilot projects
	Evaluation of the results for the development of a common cooperation platform
	Implementation analysis of the common cooperation platform using "emplemethod"
	Recommendations for cooperation - city and province - also trans-sectoral
Deliverables (drafts and final versions)	
	Report on general cooperation opportunities in the region (Month 10, 27)
	Report on cooperation in the 4 fields of action (Month 10, 27)
	Report on cooperation possibilities of the pilot projects in the 4 fields of action (Month 29, 39)
	Aggregated report on (possible) cooperation in the study area (Month 43)
	Development of the cooperation platform (Month 30, 38, 46)
	Concept for implementing the cooperation platform (report) (Month 38, 46)
	Manual with recommendations (Month 24, 36, 46)

WP5 Implementation research - development of "emplemethod" and possibilities of transferability

Targets: Continuous further development and improvement from the "emplemethod Vs.1.0" release to a "Final Version" that can be used and operated by users

Working methods: Specific and thematically integrating workshops, seminars, work accompanying data collection forms (apps) and their scientific evaluation, obstacle based transfer analysis, abstraction of the results specific to the subproject, creation of user design (digital/ analogue) for the application of the methods, instruction in the "emplemethod" and constant synchronisation of the state of knowledge in the entire project team

WP5 (and WP6) provides the scientific and methodological core of the emplement! implementation research. This is where the generation of a comprehensive, understandable and applicable methodology to support implementation processes takes place. With the start of the R&D phase, all project partners will be practically introduced to the "emplemethod Vs.1.0" components (Task 5.1). Task 5.2 is the addressee of the implementation research feedback from Task 1.1-1.5, Task 3.1 and Task 4.1-4.6 as well as from all other practical applications of the "emplemethod" by the project team in Workpackages 1-4. Abstraction, formulation, structuring and sequencing of the information and results to a comprehensive, consistent methodological approach will be carried out. From this, Task 5.3 synthesizes the marketable and distribution-ready "emplemethod Final Version". Using the OBP method for "Obstacle Based Transfer Analysis", which has been extended to include the transfer aspect within the framework of the BMBF Future Megacities project IGNIS, the transferability/ practicability of "emplemethod" (or, if applicable, subcomponents) will be examined on the basis of specific case studies defined during the project term (Task 5.4). To support the transferability analysis and definition of case studies the established network of multipliers will be used. The establishment of this network was already started in the definition phase under the coordination of UN-Habitat Vietnam and will be further expanded in the R&D phase. One of the purposes of the network is to define possible application examples for the assessment of the transferability of the methods/ tools to the South-East Asian region and to support the related work. The project tasks of this work package are structured as follows:

	Tasks
	Introduction to "emplemethod Vs. 1.0" components developed during the definition phase
	Continuous development and improvement of "emplemethod"
	Compilation of the "emplemethod Final Version"
	"emplemethod" and "empletool" transferability analysis
	Deliverables (drafts and final versions)
	Production of information material for the introduction to the method (Month 1)
	"Living Document" with data base "emplemethod" Vs 1.1-Xx (Month 8, 20, 32, 44)
	"emplemethod Final Version" and User Guide (Month 48)
	Compilation of case studies on the transferability of "emplemethod" (report)) (Month 27, 46)

WP6 Development and composition of the "empletool" toolbox

Targets: Development and compilation of a comprehensive toolbox ("empletool") for application, education & training, including a tailored capacity development concept with adapted contents.

Working methods: Research on and integration of potential tools, new development and/ or modification of existing tools, test-runs, didactic concepts in close cooperation with the local project partners

In WP6 the emplement! team will create a comprehensive toolbox. The focus is initially on the conceptual design and definition of the content, adapted to the respective needs of potential users from different administrative/ scientific fields (Task 6.1). Tasks 6.2-6.6 comprise the compilation of

the developed or adapted tools (methods, tools etc.) for the goal-oriented and sustained support of the implementation processes. The developed capacity development concepts link the methods/ tools with corresponding learning content, i.e. the necessary technical background and application knowledge (results of the Rapid Planning project will be contributed here). Within the scope of these tasks, several feedback loops of potential users are run through (questionnaires). The feedback is analysed and incorporated accordingly. In Task 6.7 the type and scope of applicable products and learning contents are finalised and combined into a coordinated toolbox.

