SURE Solutions

2nd Volume · 2025

Transfer of Strategies and Solutions in Sustainable Development of Urban Regions

«adapt» verb

/ə'dæpt/

1. to adjust or modify one's behavior, strategies, or systems in response to new conditions, innovation, or external disruption.

SURE Solutions is the science mag on transdisciplinary urban research

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SURE Solutions

Transfer of Strategies and Solutions
in Sustainable Development of Urban Regions

From the Editors

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The second volume of SURE Solutions brings together applied strategies in sustainable urban development which are shaped by local conditions, diverse stakeholders, and evolving reflexive practices. From high-resolution UAV[1] mapping in Phnom Penh to participatory heritage preservation in Chanthaboon and flood risk collaboration across provinces in Vietnam, the contributions underscore the nuanced, often non-linear nature of knowledge transferred into practice. Instead of promoting one-size-fits-all models, these articles reflect on a spectrum of context-sensitive approaches—technological, cultural, ecological, and social. Transfer happens here, not as a straightforward application of solutions, but as a process of careful translation, re-alignment, and co-production. This volume invites readers to engage with the ethics, challenges, and opportunities inherent in knowledge transfer, while highlighting the importance of local ownership, mutual learning, and adaptive governance. SURE Solutions continues to serve as a curated space for cross-project synthesis, intercultural dialogue, and the advancement of local sustainability transitions.

Deutsch
Der zweite Band von SURE Solutions vereint angewandte Strategien für eine nachhaltige Stadtentwicklung, die von lokalen Gegebenheiten, unterschiedlichen Interessengruppen und sich weiterentwickelnden reflexiven Praktiken geprägt sind. Von hochauflösender UAV-Kartierung in Phnom Penh über partizipative Denkmalpflege in Chanthaboon bis hin zur Zusammenarbeit

1 Unmanned aerial vehicle.

zwischen Provinzen in Vietnam im Bereich Hochwasserrisiko – die Beiträge unterstreichen die nuancierte, oft nicht lineare Natur von Wissen, das in die Praxis übertragen wird. Anstatt Einheitsmodelle zu propagieren, reflektieren diese Artikel ein Spektrum kontextsensitiver Ansätze – technologischer, kultureller, ökologischer und sozialer Art. Der Transfer findet hier nicht als einfache Anwendung von Lösungen statt, sondern als Prozess der sorgfältigen Übersetzung, Neuausrichtung und Koproduktion. Dieser Band lädt die Leser dazu ein, sich mit der Ethik, den Herausforderungen und den Chancen des Wissenstransfers auseinanderzusetzen, und hebt gleichzeitig die Bedeutung von lokaler Eigenverantwortung, gegenseitigem Lernen und adaptiver Governance hervor. SURE Solutions dient weiterhin als kuratierter Raum für projektübergreifende Synthese, interkulturellen Dialog und die Förderung lokaler Nachhaltigkeitsübergänge.

မြန်မာ
SURE Solutions ၏ ဒုတိယ အတွဲ သည် ဒေသခံ အခြေအနေ များ ၊ ကွဲပြား သော သက်ဆိုင် သူ များ ၊ နှင့် ပြောင်းလဲ နေ သော တုံ့ပြန် မှု အလေ့အထ များ ဖြင့် ပုံသွင်း ထား သော တည်တံ့ သော မြို့ပြ ဖွံ့ဖြိုး တိုးတက် မှု တွင် အသုံးချ သော နည်းဗျူဟာ များ ကို စုစည်း ထား သည် ။ ဖန္ဒမ်းပင်ရှိ အဆင့်မြင့် ယူအေဗို မြေပုံရေးဆွဲခြင်းမှ ချန်သာဘွန်း တွင် ပါဝင်သော အမွေအနှစ်ထိန်းသိမ်းခြင်း နှင့် ဗီယက်နမ်ပြည်နယ်များတစ်လျှောက် ရေလွှမ်းမိုးဘေးအန္တရာယ် ပူးပေါင်း ဆောင်ရွက်ခြင်းအထိ အထောက်အကူပြုမှု များက လက်တွေ့ကျသို့ ပြောင်းရွှေ့ထား သော အသိပညာ၏ သိမ်မွေ့သိမ်မွေ့သော သဘောသဘာဝကို ပေါ်လွင်စေသည်။ ဤ ဆောင်းပါးများက အားလုံးနှင့်ကိုက်ညီသော ပုံစံများကို အားပေးမည့်အစား နည်းပညာ၊ ယဉ်ကျေးမှု၊ ဂေဟဗေဒနှင့် လူမှုရေးဆိုင်ရာ ရှေ့နောက်စကားကို အကဲဖြတ်သည့် ချဉ်းကပ်နည်းများကို ထင်ဟပ်ပြသည်။ ဤ နေရာတွင် လွှဲပြောင်းမှုသည် ဖြေရှင်းနည်း များကို ရိုးရှင်းစွာအသုံးပြုခြင်းမဟုတ်ဘဲ ဂရုတစိုက် ဘာသာပြန်ခြင်း၊ ပြန်လည်ညှိနှိုင်း ခြင်းနှင့် ပူးပေါင်းထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ် တစ်ခုအဖြစ် ဖြစ်ပျက်သည်။ ဤစာအုပ် သည် ဒေသခံပိုင်ဆိုင်မှု၊ အပြန်အလှန်သင်ယူ ခြင်းနှင့် အလိုက်သင့်ပြုပြင်ပြောင်းလဲမှု၏ အရေးပါမှုကို ပေါ်လွင်စေစဉ် အသိပညာ လွှဲပြောင်းခြင်းတွင် မွေးမြူထားသော လူကျင့်ဝတ်၊ စိန်ခေါ်ချက်များနှင့် အခွင့်အရေးများနှင့်အတူ ပါဝင်ပတ်သက်ရန် စာဖတ်သူများကို ဖိတ်ခေါ်သည်။ SURE Solutions သည် စီမံကိန်း ပေါင်းစပ်ခြင်း၊ ယဉ်ကျေးမှုအချင်းချင်း အပြန်အလှန် ဆွေးနွေးခြင်းနှင့် ဒေသတွင်း တည်တံ့မှု အပြောင်းအလဲများ တိုးတက်ရေးအတွက် စီစဉ်ထားသော နေရာတစ်ခုအဖြစ် ဆက်လက်လုပ်ဆောင်နေသည်။
(Automated translation)

中文（简体）
《SURE Solutions》第二卷汇集了在可持续城市发展领域中，基于本地条件、多元利益相关者及不断演进的反思性实践而形成的应用策略。从金边的高分辨率无人机测绘，到 Chanthaboon 的参与式遗产保护，再到越南跨省份的洪水风险合作，这些贡献凸显了知识转化为实践过程中所体现的复杂性与非线性特征。这些文章并非推广“一刀切”的模式，而是探讨了一系列因地制宜的策略——技术、文化、生态与社会等多维度方法。知识转化在此并非简单地应用解决方案，而是一个谨慎翻译、重新调整和共同生产的过程。本卷邀请读者探讨知识转化中固有的伦理、挑战与机遇，同时强调本地所有权、互学互鉴和适应性治理的重要性。《SURE Solutions》继续作为一个精选平台，促进跨项目综合、跨文化对话以及本地可持续转型进程的推进。
(Automated translation)

Filipino
Ang ikalawang dami ng SURE Solutions ay pinagsasama-sama ang mga inilapat na estratehiya sa napapanatiling pag-unlad ng lunsod na hinuhubog ng mga lokal na kondisyon, magkakaibang mga stakeholder, at umuusbong na mga kasanayan sa pagmumuni-muni. Mula sa high-resolution UAV mapping sa Phnom Penh hanggang sa pakikilahok na pagpapanatili ng pamana sa Chanthaboon at pakikipagtulungan sa panganib ng baha sa iba't ibang mga lalawigan sa Vietnam, binibigyang-diin ng mga kontribusyon ang nuanced, madalas na di-linear na likas na katangian ng kaalaman na inilipat sa pagsasanay. Sa halip na itaguyod ang mga modelo ng one-size-fits-all, ang mga artikulong ito ay sumasalamin sa isang spectrum ng mga diskarte na sensitibo sa konteksto-teknolohikal, kultural, ekolohikal, at panlipunan. Ang paglilipat ay nangyayari dito, hindi bilang isang tuwirang aplikasyon ng mga solusyon, ngunit bilang isang proseso ng maingat na pagsasalin, muling pag-align, at co-produksyon. Inaanyayahan ng tomo na ito ang mga mambabasa na makisali sa etika, hamon, at mga pagkakataon na likas sa paglilipat ng kaalaman, habang binibigyang-diin ang kahalagahan ng lokal na pagmamay-ari, pag-aaral sa isa't isa, at adaptive governance. Ang SURE Solutions ay patuloy na nagsisilbing isang na-curate na puwang para sa cross-project synthesis, intercultural dialogue,

at pagsulong ng mga lokal na paglipat sa pagpapanatili.
(Automated translation)

Indonesia
Volume kedua SURE Solutions mengumpulkan strategi terapan dalam pengembangan perkotaan berkelanjutan yang dibentuk oleh kondisi lokal, pemangku kepentingan yang beragam, dan praktik reflektif yang terus berkembang. Dari pemetaan UAV beresolusi tinggi di Phnom Penh hingga pelestarian warisan budaya partisipatif di Chanthaboon dan kolaborasi risiko banjir antarprovinsi di Vietnam, kontribusi-kontribusi ini menyoroti sifat yang kompleks dan seringkali tidak linier dari pengetahuan yang diterapkan dalam praktik. Alih-alih mempromosikan model serba guna, artikel-artikel ini merefleksikan spektrum pendekatan yang sensitif terhadap konteks—teknologis, budaya, ekologi, dan sosial. Transfer terjadi di sini, bukan sebagai penerapan solusi yang langsung, tetapi sebagai proses terjemahan yang cermat, penyesuaian ulang, dan produksi bersama. Volume ini mengundang pembaca untuk terlibat dengan etika, tantangan, dan peluang yang melekat dalam transfer pengetahuan, sambil menyoroti pentingnya kepemilikan lokal, pembelajaran bersama, dan tata kelola adaptif. SURE Solutions terus berfungsi sebagai ruang terkurasi untuk sintesis lintas proyek, dialog antarbudaya, dan kemajuan transisi keberlanjutan lokal.
(Automated translation)

ខ្មែរ
ភាគទីពីរនៃ SURE Solutions នាំមកនូវយុទ្ធសាស្ត្រអនុវត្តក្នុងការអភិវឌ្ឍន៍ទីក្រុងប្រកបដោយចីរភាព ដែលត្រូវបានបង្កើតឡើងដោយលក្ខខណ្ឌក្នុងតំបន់ ភាគីពាក់ព័ន្ធចម្រុះ និងការវិវត្តន៍ការអនុវត្តឆ្លុះបញ្ចាំង។ ពីការធ្វើផែនទី UAV ដែលមានគុណភាពបង្ហាញខ្ពស់នៅរាជធានីភ្នំពេញ រហូតដល់ការអភិរក្សបេតិកភណ្ឌចូលរួមនៅ Chanthaboon និងកិច្ចសហប្រតិបត្តិការហានិភ័យទឹកជំនន់នៅទូទាំងខេត្តក្នុងប្រទេសវៀតណាម ការរួមចំណែកនេះគូសបញ្ជាក់ពីធម្មជាតិនៃចំណេះដឹងដែលត្រូវបានផ្ទេរទៅអនុវត្ត។ ជំនួសឱ្យការលើកកម្ពស់គំរូមួយទំហំសមនឹងទាំងអស់ អត្ថបទទាំងនេះឆ្លុះបញ្ចាំងពីវិសាលគមនៃវិធីសាស្ត្រដែលងាយនឹងបរិបទ—បច្ចេកវិទ្យា វប្បធម៌ អេកូឡូស៊ី និងសង្គម។ ការផ្ទេរកើតឡើងនៅទីនេះ មិនមែនជាកម្មវិធីត្រង់នៃដំណោះស្រាយទេ ប៉ុន្តែជាដំណើរការនៃការបកប្រែដោយប្រុងប្រយ័ត្ន ការតម្រឹមឡើងវិញ និងការសហការផលិត។ បរិមាណនេះអញ្ជើញអ្នកអានឱ្យចូលរួមជាមួយក្រមសីលធម៌ បញ្ហាប្រឈម និងឱកាសដែលមាននៅក្នុងការផ្ទេរចំណេះដឹង ខណៈពេលដែលគូសបញ្ជាក់ពីសារៈសំខាន់នៃភាពជាម្ចាស់មូលដ្ឋាន ការរៀនសូត្រទៅវិញទៅមក និងអភិបាលកិច្ចសម្របខ្លួន។ SURE Solutions បន្តបម្រើជាកន្លែងរៀបចំសម្រាប់ការសំយោគឆ្លងគម្រោង ការសន្ទនាអន្តរវប្បធម៌ និងការរីកចម្រើននៃការផ្លាស់ប្តូរនិរន្តរភាពក្នុងតំបន់។
(Automated translation)