	Tasks
	Concept of the "empletool" toolbox and of the related capacity development (CD)
	Inventory of tools to identify material/energy flows and related CD
	Inventory of tools to identify demands and related CD
	Inventory of tools to identify technologies and related CD
	Inventory of tools to support implementation processes and related CD
	Inventory of tools to support (regional) cooperation and related CD
	Compilation of "empletool" toolbox Final Version
	Deliverables (drafts and final versions)
	"empletool" toolbox with all components, documentation, instructions (Month 38, 48)
	Feedback analysis for the "empletool" toolbox (Month 42)

WP7 Dissemination and valorisation of results

Targets: Strengthening implementation research by disseminating the project results in scientific, economic, social, civil society, etc. communities. Compilation of targeted exploitation possibilities [-(partial) plans] and preparation of (partial) project plans/ results/ and products for presentation to potential implementing organisations and investors/ funders

Working methods: preparation of information materials, use of traditional dissemination channels and new media, preparation of business plans/ funding applications, technical discussions with project sponsors and financing institutions

In Task 7.1 information materials (brochures, leaflets etc.), scientific publications, films, content for new media will be created and provided. The regional/ international networking with participation in conferences, workshops and university seminars or summer schools etc. are organised and supported. Within the context of Task 7.2 these activities/ materials, etc. are used in a coordinated way to make the project visible. The network with multiplier organisations (see Task 5.4) will be used to increase the visibility in Vietnam and in the South East Asian region.

While Task 7.3 aims at the continuation of the general exploitation plan of project results, Task 7.4 aims at further exploitation activities for suitable and successful plans, results, products or pilot projects (or parts thereof). This can include, for example, the preparation of a business plan for a bankable project for an extended implementation or upgrade of a pilot project, or the transfer of a concrete output.

	Tasks
	Providing information (brochure, leaflet, film, new media, conference, workshop)
	Overall visibility of the project
	Utilisation plan
	Linking implementation activities with external financing opportunities
	Deliverables (drafts and final versions)
	Leaflet (Month 3)
	Project brochure (Month 10)
	Project homepage (Month 6)
	Project film (visual project documentation) (Month 26, 38, 48)
	Updated exploitation plan (Month 14, 26, 38)
	Documentation of recommendations to potential donors regarding implementation (Month 38, 48)

Milestones

A first milestone (M1) will be reached after 12 months together with the 2021 annual report including a statement on the extent to which the "emplement" methods have been successfully applied to the analysis of the relevant strategies and whether the pilot projects can be implemented. If problems arise during the implementation of the pilot projects, the procedure will be reviewed and adjusted if necessary. Pilot projects which cannot be successfully implemented will not be pursued further; the calculated workload will be transferred to other pilot projects. The second milestone (M2) is used to compare the overall project progress with the work, time and expenditure planning. In the case of delays in certain project parts, appropriate adjustments can be made; in the case of significant problems that prevent the work plan from being implemented, a general adjustment can be made after consultation with the Project Management Agency (DLR). The third milestone (M3) requires a statement on the status of method development and tools for the toolbox. In case of significant delays or difficult access to external tools, an adjustment in the schedule or a focus of activities on promising work should be discussed. In case of force majeure (e.g. pandemic), the DLR's recommendations for action will be followed.

6 Planned cooperation and work-sharing

emplement! focuses on the implementation of strategies in real projects. Since the preliminary phase the project partner UN-Habitat VN has been organising and coordinating project-related workshops and bilateral meetings at ministerial level in Hanoi (Ministries of Construction/ MoC, Science and Technology/ MoST, Natural Resources and Environment/ MoNRE, Agriculture/ MARD) in order to anchor the emplement! approach and objectives there. The national ministries support the emplement! project, enabling all subordinate levels to "officially" cooperate with the project. UN-Habitat VN has also begun to set up a network of multipliers (AMC etc.) to support the dissemination of the project idea and the transfer of the project results.