ພາສາລາວ
ປຶ້ມຫົວທີສອງຂອງ SURE Solutions ໄດ້ ຮວບຮວມເອົາຍຸດທະສາດທີ່ນຳໃຊ້ໃນການພັດທະນາຕົວເມືອງແບບຍືນຍົງ ເຊິ່ງຖືກຫລໍ່ຫຼອມໂດຍ ສະພາບການໃນທ້ອງຖິ່ນ, ຜູ້ມີສ່ວນຮ່ວມທີ່ ແຕກຕ່າງກັນ ແລະ ການພັດທະນາການປັບປຸງ. ຈາກ ການວາງແຜນ UAV ທີ່ມີຄວາມລະອຽດສູງໃນ Phnom Penh ຈົນເຖິງການປົກປັກຮັກສາ ມໍລະດົກທີ່ມີສ່ວນຮ່ວມໃນເມືອງຈັນທາບູນ ແລະ ການຮ່ວມມືກັບຄວາມສ່ຽງຕໍ່ນ້ຳຖ້ວມລະຫວ່າງ ແຂວງຕ່າງໆໃນຫວຽດນາມ, ການບໍລິຈາກດັ່ງກ່າວ ເນັ້ນເຖິງລັກສະນະທີ່ແຕກຕ່າງກັນຂອງຄວາມຮູ້ທີ່ ແຕກຕ່າງກັນ. ແທນ ທີ່ ຈະ ສົ່ງ ເສີມ ແບບ ແຜນ ດຽວ, ບົດ ຄວາມ ເຫລົ່າ ນີ້ ສະທ້ອນ ເຖິງ ວິທີ ທາງ ທີ່ ຮູ້ສຶກ ໄວ ຕໍ່ ສະພາບ ແວດ ລ້ອມ - ເທັກ ໂນ ໂລ ຈີ, ວັດທະນະທຳ, ລະບົບ ນິເວດ ແລະ ສັງຄົມ. ການ ຖ່າຍທອດເກີດຂຶ້ນໃນທີ່ນີ້, ບໍ່ແມ່ນການນຳໃຊ້ທາງ ແກ້ໄຂໂດຍກົງ, ແຕ່ເປັນຂັ້ນຕອນຂອງການແປຢ່າງ ລະມັດລະວັງ, ການປັບປຸງໃຫມ່ ແລະ ການຜະລິດ ຮ່ວມກັນ. ປຶ້ມຫົວນີ້ເຊື້ອເຊີນຜູ້ອ່ານໃຫ້ເຂົ້າຮ່ວມກັບ ສິນລະທຳ, ການທ້າທາຍ ແລະ ໂອກາດທີ່ມີຢູ່ໃນການ ຖ່າຍທອດຄວາມຮູ້, ໃນຂະນະດຽວກັນເນັ້ນເຖິງຄ ວາມສຳຄັນຂອງການເປັນເຈົ້າຂອງທ້ອງຖິ່ນ, ການຮຽນຮູ້ເຊິ່ງກັນແລະກັນ ແລະ ການປົກຄອງທີ່ ປັບປ່ຽນໄດ້. SURE Solutions ຍັງ ຮັບ ໃຊ້ ເປັນ ສະຖານ ທີ່ ທີ່ ຄວບ ຄຸມ ສຳລັບ ການ ປະສົມ ເຂົ້າກັນ ລະຫວ່າງ ໂຄງການ, ການ ສົນທະນາ ລະຫວ່າງ ວັດທະນະທຳ ແລະ ຄວາມ ກ້າວຫນ້າ ຂອງ ການ ປ່ຽນ ແປງ ຄວາມ ຫມັ້ນຄົງ ໃນ ທ້ອງ ຖິ່ນ.
(Automated translation)

แบบไทย
เล่มที่สองของ SURE Solutions รวบรวมกลยุทธ์ประยุกต์ใช้ในการพัฒนาเมืองที่ยั่งยืนซึ่งถูกกำหนดโดยสภาพท้องถิ่นผู้มีส่วนได้ส่วนเสียที่หลากหลายและแนวทางปฏิบัติในการสะท้อนกลับที่พัฒนาขึ้น ตั้งแต่การทำแผนที่ UAV ความละเอียดสูงในพนมเปญไปจนถึงการอนุรักษ์มรดกแบบมีส่วนร่วมในจันทบูลและความร่วมมือด้านความเสี่ยงจากน้ำท่วมข้ามจังหวัดในเวียดนามการมีส่วนร่วมเน้นย้ำถึงลักษณะที่ละเอียดอ่อนและมักไม่เป็นเส้นตรงของความรู้ที่ถ่ายทอดไปสู่การปฏิบัติ แทนที่จะส่งเสริมโมเดลขนาดเดียวที่เหมาะกับทุกคน บทความเหล่านี้สะท้อนให้เห็นถึงสเปกตรัมของแนวทางที่ละเอียดอ่อนต่อบริบทเช่นเทคโนโลยีวัฒนธรรมระบบนิเวศและสังคม การถ่ายโอนเกิดขึ้นที่นี่ ไม่ใช่การประยุกต์ใช้โซลูชันที่ตรงไปตรงมา แต่เป็นกระบวนการแปลอย่างระมัดระวัง เล่มนี้เชิญชวนให้ผู้อ่านมีส่วนร่วมกับจริยธรรม ความท้าทาย และโอกาสที่มีอยู่ในการถ่ายโอนความรู้ ในขณะที่เน้นย้ำถึงความสำคัญของความเป็นเจ้าของในท้องถิ่น การเรียนรู้ซึ่งกันและกัน และการกำกับดูแลที่ปรับตัว SURE Solutions ยังคงทำหน้าที่เป็นพื้นที่ที่คัดสรรมาอย่างดีสำหรับการสังเคราะห์ข้ามโครงการ การสนทนาระหว่างวัฒนธรรม และความก้าวหน้าของการเปลี่ยนแปลงความยั่งยืนในท้องถิ่น
(Automated translation)

Tiếng Việt
Tập hai của SURE Solutions tập hợp các chiến lược ứng dụng trong phát triển đô thị bền vững, được hình thành

bởi điều kiện địa phương, các bên liên quan đa dạng và các thực hành phản ánh đang phát triển. Từ việc lập bản đồ bằng UAV độ phân giải cao tại Phnom Penh đến bảo tồn di sản có sự tham gia của cộng đồng tại Chanthaboon và hợp tác quản lý rủi ro lũ lụt giữa các tỉnh tại Việt Nam, các bài viết nhấn mạnh bản chất phức tạp, thường không tuyến tính của việc chuyển giao kiến thức vào thực tiễn. Thay vì thúc đẩy các mô hình "một kích thước phù hợp cho tất cả", các bài viết này phản ánh một phổ các tiếp cận nhạy cảm với bối cảnh - công nghệ, văn hóa, sinh thái và xã hội. Chuyển giao diễn ra ở đây không phải là việc áp dụng đơn thuần các giải pháp, mà là quá trình dịch thuật cẩn thận, điều chỉnh lại và sản xuất chung. Tập san này mời độc giả tham gia vào các vấn đề đạo đức, thách thức và cơ hội vốn có trong quá trình chuyển giao kiến thức, đồng thời nhấn mạnh tầm quan trọng của sự sở hữu địa phương, học hỏi lẫn nhau và quản trị thích ứng. SURE Solutions tiếp tục đóng vai trò là không gian được tuyển chọn cho tổng hợp đa dự án, đối thoại liên văn hóa và thúc đẩy quá trình chuyển đổi bền vững địa phương.

(Automated translation)

“This volume offers a variety of perspectives: on transfer, as a process shaped by people, places, and politics; on what it means to ‘adapt’ rather than ‘adopt’; and on how to make space for failure, reflection and learning along the way”

Vietnam (photo credit: Vivienne Mayer)

Vietnam (photo credit: Vivienne Mayer)

Transferring with Care: On the Situated Nature of Solutions

Knowledge transfer is a multilateral activity. To transfer a strategy or solution from one urban region to another means to translate, to negotiate, and to reimagine original concepts in relation with new environments, cultures, governance systems, and lived realities. As urban researchers and practitioners working across borders and disciplines, we are repeatedly confronted with the task of balancing technical ambition with cultural attunement—of ensuring that what travels is not only effective, but appropriate, meaningful, and empowering.

Highlighting on the theme *Transfer of Strategies and Solutions*, the second volume of *SURE Solutions* collects contributions that explore the pathways through which applied research finds its place in local implementation. The focus is on the interface between knowledge and context: how strategies emerge and evolve in dialogue with local actors, and how their transfer is either enabled or constrained by institutional arrangements, social infrastructures, and ecological particularities.

In line with the purpose of this publication series—to reflect the realities and potentials of sustainable urban development—this volume offers a variety of perspectives: on transfer, as a process shaped by people, places, and politics; on what it means to 'adapt' rather than 'adopt'; and on how to make space for failure, reflection and learning along the way.

This volume contains scientific contributions that frame the broader challenge. The *Flood Risk Information System for Adaptation Measures and Evaluation* (FRAME) is a GeoNode-based decision-support platform tailored to Central Vietnam. Developed within the FloodAdaptVN project, FRAME stands as a technical, yet highly transferable tool—one that makes flood risk and adaptation planning more accessible and responsive. The article focuses on the orchestration of the system's core functionalities, offering insight into how digital infrastructures can be locally deployed and customised. Complementing that, a contribution by the members of the SURE facilitation and synthesis research team shifts the lens from technology to reflexivity. Drawing on four years of transdisciplinary scientific work within the SURE programme, the article proposes a novel framework for impact-oriented monitoring—one that privileges ongoing self-reflection over static metrics, and that positions reflective research cultures as a catalyst for transformative urban change. In the volume's third scholarly article, the SURE facilitation and synthesis research team comments on the nature, theory, and practice of synthesis research, of course in the thematic area of sustainability, especially in the urban context. That article explains in what ways facilitation and synthesis efforts help understand the interlinked dimensions of the built environment, and illuminates the project's approach and methodology while doing so.

The volume's activity reports build upon this conceptual foundation, taking us into the texture of place and practice. In Phnom Penh, thermal UAV technology is used to map urban heat footprints, producing high-resolution visual data that help local decision-makers grasp the cooling potential of green and blue infrastructure. In Thailand's Chanthaboon Waterfront Community, we find an inspiring case of financial social innovation—where a locally rooted social enterprise has fused heritage conservation with participatory investment, yielding both economic vitality and cultural renewal. Also located in Thailand, the CHARMS project experiments with participatory storytelling methods, using the SenseMaker® tool to capture citizens' emotional attachments to traditional wooden homes. In this case, preservation is less about architectural typologies than about memory, belonging, and identity—and the role of citizens as co-authors of the urban narrative.

Several contributions from Vietnam illustrate the diversity of what 'transfer' can mean. One report revisits the Cu De River Valley, where a community-based ecotourism concept has been gradually co-developed through workshops, training, and iterative engagement—a reminder that successful implementation often unfolds over years. Another article presents the outcomes of a regional networking forum convened under the FloodAdaptVN project, exploring the prospects of interprovincial cooperation in climate adaptation and disaster-risk reduction. And yet another article documents a bathymetric survey of the Huong and Bo Rivers, offering both a technical intervention and a story of the practical challenges involved—from sand theft to outdated reference systems.

These field-based accounts are complemented by a series of shorter contributions—news items and snapshots. These capture moments of innovation and relationship-building. Whether through the development of a gender-equitable building approach in Cambodia, the launch of a green infrastructure survey in Huế, or a collaborative workshop on ecosystem services in Shanghai, these pieces underline the vibrant, ongoing dialogues that surround SURE's research efforts. And they remind us, too, that solutions are always situated: they emerge not only in laboratories and offices, but in workshops, classrooms, on street corners, and riversides.

Taken together, the contributions in this volume ask to rethink the very notion of "solution transfer." What if, instead of framing solutions as something to be handed over, we understood them as processes of co-production—fragile, contextual, and unfinished? What if we judged success not solely by efficiency or impact, but by the depth of engagement, the mutuality of learning, and the care taken in translation?

In this spirit, *SURE Solutions* continues to serve as a platform for dissemination as well as a space for synthesis—a curated forum where technical detail meets narrative insight, and where knowledge is mobilised as a community endeavour. As editors, we thank all contributors for their commitment, creativity, and honesty in sharing their achievements and questions.

We invite readers to engage with this volume as a kind of open-ended conversation. As cities across the world are increasingly challenged by the urgency of sustainability, successful transfer means not only moving ideas, but moving together.

> **"Transfer happens here, not as a straightforward application of solutions, but as a process of careful translation, re-alignment, and co-production"**

Katharina M. Borgmann,
Jörg Rainer Noennig &
Frank Schwartze

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Build4People

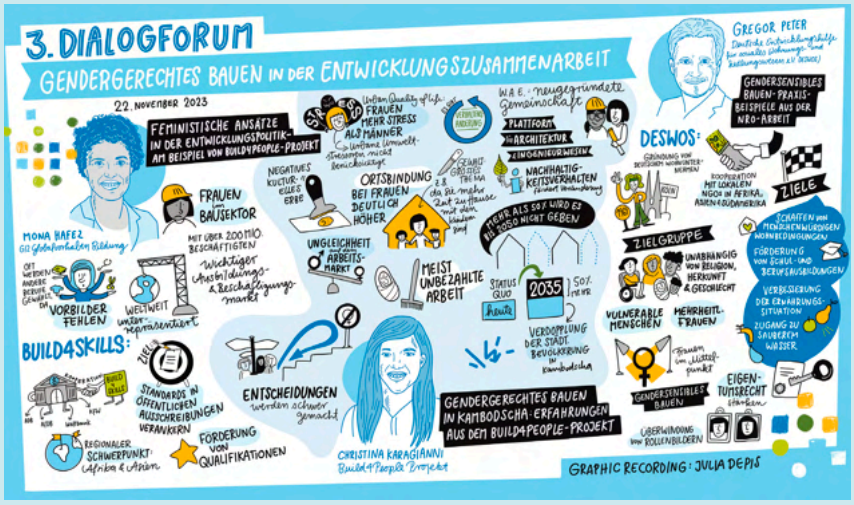
Gender-Equitable Building in Cambodia: Experiences From the Build4People Project

Introduction

On November 22nd 2023, the Build4People Project was presented during a conference on the topic of "Gender-Equitable Building in Development Cooperation" at the seat of the German Ministry of International Cooperation (BMZ) in Berlin, Germany.

Following Build4People's transdisciplinary research approach, our presentation titled "Gender-Equitable Building in Cambodia: Experiences from the Build4People Project" had been jointly prepared by the Build4People consortium leader Dr Michael Waibel (Hamburg University), Dr Anke Blöbaum (Magdeburg University), leader of the Build4People Work Package "Behaviour Change", and by Christina Karagianni (Technical School of Applied Sciences, Lübeck), research associate of the Build4People Work Package "Sustainable Building".

Among other topics, we presented a gendered analysis of our survey results on the urban quality of life of residents in Phnom Penh, where it was found that the subjective quality of life is significantly lower for women compared to men and they also seem to feel more burdened by environmental factors. This might be explained by the fact that they spend less time at work or outside of their neighbourhood. Furthermore, the general stress is probably also affected by multiple burdens due to responsibility for family, household, and work, and coping with environmental stressors might require so much energy that the general stress level increases.



Graphical Summary of Build4People's presentation (Source: Edited from BMZ).

In addition to the standardised survey, we also conducted focus group interviews with residents in Phnom Penh within our last year's Build4People Ecocity Transition Lab—another good-practice example of Build4People's cross-cutting, transdisciplinary approach that brings together a diverse group of multi-stakeholders to create an innovative atmosphere for joint exchange, to communicate, and to promote alternative visions of urban sustainability on the neighbourhood level, beyond business-as-usual. Groups responses to the question of whether they as women have special demands on their living situation. Here, the finding of insecurity was confirmed once again; in addition, there were also suggestions regarding leisure opportunities, like the desire to be able to do something for themselves during childcare hours.

Following the survey and focus group findings, and given that in Cambodia the traditional understanding of gender roles is still much more present than in Germany, and women appear to be more dependent than men on the planning and design of the urban living environment, we wondered how the current gender bias in planning can be countered in such a context.

To answer this question, we conducted an explorative survey among our contacts in Phnom Penh and included in our presentation the thoughts and perspectives of women from the construction sector on their role in architecture and engineering, and how they think it can be supported not only within the sector but also in the built urban environment. Most of them wished to remain anonymous, but the comments we gathered represent a wide age range and come both from academia and the private sector. From this small sample we saw that, on the one hand, women in the sector have a clear understanding of their

strengths and how they can be further supported, but also that the glass ceiling is present and visible to them.

On the other hand, Ms. Leakhena Setha, an architect herself, is very cautious about women voicing criticism of discrimination in their workplace. Her quote shows apparent discomfort with gender quotas, and her belief that competence will be enough to overcome any hurdles comes in contrast with the admittance that she has indeed "in rare cases" faced gender-related discrimination herself. This statement may indicate that there is still a lack of awareness of structural discrimination in Cambodia's construction sector that needs to be further investigated.

Although not sufficient to reach concrete conclusions, this first exploratory study already gives an overview of women's aspirations in this sector, and it is a first step towards making their voices heard.

Women in Architecture and Engineering (W.A.E.): A New Group Promoting Women Empowerment in the Construction Sector in Phnom Penh and Cambodia

During our presentation we introduced the newly formed Women in Architecture and Engineering (W.A.E.) group, an initiative that was "born" during one of our workshops on Inclusive and Sustainable Design. This community emerged from the collective desire to create a supportive environment that encourages women's participation in these fields, fosters talent, and is driven by a commitment to break down barriers and create a more inclusive, diverse future in architecture and engineering in Cambodia.

The Build4People project supports such processes of transformational change towards urban sustainability (like the Sustainable Building Arena presented in the previous edition of SURE Solutions) and gender equality in the construction sector, and we consider the formation and support of this group to be one of our project's great achievements.

One of the first ideas of the group is to organise a competition with accompanying seminars and exhibitions about inclusive street design and mobility in Phnom Penh, and we are in close discussions with them in order to support them. Moreover, Christina Karagianni, a member of our team, is also a member of the advisory board of the group, where she is providing input on issues related to gender-mainstreaming, sustainability and building design. Together, they authored a chapter on this exact topic in the upcoming Build4People publication, titled "Transformation Handbook for Sustainable Housing and Urban Quality of Life."

Conclusion

From a scientific viewpoint, our presentation served to highlight the need for research on gender-related behaviour constraints instead of a simple dichotomous view on gender-differences.

Specifically, reflecting on our own work, we need to analyse the spatial and structural gender-specific barriers in more depth overall.

In conclusion, we have to say that applying gender analysis in the context of our presentation preparation increased our gender-based sensitivity even further with regard to Build4People's upcoming project activities. Our team members sincerely commit to support the active participation of women, girls, and all genders in our work and research.

Christina Karagianni, Anke Blöbaum & Michael Waibel

CHARMS

Moving Forward: The CHARMS Partnership with KMITL Takes Shape

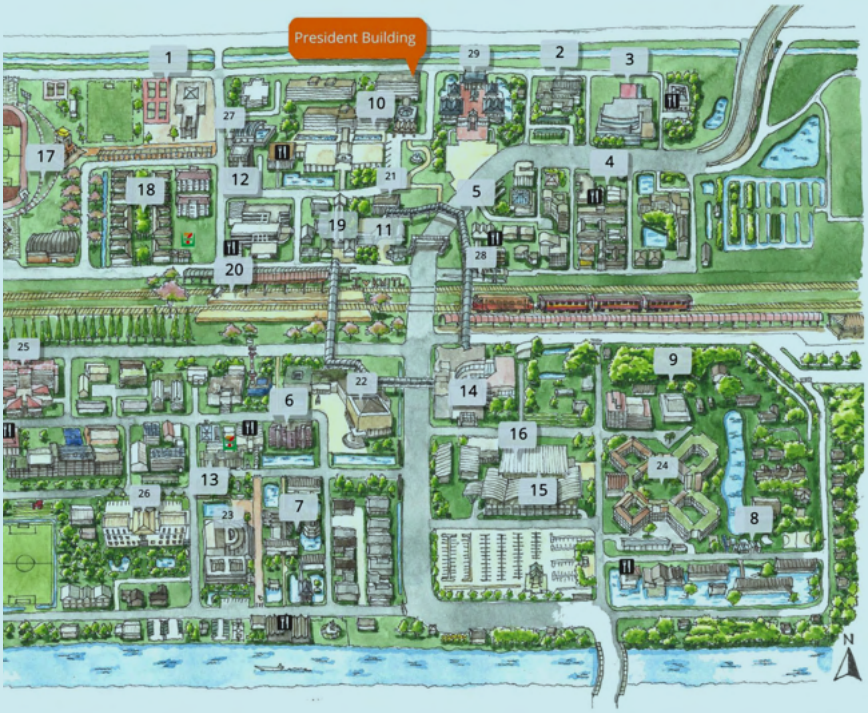
What began in late 2023 as an ambitious collaboration between the CHARMS project and King Mongkut's Institute of Technology Lat Krabang (KMITL) in Thailand, has now evolved into a dynamic partnership with promising outcomes. As we reach mid-2025, this alliance is already bearing fruit and opening doors to even broader initiatives in sustainable construction and urban development, such as the establishment of a competence center for bio-based building materials in the implementation phase set to start by the end of 2025.

About KMITL: A Leading Hub for Technology and Sustainable Innovation

King Mongkut's Institute of Technology Ladkrabang (KMITL) is one of Thailand's most respected technical universities. Established

in 1960, it is located in Bangkok's Lat Krabang District near Suvarnabhumi Airport. With the guiding motto *"Education and research in science and technology are the foundation of national development,"* KMITL has grown into a major educational hub, enrolling nearly 25,000 students in 2012, most of them in engineering disciplines.

KMITL is distinguished by its strong commitment to sustainable, bio-based construction. Its ATOM Project developed an electric three-wheeler using natural fibers like hemp, bamboo, and flax—materials that are renewable, lightweight, low-carbon, and biodegradable. The School of Architecture emphasises this focus through labs on Sustainable Tropical Design, while the Department of Civil Engineering prioritises environmental engineering for community well-being. These efforts highlight KMITL's drive to promote eco-friendly construction and smart urban solutions, making it an excellent partner for CHARMS.



KMITL Campus Map. The CHARMS demonstration house is situated between the dean's office (1) and the adjacent water pond in the western area of KMITL's Lat Krabang campus. This location was selected after earlier discussions that also considered a site along the southern canal (KMITL, 2023).

The Pilot House: Nucleus of our Partnership

At the heart of our collaboration is the pilot house—a demonstration project that laid the groundwork for all that followed. Completed in March 2024 on KMITL's Eastern Bangkok campus, this Typhaboard structure features two rooms—one insulated with Typha, the other left uninsulated—and is fitted with a sophisticated sensor network. Over the past year, it has generated valuable data on hygrothermal behavior and indoor climate, validating our simulation models and sparking strong interest among local stakeholders. More than a research facility, this pilot house has become the nucleus of our partnership: a tangible showcase for bio-based construction in tropical urban environments and a catalyst for future joint initiatives.

Strengthening Ties and Expanding the Vision

In March 2024, the two institutions formalized our collaboration through a Memorandum of Understanding (MoU), underscoring our shared commitment to long-term partnership beyond the initial scope of CHARMS. Since then, discussions have progressed on integrating biotechnology and smart city concepts into future projects, reflecting a joint ambition to pioneer solutions for sustainable urban living.