Overall coordination and project responsibility lies with the AT Verband, the partners of the emplement! consortium (WP and Task leaders) are responsible for the individual work packages described in the work programme and coordinate their interdisciplinary cooperation. They ensure the processing of the respective tasks. The project activities on site are authorised and supported by the participation of the People's Committees Da Nang and Quang Nam. The corresponding LOIs from the definition phase are still valid.

In order to provide ongoing advice and support for the project with helpful external contributions and to follow up on the international debate on sustainability and resilience, an "Advsiory Board" has been set up, consisting of Rogier van den Berg from the World Resource Institute (Director, Urban Development, Ross Center for Sustainable Cities), Laura Petrella from UN-Habitat HQ Nairobi (Leader of the City Planning, Extension and Design Unit) and Dieter Steinbach (Director AT-Verband). Also at this level, the project is supported by the UN-Habitat Programme Manager Vietnam Dr. Nguyen Quang, who transports the project to the national level in Vietnam and obtains feedback from the high authority level for the benefit of the project.

In order to solve potential conflicts in the course of project implementation, a Scientific Management Team (SMT) has been established on the scientific side (Prof. V. Hochschild; Prof. M. Peterek; A. Schultheis). Possible conflicts in the practical implementation of the work on site are discussed and solved for Da Nang by Dr. Thai of DISED, for the province of Quang Nam by the Mayor of the city of Tam Ky Van Anh Tuan and Dr. Quang of UN-Habitat VN.

To ensure a smooth active workflow in the project area, the WP and task leaders work closely with the local Focal Points (FP). For Da Nang, the Da Nang Institute for Socio-Economic Development (DISED) has the official mandate to take over the role of the FP, for Quang Nam Province the People's Committee takes over this function.

In order to be able to carry out the work in a targeted manner, various administrative departments at city and state level as well as semi-governmental institutions must be involved. The FPs are in close contact with them and ensure the feasibility of the activities in the project area. The local project manager (LPM) Ms Tram Bui coordinates all activities in the project area in close cooperation with the project team. UN-Habitat VN takes an active role in emplement! and ensures the connection to the relevant SDGs and the New Urban Agenda.

The emplement! project tasks are carried out by an interdisciplinary team of researchers. IZES is responsible for the analysis of administrative structures, policies and strategies. Ostfalia is responsible for infrastructural issues in the field of water and wastewater (sanitation) and supervises the introduction of the pilot projects. The University of Hohenheim covers the topic of agriculture and is responsible for the evaluation of the pilot projects. The Frankfurt University of Applied Sciences is

responsible for spatial aspects/ planning, regional networks and development concepts. The University of Tübingen works in the field of remote sensing and GIS analyses and supervises the compilation of applied methods and instruments. The AT-Verband is responsible for method development and covers the areas of supply and disposal technologies and synergetic processes. On the Vietnamese side, DISED will significantly support the procurement of project-relevant documents and actively participate in their methodological analysis and evaluation, also with regard to the city-regional cooperation. DISED will also support the introduction of the pilot projects, both in the context of the actual practical implementation and with regard to the coordinative/ administrative aspects and the involvement of local stakeholders. The Da Nang University of Architecture (DAU) and the Da Nang University of Science and Technology (DUT), possibly also the Quang Nam University, will be involved in the implementation and operational processes of pilot projects in order to provide scientific/ technical support. In addition, interdisciplinary events (workshops/ summer schools) will be held in cooperation with them in order to conduct initial analyses of the implementation, generate further ideas and develop concepts (co-design) for the 4 fields of action. The work is supported by the subcontractors with their respective expertise.

7 Expected results, application potential and envisaged utilisation of results

The structured implementation research within the framework of emplement!, but above all the scientific results and products will enable stakeholders to broaden their view beyond their own urban or regional borders and to exploit potential synergies (technological/ procedural/ financial) of implementation measures. This is an important prerequisite for a future effective reduction of GHG emissions, an efficient use of resources and a sustainable and robust infrastructure.

Already in the definition phase, the establishment of an efficient research cluster for the region of Central Vietnam was started, from whose expansion the project partners from science and practice will benefit.