Looking Ahead: From Local Innovation to Global Impact

As this partnership moves forward, it exemplifies how international research collaboration can drive both scientific progress and practical transformation in the construction sector. By combining CHARMS' expertise in bio-based insulation with KMITL's deep local knowledge and networks, we aim to help mainstream environmentally friendly building practices—not only in Thailand, but as part of a global shift toward more sustainable cities.

What started as an exploratory venture has now matured into a multifaceted relationship that continues to grow. We look forward to building on this momentum, driving innovation, and sharing insights that will help shape the future of construction and urban development worldwide.

Henrik Beermann

CHARMS

From Heritage Building Preservation to Cities as Carbon Sinks: Towards a Typha Test House in Bangkok

During the project, CHARMS sharpened its perspective on the role of wooden, traditional buildings in sustainable urban development. Besides their intrinsic heritage value, vernacular residential buildings are essentially bio-based built urban structures. They are a symbol for a built environment that proactively contributes to climate change mitigation by using building materials that store carbon in its built structures. This way, a city can become a carbon sink – if designed and built appropriately.

Enacting the Bio-Based Transition Using the Example of a Sustainable Insulation Material

Our activities aim at gaining a deeper understanding of how to put the concept of a regenerative built environment into action. We look at the concept from two angles. The first concerns the question of preserving existing bio-based structures, notably wooden, traditional houses, and addresses the current, unsustainable trend in Thailand of replacing these houses with buildings made of concrete. The second angle relates to the assessment of the usability of Typha board, a bio-based insulation material made from the wetland crop cattail. Due to its special structural properties, *Typha angustifolia* enables the production of building materials that offer a combination of insulation and load-bearing effect that is unique on the market. The special suitability of the leaf mass of Typha is determined by the structure of the plant. The leaves have a fibre-reinforced and stable support fabric, which is filled with a soft, open-cell sponge fabric. This results in both amazing statics and an excellent insulating effect.

Due to its good insulating properties combined with its load-bearing capability and excellent fire protection properties, it can be used for both, retrofitting wooden, vernacular houses and for new construction. In addition to the thermal insulation effect, the installation of Typha panels in existing buildings could also reduce the entry of air pollutants and thus improve the indoor air quality. The thermal insulation primarily serves to reduce the energy consumption of an air conditioning system for cooling the interior significantly compared to an uninsulated house.

King Mongkut's Institute of Technology Lat Krabang as a Key Partner

A significant achievement is our collaboration, initiated in December 2023, with Thailand's King Mongkut's Institute of Technology Lat Krabang (KMITL). The collaboration is focusing on the feasibility assessment applying and implementing Typhaboard in the Thai context. By the end of March 2024, the CHARMS project team and KMITL constructed a Typha-based pilot house on the university campus in Eastern Bangkok. The house consists of two rooms, one completely insulated with Typha panels and the other entirely uninsulated. The pilot house is equipped with va-

(Left): Identification of wild cattail plants in the Chaiyaphum province in the Northeast of Thailand (photo credit: © Fraunhofer IMW) / (Right) Cross section of Typha leaf bundle with well visible sponge tissue and supporting tissue (photo credit: © Fraunhofer IBP).

rious sensors to collect data that help to validate our simulations, which are conducted with regard to hygrothermal aspects and thermal indoor comfort. Furthermore, the effect of Typha insulation on the indoor air quality due to its sealing effect and on the cooling energy consumption of the air conditioning systems is investigated. In addition, the house serves as a showcase for bio-based construction and insulation materials to Thai actors from the construction industry. KMITL role is to explore the sustainable potential of farming cattail alongside rice and assess the material's resistance to insects and microorganisms.

By the end of 2024, CHARMS had assessed the role that bio-based building materials can play within existing local urban development policies and initiatives in Thailand. In addition, the project consolidated the data and insights gathered on residential indoor comfort and developed an inventory of dimensions and attributes that define high-quality indoor comfort from the residents' perspective.

Henrik Beermann, Jakob Richtmann, Martin Krus & Ralf Kilian

“Operating in five wards, the survey reflects the great diversity of neighborhoods in Huế”

GreenCityLabHuế

Revealing Preferences for Urban Greenery: GreenCityLabHuế Launched Public Survey on Green Infrastructure in Huế, Vietnam

Following a collaboration between the Mientrung Institute for Scientific Research, the Faculty of Architecture at Huế University and the Humboldt-University of Berlin, GreenCityLabHuế has launched a public survey in mid-January 2024 aiming to reveal the public's opinion on green-blue infrastructure in Huế, Central Vietnam.

Citizens' Preferences are a Key Factor for the Acceptance of Local Climate Adaptation Measures

Being highly affected by the impacts of climate change, e.g. due to prolonged heat waves, cities in Central Vietnam are challenged to find sustainable solutions for climate change adaptation. In this respect, elements of urban green-blue infrastructure (GBI) have proven to be effective measures and are increasingly being financed and implemented in South-East Asia, including Vietnam (Nguyen et al., 2022; MONRE (ed.), 2022; Pham et al., 2022; Asian Development Bank, 2019).

However, specifically for Vietnam, there are still knowledge gaps, e.g. in terms of the effectiveness of certain measures on local microclimatic conditions (Fu et al., 2022; Koc et al., 2018), but also in terms of citizens' perceptions, demands or preferences for specific types of GBI. The latter is particularly important for realising sustainable, socially inclusive and thus accepted, and locally adapted action (Sowińska-Świerkosz et al., 2021). In this regard, collaborative and inclusive decision-making that involves the

views and perspectives of broad and diverse groups of actors, including citizens, has been described as a vital factor for achieving successful GBI as nature-based solutions (ibid.). Moreover, the aesthetical and local preferences and perceptions of nature of potential (recreational) users as beneficiaries of nature-based solutions are considered fundamental not only in the design of greening interventions, but also for gaining local legitimacy through an improvement of quality of life (Jørgensen et al., 2022). Accordingly, the survey seeks to elicit multifaceted responses that reveal attitudes

towards climate change adaptation and GBI in Huế. In so doing, first we identify perceived local, environmental, and climate change-related challenges as framing conditions of GBI interventions, including citizens' awareness with regard to the benefits provided by GBI for their potential mitigation. Second, to support the mainstreaming of GBI and NbS in Huế as tools for addressing the identified local issues, more-specific preferences, demands and perceptions of nature are being evoked.

Green oasis next to a main road (photo credit: Luca Sumfleth).

A Comprehensive Questionnaire Allows for Insights into Key Aspects for GBI Governance and Design

The survey questionnaire was co-developed through several reviews between the Vietnamese and German partners, and was then translated from English into Vietnamese. A pilot questionnaire was internally circulated among the project members, relatives and acquaintances to assess word choice, ensure a reader-friendly structure, and estimate the time required for responses. The final questionnaire combines both Likert scale questions and open-ended questions, and comprises the following sections:

- First, the scope and purpose of the survey are introduced, including information on the project background, and presenting a definition of GBI;
- Second, information on the respondent, including socio-demographic characteristics, is elicited, to support detecting potentially different perceptions or demands between groups of citizens, e.g. based on gender, age, or level of education;
- Third, personal awareness, perceptions and demands are explored, with respondents asked to indicate (dis-)agreement on predefined statements and items. These were chosen based on previous project findings, e.g., a co-created typology of GBI elements, and roundtable outcomes, e.g. regarding common challenges. The statements also consider potentially desirable GBI traits or features in terms of their aesthetics and design. This includes eliciting the acceptance of and preference towards differing degrees of green spaces' cultivation or naturalness, which may subsequently support an optimisation of ecosystem service delivery, as well as identifying potential synergies or trade-offs due to stated preferences. Furthermore, questions on local potential as perceived by citizens, i.e., opportunities for the improvement or development of GBI, have also been recorded.

Operating in Five Wards, the Survey Reflects the Great Diversity of Neighbourhoods in Huế

The survey was conducted in five wards within the administrative boundaries of the city of Huế. The wards were selected based on different categories such as population density, location considering also an urban-rural gradient, and green space distribution and density. The selected wards are (1) An Dong, a newly developed ward; (2) Phu Hoi, the most populated ward; (3) Thuy Bieu, a ward located at the outskirts; (4) Tay Loc, the Citadel ward; and (5) Huong So, a resettlement ward. The survey took place from the 9th to 12th of January 2024. It was carried out with the assistance of 10 students trained by the GreenCityLabHuế project members on how to approach and interview randomly selected citizens, and how

to correctly interpret the questions by using the semi-structured questionnaire. The students were equally divided into groups of 4, with each group being in charge of selected wards. The interviewers were walking or using motorbikes to move across the ward and spontaneously asked the residents, who have permanently or temporarily settled in the chosen ward, to participate in the survey. As is typical for Vietnam, at the end of each interview the participants received an environmentally friendly, locally designed bookmark as an acknowledging present from the GreenCityLabHuế project. Parallel to this onsite survey in the chosen wards, the survey was launched online and distributed on social media, to engage a wider audience.

Initial Results Indicate Potential Trade-Offs

Initial results indicate a high level of awareness regarding environmental issues, a generally high acceptance of green infrastructure, and a high demand for ecosystem services. However, there may be low acceptance of more natural GBI designs, resulting in potential trade-offs with regard to demanded ecosystem services or wider benefits such as the support of biodiversity. This demonstrates the potential need to raise awareness of the benefits of solutions close to nature.

Luca Sumfleth, Long Nguyen & Sebastian Scheuer

IMECOGIP

IMECOGIP Workshop Explores Ecosystem Services in Shanghai

From October 31 to November 2, 2023, after another prolonged hiatus, the German members of the IMECOGIP project had the opportunity to visit their Chinese project partners in Shanghai again, hosting a workshop focused on the IMECOGIP toolbox for assessing ecosystem services. The event started with a keynote speech by representatives of the environmental assessment company DIST, setting the stage by evaluating cities based on various sustainability aspects and by using geospatial data. This speech provided us with a comprehensive understanding of sustainable practices, utilising advanced computational tools and methodologies. The workshop was accompanied by field trips to key locations, including Shuxin Town on Chongming Island and Shuiku Village, where all participants had the opportunity to witness firsthand the impactful green infrastructure projects shaping Shanghai's landscape. These excursions provided valuable insights into the green space planning practice as well as into local initiatives, fostering a deeper understanding of the environmental chances and challenges faced by the region.

Two dynamic hands-on workshops were conducted, where IMECOGIP project members initially introduced participants to the concept of ecosystem services and the functionalities of EnhancES, the toolbox developed by IMECOGIP for mapping, assessing and enhancing ecosystem services. Subsequently, participants, including students from Tongji University and professionals from the planning and business sectors in China, applied the IMECOGIP toolbox to their own data and use cases. In the evaluation phases, participants were able to provide feedback on the application and user-friendliness, engaging in collaborative discussions with the project members. Together, we explored potential use cases for the toolbox in China and discussed the prerequisites necessary to integrate it into planning practices within the Chinese context. The diverse perspectives of both students and practitioners have helped us understand the varied expectations that users have with regard to the toolbox. Building upon these insights, we have identified opportunities for improvement and further development to meet the distinct needs of the users. The collaborative nature of these sessions allowed for exchange of ideas, experiences and expertise with valuable insights into how planning in China is conducted, and how the project can support ongoing developments in green space planning.

We extend our heartfelt gratitude to our Chinese project partners from Tongji University, whose support played a pivotal role in the success of these workshops. Their contribution ensured that the sessions were not only insightful but also paved the way for crucial feedback on the functionality, potential applications, and future development of our toolbox within the unique context of China. The diverse perspectives shared by participants, coupled with the vibrant energy of Shanghai, created an atmosphere of innovation and collaboration. Through this workshop, we not only gained valuable insights into the practical implementation of our tools but also created meaningful connections with our partners and new ac-

IMECOGIP project partners meet in Shanghai (photo credit: IMECOGIP).

quaintances dedicated to advancing sustainable practices in China. As we reflect on the IMECOGIP workshop in Shanghai, the shared experiences, the exploration of green infrastructure projects and the collaborative workshops have undoubtedly pushed our mission forward. We look forward to continuing this journey, building on the knowledge gained and furthering our collaborative efforts to promote sustainable practices and enhance ecosystem services worldwide.

Christin Busch, Malte Bührs, Lars Gruenlagen & Harald Zepp

URA

International Conference: StadtLand – From Thuringia to a Planetary Perspective

The collaboration between the Sino-German project Urban Rural Assembly (URA) and the International Building Exhibition (IBA) Thuringia reached its pinnacle with the organisation of the international conference "StadtLand – from Thuringia to a Planetary Perspective". Held in the iconic Eiermann building in Apolda, the conference was an integral part of the "Stadtland – Learning from Thuringia" exhibition, showcasing the outcomes of IBA's ten-year project development process.

The URA project, ongoing since 2019, has been dedicated to researching the development and planning of urban-rural interface regions in both China and Germany. At the heart of the conference was the call for a “Stadt-Land” perspective, highlighting the interconnectedness and material cycles within larger territories that encompass both urban and rural areas. Recognising the significance of “rural” areas as critical resources for achieving a more circular and climate-friendly future, the Stadt-Land perspective advocates for new societal practices that promote solidarity in land use, alongside resource-efficient

International Conference "StadtLand – from Thuringia to a Planetary Perspective" (source: IBA Thuringia. Photo credit: Thomas Müller).

construction and economic activities. URA delved into the rapid socio-spatial transformation processes characterising the urban-rural regions in Huangyan/Taizhou, Zhejiang Province, China. IBA, along with its local partners, implemented model projects in Thuringia, showcasing practical examples of sustainable urban-rural development. Both projects utilised "living labs" as platforms to support the development of strategies and tools for future changes, making the conference a point of convergence of theoretical discussions and practical initiatives.

Conducted in both German and English, the conference provided a forum for international researchers and practitioners interested in the urban-rural interface. The inclusion of a live-streaming option extended the reach of the conference to a broader audience. The diverse lineup of speakers, representing various regions and disciplines, added depth and breadth to the discussions. The program, spread over three days, featured keynote speakers, panel sessions, and a visit to IBA project sites.

The conference commenced on Thursday, May 4th, 2023, with an introductory session moderated by Dr. Cordelia Polinna from Forward Planning and Research. Welcoming remarks from Klara Geywitz, the Federal Minister of BMWSB, Bodo Ramelow, the Minister-President of the State of Thuringia, and Marta Doehler-Behzadi, the Director of IBA Thuringia, set the tone for the event. Keynotes were delivered by Philipp Misselwitz from Bauhaus Earth, Berlin, and Remy Sietchieping from UN-Habitat, Nairobi, and were followed by the opening of the IBA exhibition.

The second day, May 5th, continued with thematic sessions moderated by Dr. Cordelia Polinna, covering StadtLand, strategies for sustainable development, and practical actions. Speakers like Hillary Angelo, Milica Topalovic, Steffen Nijhuis, Marta Doehler-Behzadi, Kelly Shannon, Guiqing Yang, Anke Hagemann and others engaged in discussions, offering valuable insights and diverse perspectives on urban-rural relations. The final day concluded with an excursion to IBA project sites, allowing participants to witness firsthand the practical implementation of sustainable urban-rural development strategies. This hands-on experience added a tangible dimension to the conference's theoretical discussions, fostering a deeper understanding of the challenges and opportunities in the field.

In summary, the "StadtLand – From Thuringia to a Planetary Perspective" conference served as a platform for interdisciplinary dialogue, knowledge exchange, and the exploration of innovative solutions for urban-rural challenges. By bringing together diverse perspectives and practical examples, the conference contributed to shaping a more holistic and sustainable approach to urban-rural development on both a local and global scale.

Li Fan

SURE F&SR

SURE at the World Urban Forum 12, in Cairo

The SURE funding priority was featured at the German Pavilion during the 12th World Urban Forum, held from 4–8 November 2024 in Cairo, Egypt. Visitors were welcomed with a dynamic showcase of SURE Funding Priority through a digital platform and interactive formats.

A notable part of the permanent exhibition was the SURE atlas—an interactive digital platform developed by the Facilitation and Synthesis Research (F&SR) team. The atlas provides in-depth insights into ten pioneering research projects and includes tools such as:

- Cross-Project Analysis for visualising key performance indicators of the funding priority,
- The Reflection Toolbox for capturing research projects' and researchers learning journeys,
- The Stakeholder Network Tool for mapping institutional and individual connections across the SURE community.

Presentation of the SURE F&SR Team during the WUF 12 in Cairo (photo credit: SURE F&SR).

Displayed on a touchscreen within the pavilion, the atlas attracted a diverse audience and helped to make complex research engaging and accessible.

To deepen the experience, the F&SR team hosted two interactive sessions offering immersive insights into the program's objectives and outcomes.

The first session, "Transformative Urban Research for Sustainable Urban Regions," introduced the SURE funding priority and engaged participants in an open dialogue on research-driven approaches to urban sustainability. Moderated by Dr. Katharina Borgmann (HafenCity University Hamburg), Prof. Frank Schwartze (TH Lübeck), and Dr. Heike Bauer (DLR), the discussion explored how urban research bridges global sustainability targets with local realities. Key topics included expectations, challenges, and success stories in transformative research, with an emphasis on knowledge transfer.

The second session, "Transdisciplinary, Collaborative Alliances for Sustainable Urban Regions," featured three SURE projects—URA, Build4People, and PolyUrbanWaters. These initiatives tackle topics such as urban–rural integration, water resource management, and sustainable behaviour and housing in rapidly growing cities.

Panellists Prof. Dr. Anke Hagemann (TU Berlin), Dr. Bernd Gutterer (Borda e.V.), and Dr. Michael Waibel (University of Hamburg) shared cross-cultural experiences and emphasised the value of inclusive partnerships and mutual learning. Participants were encouraged to reflect, ask questions, and find inspiration for future collaboration.

From digital tools to in-depth discussions, the SURE showcase at the pavilion offered a compelling snapshot of how transdisciplinary research can foster urban resilience and sustainability in Southeast Asia and China.

Ágota Barabás

Build4People

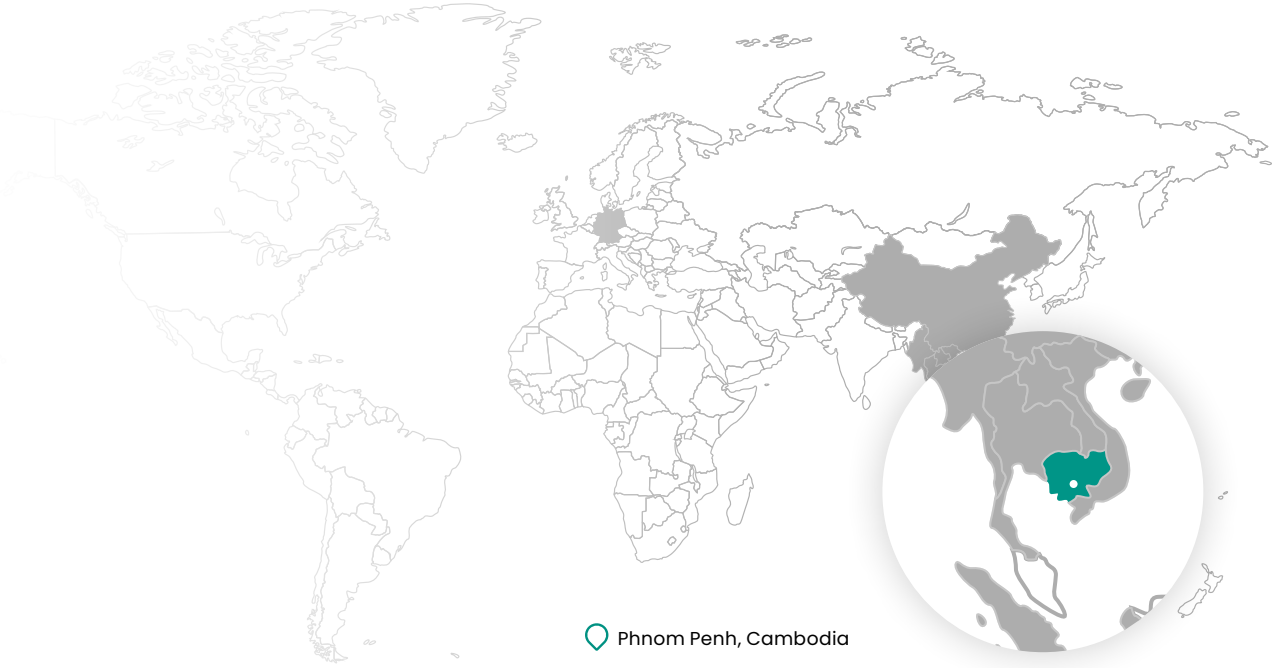
Enhancing Urban Resilience through Thermal UAV Technology: A Case Study of Green Space Monitoring in Phnom Penh, Cambodia

Gulam Mohiuddin, Jan-Peter Mund, Chea Chetha, Eun Sambath, Sanara Hor & Michael Waibel

This activity report describes the use of thermal Unmanned Aerial Vehicle (UAV) for monitoring urban land cover (i.e., green spaces), focusing on the potential to monitor urban ecosystems of the rapidly urbanising Phnom Penh. By employing a transdisciplinary approach, the Build4People project trained local partners on using thermal UAVs to collect high-resolution RGB and thermal images. Results revealed distinct thermal footprints of different land covers, highlighting the cooling effects of water bodies and vegetation in an urban area. This activity demonstrates how thermal UAV technology can advance urban environmental monitoring. The empirical results from the activity are useful in fostering sustainable urban transformation because local decision-makers received clear visual hints about thermal footprint of different infrastructures inspiring measures to combat urban heat island (UHI) effects, among others. Generally, applying such innovative technologies in the field of sustainable urban transformation is regarded as essential to enhancing environmental sustainability and urban liveability.

Deutsch

Dieser Tätigkeitsbericht beschreibt den Einsatz von thermischen unbemannten Luftfahrzeugen (UAV) zur Überwachung der städtischen Bodenbedeckung (d. h. Grünflächen) mit Schwerpunkt auf dem Potenzial zur Überwachung städtischer Ökosysteme in der sich rasch urbanisierenden Stadt Phnom Penh. Mit einem transdisziplinären Ansatz schulte das Projekt Build4People lokale Partner in der Verwendung thermischer UAV zur Erfassung hochauflösender RGB- und Wärmebilder. Die Ergebnisse zeigten deutliche thermische Fußabdrücke verschiedener Landbedeckungen und verdeutlichten die kühlenden Effekte von Gewässern und Vegetation in einem städtischen Gebiet. Diese Übung zeigt, wie thermische UAV-Technologie die städtische Umweltüberwachung verbessern kann. Die empirischen Ergebnisse der Übung sind nützlich für die Förderung einer nachhaltigen städtischen Transformation, da lokale Entscheidungsträger klare visuelle Hinweise auf die thermischen Fußabdrücke verschiedener Infrastrukturen erhielten, die unter anderem zu Maßnahmen zur Bekämpfung des städtischen Wärmeinseleffekts (UHI) inspirierten. Generell wird der Einsatz solcher innovativen Technologien im Bereich der nachhaltigen Stadtumgestaltung als wesentlich für die Verbesserung der ökologischen Nachhaltigkeit und der Lebensqualität in Städten angesehen.



Cover photo:
Phnom Penh, Cambodia (photo credit: Katharina M. Borgmann).

Street Landscape in Phnom Penh, Cambodia
(photo credit: Katharina M. Borgmann).