Especially for the implementation of sustainability/ green growth strategies, planners and executing companies depend on fact-based information and experience. Since "green" technologies are supposedly inferior to conventional technologies in terms of costs, comprehensive knowledge of their performance and systemic effects and costs is crucial.

Besides respective computer simulations, pilot or demonstration projects in particular show very sustainable learning effects, since, in contrast to simulations, they already include an initial implementation step. Furthermore, pilot projects make the development and communication of an "abstract methodology" practically tangible and comprehensible and in this way contribute to the promotion of competences.

Although the 10 pilot projects are strictly speaking means to an end in the context of method development, they will, due to the requirements placed on them (e.g. environmental technologies, synergy formation, modularity, scalability, performance), provide important information and practical knowledge, e.g. on functionalities or structured, transferable implementation processes. This information will be prepared and compiled in documentations and made available to the public.

Two of the pilot projects should be mature enough in the R&D phase to qualify for further funding for upscaling (Sanitation modules for tourism, f.r.u.i.t.s.) in the NUR programme implementation phase. It is also expected that the Central-Vietnamese Spatial Decision and Cooperation Platform can be realised.

During the R&D phase, the project partners will develop, evaluate and publish reports and documentations (presentations, workshops/ conferences, discussion forums, etc.), so that relevant contents will be available to the scientific community, NGOs and the interested public.

During bilateral meetings with the Academy of Managers for Construction and Cities - AMC (responsible for the further training of city managers and experts at all levels in Vietnam), the deputy leader clearly stated that emplement! will make a valuable contribution to building and developing capacities with regard to implementation methods, cooperation between cities and regions, and various technical aspects (especially waste and wastewater management, renewable energies, efficiency potentials, etc.). AMC is also highly interested in including "emplemethod" in its education and training portfolio.

The question of translating plans, strategies and guidelines into practical outcomes is central to the IG-UTP (International Guidelines on Urban and Territorial Planning), the NUA (New Urban Agenda) and also the achievement of the SGDs (Sustainable Development Goals). The project will thus serve as a vehicle for a better implementation of global reference documents such as IG-UTP, NUA and SDGs and will thus play an important catalytic role.

Cooperation with UN-Habitat and also UNIDO (United Nations Industrial Development Organisation) will ensure the necessary visibility within the international debate on sustainability and resilience, as well as economic and technological cooperation. This will also be beneficial during and especially after the R&D phase for the implementation and continuation of the pilot projects and ensure that the project results of emplement! support Vietnam in its efforts to achieve economically, socially and ecologically sustainable development and to achieve corresponding global goals.

Scientific connectivity results from the updating and thematic development of the emplement! approach - i.e. its continuous adaptation to new scientific findings and the evaluation of the results from implementation activities. For the German economy, positive effects are expected in connection with (environmental) technology transfer, capacity building, and private-sector dialogue (e.g. on innovative and synergetic technologies in the context of pilot projects). With the project results of emplement! which provide a broad pool of suitable and transferable options for the most diverse technological challenges, direct economic connectivity is also guaranteed.

8 Time and financing plan

The first two tables below provide an overview of the planned total annual expenditure of the project, as well as an allocation to the individual project partners during the emplement! R&D phase (01/2021 - 12/2024). Furthermore, a forecast of expenditures for an NUR implementation phase (2025-2026) with the three mentioned projects is attached.

9 Own contribution of the international partners

To ensure the smooth implementation of the project, the Vietnamese partners from the administrations in Da Nang and Quang Nam/ Tam Ky take over all tasks regarding the administrative requirements for the project team's stay in the project area. This includes all processes for obtaining and issuing permits, such as the group's travel in the country, access, information and data requests, surveys, flying drones or reporting to the authorities for Vietnamese foreign affairs. The partners provide work rooms (shared office space), event rooms for workshops/ summer school and small transport facilities. The use of laboratories at the DUT - with the participation of consumables - is contributed as well as e.g. interpreters for smaller groups or during fieldwork, surveys, interviews etc. (for larger workshops and conferences professional interpreters must be contracted). DISED will support 10% of its funding amount (approx. 6,850 Euro) as an additional own contribution for project logistics on top. The Quang Nam Province and the UN-Habitat Office will participate with similar, but not explicitly formulated, support.