ខ្មែរ
របាយការណ៍សកម្មភាពនេះបានពិពណ៌នាអំពីការប្រើប្រាស់ ឧបករណ៍ដ្រូនដែរមានបំពាក់កាមេរ៉ារង្វាស់កម្តៅ (Thermal UAV) សម្រាប់ការតាមដានលំហបៃតងនៅក្នុងទីក្រុង និងផ្តោតលើសក្តានុពលដើម្បីពង្រឹងប្រព័ន្ធអេកូឡូស៊ីទីក្រុងភ្នំពេញ ដែលកំពុងរីកចម្រើនយ៉ាងឆាប់រហ័ស។ តាមរយៈការប្រើប្រាស់វិធីសាស្ត្រទំនើប គម្រោងBuild4People បានបណ្តុះបណ្តាលដៃគូក្នុងស្រុកឱ្យចេះប្រើបច្ចេកវិទ្យាកម្រិតខ្ពស់ទាំងនេះ។

យើងក៏បានប្រើប្រាស់ឧបករណ៍ដ្រូនដើម្បីប្រមូលរូបភាព(RGB) និងរូបភាពកម្តៅដែលមានគុណភាពកំរិតខ្ពស់ ។ លទ្ធផលបានបង្ហាញអំពីលក្ខខណ្ឌកម្តៅខុសៗគ្នាទៅតាមប្រភេទគម្របដីនីមួយៗ ផ្ទៃទឹកនិងរុក្ខជាតិមានឥទ្ធិពលក្នុងការកាត់បន្ថយកម្តៅក្នុងទីក្រុង។ ការសិក្សានេះក៏បានបង្ហាញអំពីរបៀបដែល ឧបករណ៍ដ្រូនមានបំពាក់កាមេរ៉ារង្វាស់កម្តៅ(Thermal UAV)អាចតាមដាន និងប្រមូលទិន្នន័យពាក់ព័ន្ធជាមួយនឹងបរិស្ថាន

ទីក្រុងបានទូលំទូលាយ និងប្រកបដោយប្រសិទ្ធភាព។ ព័ត៌មានដែលទទួលបានដោយការសិក្សាបានប្រែក្លាយជាឧបករណ៍ដ៏សំខាន់ក្នុងការប្រើប្រាស់សម្រាប់ការជម្រុញកែលម្អទីក្រុងប្រកបដោយចីរភាព ព្រោះអ្នកអនុវត្តអាចទទួលបានការបង្ហាញយ៉ាងច្បាស់អំពីទីតាំងដែលគួរសម្រេចចិត្តក្នុងការបន្ថែមផ្ទៃបៃតងដើម្បីទប់ទល់នឹងឥទ្ធិពលកោះកម្ដៅ(Urban Heat Island)។ ជាទូទៅ ការអនុវត្តបច្ចេកវិទ្យាដែលប្រកបដោយភាពច្នៃប្រឌិតក្នុងការកែប្រែទីក្រុងប្រកបដោយចីរភាពត្រូវបានចាត់ទុកថាជាកត្តាចាំបាច់ក្នុងការលើកកម្ពស់ដល់និរន្តរភាពបរិស្ថាន និងគុណភាពនៃការរស់នៅរបស់ប្រជាជនក្នុងទីក្រុង។
(Automated translation)

Introduction

Urban green spaces (such as parks, community gardens, and tree-lined boulevards) are not merely aesthetic enhancements in our cities but are vital to urban ecosystems. They provide many benefits: mitigating urban heat island effects, improving air quality, supporting biodiversity, and offering recreational opportunities for city dwellers (Bowler et al., 2010). These areas serve as natural oases in concrete jungles, contributing significantly to the physical and mental well-being of the population (Hartig et al., 2014). However, effectively monitoring and managing these spaces is a complex task, often heavily resource-consuming to address the challenging dynamics of urban environments. Traditional monitoring methods can be labour-intensive and time-consuming (Haaland et al., 2015).

In this context, thermal UAVs equipped with advanced sensors and thermal imaging capabilities provide a unique vantage point to study urban green spaces. By capturing high-resolution thermal images from above, they offer detailed insights into the thermal properties of an urban area (Berni et al., 2009). This technology enables researchers and urban planners to monitor land surface of skin temperature variations of urban structures, assess vegetation health, and understand different surfaces' heat absorption and radiation patterns (Zarco-Tejada et al., 2012). The data gathered is invaluable for planning and monitoring urban green spaces, contributing to strategies that combat the UHI effect, thus safeguarding the sustainability and resilience of our cities. Mapping the thermal footprints of urban structures can thus serve as a powerful approach for studying the spatial physical pattern of the urban heat island in tropical cities.

As we seek solutions for sustainable urban development, integrating advanced technologies like thermal UAVs in environmental monitoring of urban structures represents a significant leap forward in using sophisticated technologies. In this report, we delve into the one of the activities of the Build4People project, an exemplary initiative that leveraged thermal UAV technology to monitor urban green spaces.

Build4People Project Overview

The overall aim of the inter- and trans-disciplinary Build4People project is to support and analyse the transformative shift in Phnom Penh's current business-as-usual urban development pathway towards a pathway with higher sustainability and liveability levels. The entry points for the research are initially the building and in further course of the project increasingly the more comprehensive neighbourhood planning sectors. Methods, tools and key instruments to achieve the Build4People's objectives are collaborative planning workshops, strategic niche management approaches, transition management approaches such as living labs and subsequent experimental implementation. Thereby, the constant transfer of knowledge between stakeholders from science, politics, civil society and the corporate sector is being regarded as essential for sustainable urban transformation. All of these measures are expected to generate applied knowledge, the development of sustainable practices and consequently to serve as a basis for evidence-based decision-making for local stakeholders in line with the UN Sustainable Development Goals (SDGs).

Approach

Thermal infrared (TIR) remote sensing using unmanned aerial vehicles (UAVs) is an important means of obtaining the temperature of the land surface (LST) with high spatial resolution. In this effort, the Build4People project adopted a collaborative and hands-on approach. Key to this initiative was the training of local research partners, young academic staff of the Royal University of Agriculture (RUA) in Phnom Penh in using the thermal UAVs for data collection. Marking a significant milestone in capacity building, the UAV was formally handed over to RUA in a ceremony, symbolising the project's commitment to sustainable research practices and continuing this vital work in the future (Build4People, 2022).

Necessary thermal image data processing was a joint effort between RUA and Eberswalde University for Sustainable Development (HNEE), ensuring a comprehensive analysis incorporating local

Fig.1: Location of the study area.

knowledge and technical experience combined with international perspectives. The University of Hamburg, as the project consortium leader, played a pivotal role in facilitating the overall task and in disseminating the results at project events.

Data and Methods

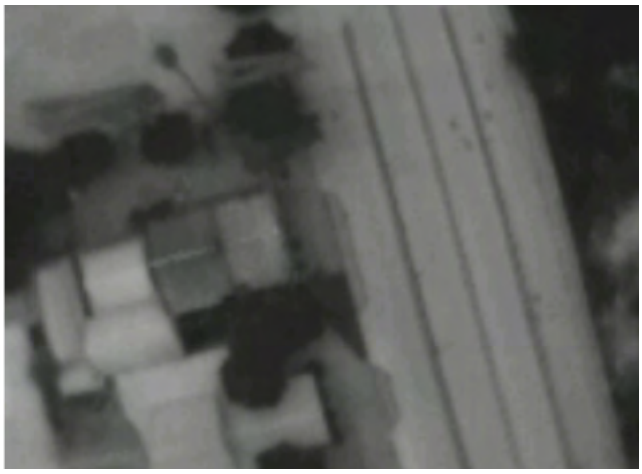
The image data presenting urban structures' LST was collected from an urban green space in the eastern part of Phnom Penh city, close to the Riverfront area at the Mekong River (Figure 1). We used a DJI Mavic Air 2 Enterprise Dual sensor UAV to collect the thermal image data on selected flight parameters (Figure 2). 180 UAV images (90 RGB and 90 thermal images) were collected to build RGB (visible wavelengths in red, green, blue) and thermal orthomosaics (a collection of UAV images joined in a single geometrically corrected large image).

An example of the raw (unprocessed) RGB and thermal image is given in Figure 3. Each RGB and thermal image were spatially aligned to build the dense (point) cloud (a collection of points generated from the images representing the flight area), a digital elevation model (DEM), a surface model (DSM), and RGB and thermal orthomosaics. After obtaining the orthomosaics, distinct features (i.e., trees, roads, bare soil) were identified visually from the RGB orthomosaics. Then, thermal

Flight parameters	
Flying altitude:	33.5 m
Overlaps (front and side):	85%
Maximum speed:	10 km / hour
Camera angle:	Nadir
Flight pattern:	Normal
Pixel size (RGB):	1.6 x 1.6 µm
Pixel size (thermal):	3 x 3 µm

Fig.2: Project UAV and flight parameters.

RGB image (raw/unprocessed)



Thermal image (raw/unprocessed)

Fig.3: Example of RGB and thermal images.

orthomosaics were used to extract the surface temperature of selected features.

Results and Discussion

Different features are identified visually in the study area to identify the thermal footprint within four primary land use land cover (LULC) categories; the categories and sub-categories are given in Table 1.

The calculated overall range of LST was about 28 to 60°C, with water being the lowest LST and an ongoing car engine on the road being the highest LST (Figure 4). Tree crowns and other vegetation surface temperatures range from 30 to 33 °C, built-up and sealed surface areas range from 40 to 45°C, and the surface temperature of bare soil is 40°C.

Water bodies and trees show lower LST than other features in the study area. Larger tree canopies appear to have lower surface temperatures than smaller tree canopies. However, even the smaller canopy also has a visual lower LST buffer around them; similar findings were observed in a previous study by Akbari et al., (2001). In the grass cover case, the grass patch's size influences LST and the lower LST buffer around them. A combination of grass and trees appears to have larger, lower LST buffer areas. In the built-up area category, the concrete pavement appears warm regarding emitted heat

Table 1: Identified major LULC categories and sub-categories.

LULC category	Sub-category
Trees and vegetation	Large canopy
	Smaller canopy
	Grass
Built-up areas	Road
	Pavement
	Red roof building
	White roof building
	Concrete road divider (without vegetation)
	Concrete road divider (with vegetation)
Bare soil	Bare soil
Water	Water

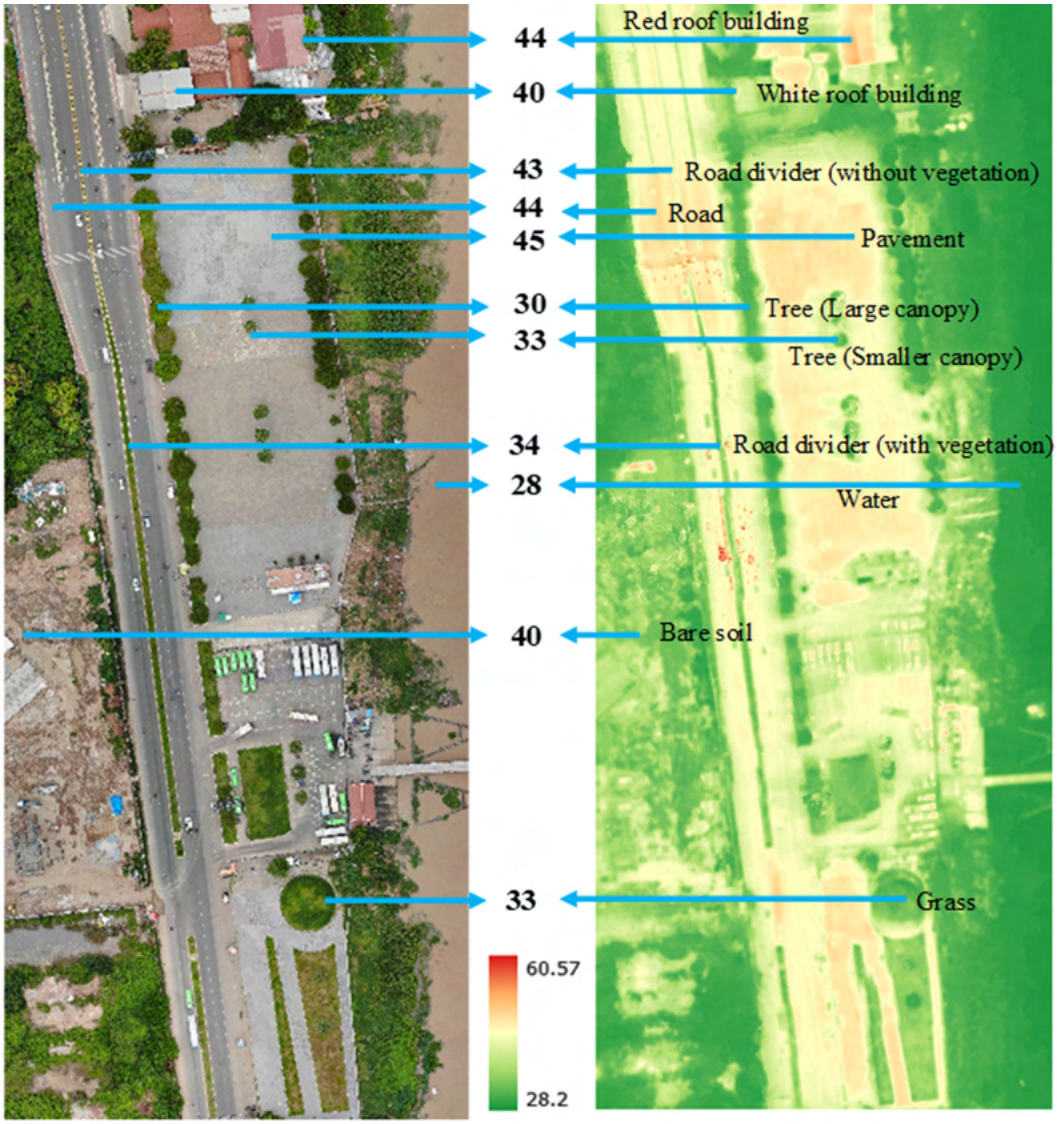


Fig.4: Surface temperature of LULC subcategories.

fluxes and LST in the image. In the case of the road, both the road and the concrete road divider appear to be comparatively warmer areas. However, the concrete road divider with vegetation cover on its top seems to have noticeably lower LST (up to 9°C). This finding echoes the observation of a previous study (Tan & Sia, 2005). Also, white-roof buildings seem to emit lower surface temperatures than red-roof buildings. While it requires further investigation of building materials, construction types, volumes and uses to make concluding remarks, it appears that the colour of the roof influences the LST, which is also argued by Santamouris (2014). Bare soil mainly shows LST similar to that of the built-up areas.

The results demonstrate how different materials and surfaces have distinct thermal signatures. This insight is helpful for urban planning, particularly in designing and enhancing green spaces or vegetation islands or a technical combination or integration of vegetation into the physical built-up

Constant transfer of knowledge between international stakeholders from science, urban citizens and the corporate sector is being regarded as essential for sustainable urban transformation."

structure of urban areas. By understanding the thermal behaviour of different surfaces, urban planners can strategically position green spaces to mitigate urban heat island effects, thereby creating more environmentally sustainable and comfortable urban areas. Using thermal UAV sensor technology marks an advancement in urban environmental monitoring. Thermal UAVs offer greater efficiency, comprehensive coverage, and in-depth data collection than traditional methods and allow for a more detailed analysis of urban green spaces, facilitating informed urban planning and environmental management decisions. The findings from the study can inform policy decisions related to urban development and sustainability. This might include strategies for urban cooling, air quality improvement, and biodiversity enhancement (Gómez-Baggethun & Barton, 2013).

The approach to this activity from the Build4People Project includes collaboration between scientists and capacity building for young academic staff of the research partners. This is required to create a sustainable impact in the project area and enables the learning to be transferred and spread to a larger audience through the research partners.

The data was collected during the wet season, and the LST is influenced by seasonal variability, air temperature and other environmental variables. So, the absolute temperature values are not to be taken generally for the area. In addition, the results and interpretation relied on visual observation; hence, the precise information about the size of grass patches, tree canopies and material of the built-up areas, including roads and building roofs, is not considered. The study presented here includes one green space, an example from Phnom Penh city.

Hence, the findings cannot be generalized for all green spaces. The next step is to carry out similar investigations in different green spaces and transfer results to identify potential common patterns emerging or not, including different scenarios in different urban spaces and physical built-up structures. Moreover, a future experiment can include the cooling effect of different surfaces considering the material, size of the specific surface, and proximity to the nearest vegetation and water.

Conclusions

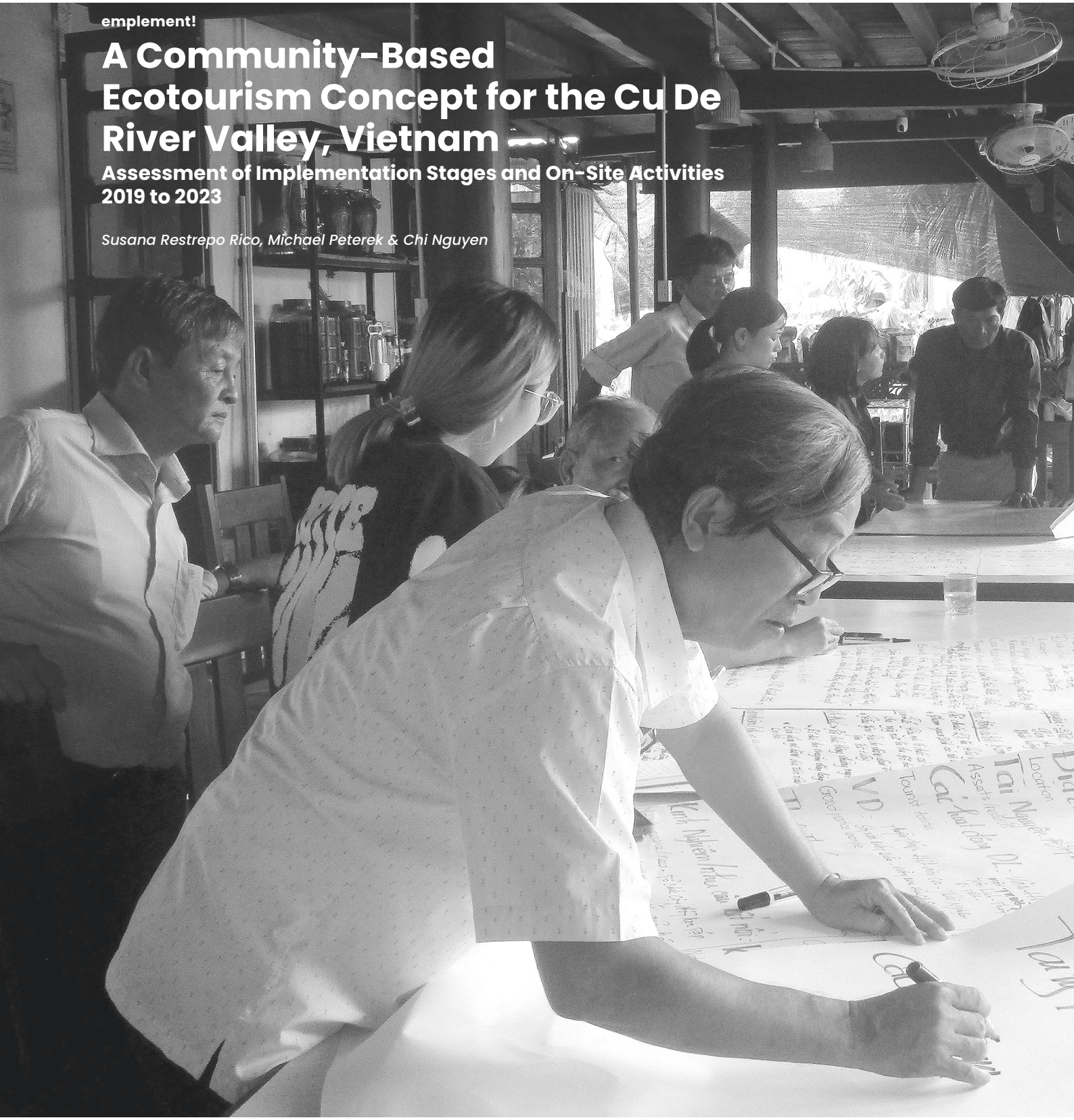
The method and findings potentially apply to various urban areas in other projects with similar, broader goals. Future projects should consider different climatic and urban contexts to adapt and scale these methods globally. Furthermore, the subjective experience of the quality of urban green spaces should be explored by citizen science approaches to grasp the essential perspective of the urban residents. In this way participatory bottom-up approaches go hand in hand with the integration of technologies. Integrating such technologies in urban planning can be helpful for the sustainable transformation of urban areas, thus contributing to sustainable development goals (SDGs) in urban planning. Such initiatives contribute significantly to creating more resilient and liveable cities, underscoring the importance of innovative technology in urban environmental management.

emplement!

A Community-Based Ecotourism Concept for the Cu De River Valley, Vietnam —

Assessment of Implementation Stages and On-Site Activities 2019 to 2023

Susana Restrepo Rico, Michael Peterek & Chi Nguyen



Sustainable regional tourism workshop in Hoa Bac in 2022
(photo credit: Frankfurt UAS, Global Urbanization Research Team).

Community-Based Ecotourism (CBET) is a sustainable tourism approach aiming to harness the benefits of tourism while preserving the environment and empowering local communities. It is a multifaceted endeavour that involves communities, administrations, non-governmental organisations, and other stakeholders in a collaborative effort. Key steps in the implementation process include community mobilisation and empowerment, resource assessment, management planning, infrastructure development, capacity building, and marketing strategies tailored to the specific area. Within the emplement! research project, a pilot approach aims at supporting CBET in the Cu De River Valley in Vietnam. Based on a strategic set of implementation stages, a range of participatory on-site activities has been realised since 2019. This includes surveys, community workshops, summer schools, and a diversity of capacity development measures indicated by the research and requested by the locals. This paved the way for the development of well-founded concepts adapted to local needs and conditions, which led to a significant activation of CBET potential in the valley.

Da Nang City, Vietnam

Deutsch
Gemeinschaftsbasierter Ökotourismus (CBET) ist ein nachhaltiger Tourismusansatz, der die Vorteile des Tourismus nutzt und gleichzeitig die Umwelt schützt und lokale Gemeinschaften stärkt. Es handelt sich um ein vielschichtiges Unterfangen, an dem Gemeinschaften, Verwaltungen, Nichtregierungsorganisationen und andere Interessengruppen gemeinsam beteiligt sind. Zu den wichtigsten Schritten im Umsetzungsprozess gehören die Mobilisierung und Stärkung der Gemeinden, die Bewertung der Ressourcen, die Managementplanung, die Entwicklung der Infrastruktur, der Aufbau von Kapazitäten und auf das jeweilige Gebiet zugeschnittene Marketingstrategien. Im Rahmen des Forschungsprojekts emplement! soll ein Pilotansatz den CBET im Cu De River Valley in Vietnam unterstützen. Auf der Grundlage einer Reihe strategischer Umsetzungsphasen wurde seit 2019 eine Reihe partizipativer Aktivitäten vor Ort durchgeführt. Dazu gehören Umfragen, Workshops für die Bevölkerung, Sommerschulen und eine Vielzahl von Maßnahmen zum Kapazitätsaufbau, die aus der Forschung hervorgegangen sind und von den Einheimischen gewünscht wurden. Dies ebnete den Weg für die Entwicklung fundierter Konzepte, die an die lokalen Bedürfnisse und Gegebenheiten angepasst sind und zu einer deutlichen Aktivierung des CBET-Potenzials im Tal geführt haben.

Tiếng Việt
Du lịch sinh thái dựa vào cộng đồng (CBET) là một hướng tiếp cận du lịch bền vững nhằm khai thác lợi ích do hoạt động du lịch mang lại song song với bảo vệ môi trường và trao quyền cho cộng đồng địa phương. Đây là một khái niệm đa chiều, đòi hỏi nỗ lực hợp tác giữa cộng đồng, cơ quan quản lý hành chính, tổ chức phi chính phủ và các bên liên quan khác. Quá trình triển khai bao gồm nhiều bước quan trọng như sự tham gia và trao quyền cho cộng đồng, đánh giá nguồn lực, lập kế hoạch quản lý, phát triển cơ sở hạ tầng và chiến lược quảng bá phù hợp. Trong khuôn khổ dự án nghiên cứu emplement!, một phương pháp tiếp cận thử nghiệm đã được triển khai từ năm 2019 với nhiều hoạt động, bao gồm các cuộc khảo sát, các buổi workshop cộng đồng, khóa học mùa hè cùng các giải pháp nâng cao năng lực do nhóm nghiên cứu đề xuất và theo nhu cầu thực tế của cộng đồng, hướng đến mục tiêu phát triển mô hình CBET tại Thung lũng sông Cu Đê, Việt Nam. Những hoạt động này đã mở đường cho sự phát triển khung khái niệm thích ứng với nhu cầu và năng lực của địa phương, kích hoạt tiềm năng phát triển CBET trong khu vực.
(Automated translation)

Introduction

The emplement! project, as part of the funding priority “Sustainable Urban Regions (SURE)” of the German Federal Ministry for Research, Technology and Space (BMFTR), focuses on proposing integrated development strategies in the Da Nang and Quang Nam regions in Vietnam to promote a more resilient and sustainable development. The Da Nang City administration has set up a series of tourism development strategies for the region, including the Hoa Vang District and the Hoa Bac Commune where the Cu De River Valley is located. These strategies are compiled in the “Plan for Developing Tourism in Da Nang in the period of 2021 to 2025”, published in 2020, which uses tourism development as an instrument for economic development. Among the objectives of the plan are promoting sustainable development including increasing incomes, multi-stakeholder participation, environmental protection and culture preservation.

The Task 2.1 of the emplement! project, defined as “A Sustainable Tourism Concept for the Cu De River Valley Featuring Sanitation, Biodiversity and Promoting Forest Management”, aims at supporting community development in the area, in a process where the inhabitants take responsibility for their future while ensuring sustainable development. In the following report, the main strategic implementation stages and the on-site activities in the period from 2019 to 2023 are presented and assessed.

Community Based Tourism as a Form of Sustainable Tourism

Sustainable tourism is an economic activity that protects the existing resources upon which it depends, namely, the social, human, cultural, organisational, built, and natural environment, as well as promotes collaboration between the stakeholders involved in the sustainable tourism development process (Mcareavey and Mcdonagh 2011; Swarbrooke 1999; Flora, Flora, and Gasteyer 2016).

> **"A Sustainable Tourism Concept for the Cu De River Valley Featuring Sanitation, Biodiversity and Promoting Forest Management"**

Community-based tourism (CBT) emerges as an approach to implement sustainable tourism development, particularly in rural areas. In this model, local communities actively participate in the planning and execution of tourism initiatives, ensuring that the projects align with their cultural values, environmental conservation efforts, and economic aspirations (Smith, 2001). By fostering a sense of ownership and involvement among residents, CBT helps to mitigate negative impacts associated with conventional tourism, such as environmental degradation and cultural commodification (Murphy, 1985). The engagement of local communities in decision-making processes not only protects the authenticity of the destination but also promotes responsible tourism practices that contribute to the preservation of natural resources and the protection of cultural heritage.

Moreover, community-based tourism in rural areas facilitates sustainable development by addressing the specific needs and challenges of these regions. Rural communities often face economic disparities and limited infrastructure, making it crucial to tailor tourism initiatives to their specific context (Buckley, 2012). CBT allows the creation of small-scale, locally-driven projects that capitalise on the region's natural and cultural assets. This approach not only diversifies the economic base of rural communities but also enhances their resilience to external pressures, creating a foundation for long-term sustainable development (WTO, 2004). As residents actively participate in tourism activities, they experience an improved socio-economic condition through a more equitable distribution of benefits and a strengthened sense of community. In essence, community-based tourism in rural areas emerges as a holistic and effective strategy for sustainable tourism development, ensuring the well-being of both the community and the environment.

Community-Based Ecotourism

Community-based ecotourism (CBET) is one step further into a sustainable and socially responsible way to harness the benefits of tourism while preserving natural ecosystems and empowering local communities (Regmi & Walter, 2016; Scheyvens, 1999; Stronza & Gordillo, 2008). The implementation process of CBET is a complex and multifaceted endeavour that involves local communities, government agencies, non-governmental organisations, and diverse stakeholders in a collaborative effort. Key steps in the implementation process typically include community mobilisation and empowerment, resource assessment and management planning, infrastructure development, capacity building, and marketing strategies tailored to the unique characteristics of the area.

Strategic Implementation Stages of Community-Based Ecotourism in the Cu De River Valley

The implementation of a CBET approach requires a strategic and participatory process that considers the specific context and needs of the community. For a sustainable tourism concept in the Cu De River Valley, the emplement! project defined the following steps and stages:

Community Engagement and Empowerment

Engage local communities in the decision-making process from the beginning. Encourage active participation and provide opportunities for them to have a voice in planning and decision-making (Scheyvens, 1999).

Since 2019, the project activities have been focused on mobilising the community and promoting sustainable tourism initiatives to foster community development in the valley through the diversification of incomes. Several community-based initiatives have been established since then by the community where culture, tourism, agriculture and environmental protection constitute the basis of the projects. The residents organised themselves and formally set up the "Hoa Bac Ecological Agriculture and Community Tourism Cooperative" in 2023. The cooperative's members understand that joint action and collaboration will result in economic development for all, therefore they have organised themselves into eight working groups, each with a specific focus and responsibilities. The groups are: Homestay, Transportation, Tours, Traditional Dance and Music, Traditional Gastronomy, Agriculture, Forestry, and Handicrafts.

Resource Assessment

Conduct thorough assessments of the natural and cultural resources within the community, identifying their unique selling points and potential for sustainable tourism development (Hall, 2007).

Communities own diverse forms of cultural, natural, financial, built, and social capital or resources that serve as both the foundation for all community stakeholders' needs and the reservoir of contributions made by these stakeholders (Callaghan & Colton, 2008). The availability of resources for CBET comes in different forms; these resources or assets are community capitals when they are invested to create new resources (Flora et al., 2016).

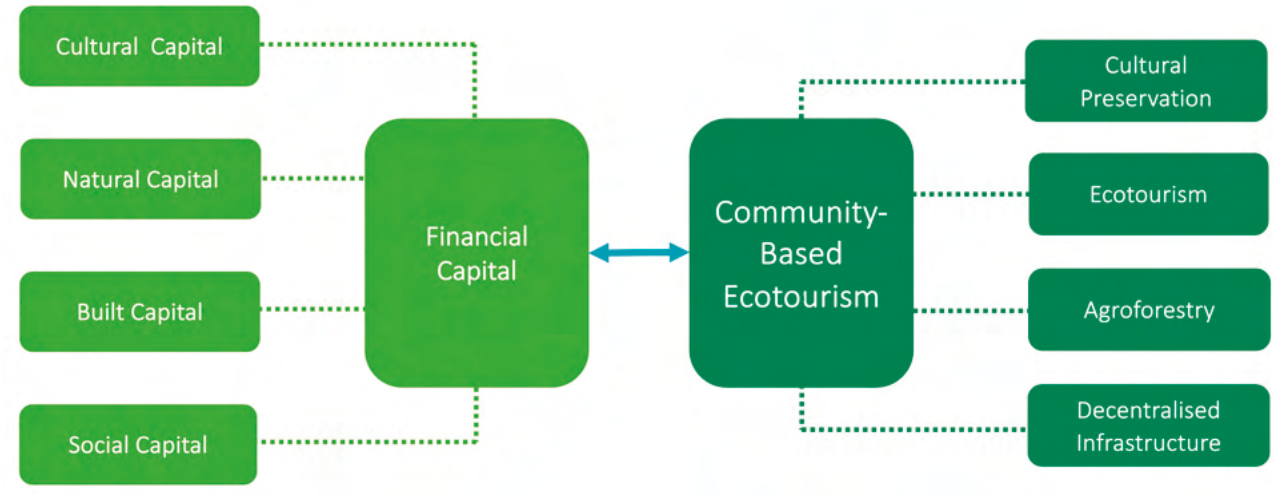


Fig.1: Assessment of existing community capitals as a foundation for Community- Based Ecotourism (CBET) strategies (Adapted from © Frankfurt UAS, Global Urbanization Research Team).

In order to assess these capitals, the activities of emplement! in Hoa Bac have included two Summer Schools with the participation of international and local experts as well as students from diverse backgrounds and disciplines. These Summer Schools have helped the project understand the evolution so far of touristic activities among the community as well as identify the potential for emerging and future community-based initiatives (Peterek, Restrepo Rico et al., 2020 and 2023). Together with the community, the assessed capitals

were then translated into different strategies for cultural preservation, ecotourism, agroforestry, and decentralised infrastructure to guide the proposal of the CBET approach for the valley.

Stakeholder Collaboration

Collaborate with various stakeholders, including local governments, NGOs, and tour operators, to share knowledge, resources, and responsibilities (Beeton, 2006).

The research and work in Hoa Bac mobilised not only the community but also the local authorities, universities and other relevant stakeholders, resulting in a better understanding of the community's needs by the government and external support for the development of tourism offer in the region. Workshops and meetings with the participation of diverse stakeholders have initiated a process of communication between the community and the government facilitating the support of the CBET process and empowering the community as they identify their strengths and work on their weaknesses as a collective.

Capacity Development

Invest in capacity-building programs to enhance the skills and knowledge of community members, enabling them to manage effectively and benefit from ecotourism ventures (Sofield & Li, 1998).

The activities of emplement! led to the identification of the knowledge gaps among the residents and the needed capacities for the community to implement their CBET vision. In joint work with the community members, the workshops and activities have also highlighted the capacity development priorities. These priorities are directly related to the capitals of the CBET objectives in the valley, as well as the strategies proposed by the emplement! project.

The capacity development process for the Hoa Bac community involves: learning about specific topics such as organic agriculture, agroforestry, tourism services, and business management; likewise, skill development for the implementation of sanitary infrastructure in homestays through small-scale decentralised infrastructure; marketing and promotion skills to develop effective and target-oriented marketing and promotional strategies that highlight the community's unique offerings and emphasize the principles of ecotourism (Wearing & Neil, 2009); and finally, collective agreements on sharing profits to ensure that the economic benefits generated by CBET are distributed equitably among community members, fostering a sense of ownership and motivation (Ashley et al., 2000).

Infrastructure Development

Invest in necessary infrastructure, such as trails, visitor centres, and waste management systems, to ensure the safety and satisfaction of tourists while minimizing environmental impact (Weaver, 2008).

Sanitation infrastructure has been a focus of the project since its conception. The analysis of the area highlighted the need for waste collection and processing systems, along with the need for transport and community facilities. The development of infrastructure regarding sanitation in private properties could be approached through decentralised infrastructure; a pilot project for decentralised sanitation is being implemented in

Fig.2: General research structure for the pilot project in the Cu De River Valley 2019 to 2025 (Adapted from © Frankfurt UAS, Global Urbanization Research Team).

the Ta Lang village. The larger projects require larger investment; thus the intervention of the local government is essential for the development of infrastructure in Hoa Bac.

Legal and Policy Support

Advocate for supportive policies and legal frameworks at the local and national levels to protect the rights and interests of rural communities engaged in ecotourism (Mbaiwa, 2003).

The CBET concept aims at facilitating the inclusion and acceptance of the existing and future community's initiatives into the legal framework of the local administration. Although the initiatives in the commune show greater support and acceptance by the residents, there is still a disconnection between the legal policy framework and the land uses accepted in the area. Thus, the inclusion of the CBET concept in the policy framework will promote the emergence of additional initiatives and encourage local residents to invest in the improvement of the existing offerings. This inclusion will ensure the legitimacy of the projects and safeguards the financial investments of the owners.

Monitoring and Evaluation

Implement robust monitoring and evaluation mechanisms to assess the social, environmental, and economic impacts of ecotourism activities and make necessary adjustments (Duffus & Dearden, 1990).

The coming years will become a good opportunity for researchers and local administrations to evaluate and adjust the impacts of ecotourism development in the Hoa Bac Commune. At the moment, the residents are still learning about tourism and self-organisation, and require support in the realm of capacity building and development of existing skills to provide an attractive offer of ecotourism products to local, national and international visitors.

On-Site Activities of emplement! for Community-Based Ecotourism in the Cu De River Valley

Although basically following the sequence of steps indicated above, implementation is never a simplistic linear process, but it involves overlaps and regular feedback loops between the different stages. In the following report, a brief summary of the most relevant on-site research and implementation activities in the period 2019 to 2023 is given.

In this context, one of the most relevant emplement! partners for the CBET project has been the Danang Architecture University (DAU) and its Community Engaged Learning Center (CELC-DAU). This partnership has facilitated the progress of the project by supporting the on-site research activities, i.e. surveys, community meetings, community workshops and communication with the community. Moreover, CELC-DAU has also taken the responsibility of implementing several of the proposed capacity development activities for the Cu De River Valley. These activities have brought specific knowledge requested by the community and have legitimised the research activities among the community.

2019 – Community Engagement

First emplement! Summer School: In September 2019, the first international Summer School established a platform for a preliminary analysis of the status quo of the area, engaging with stakeholders of the community and identifying the community capitals and potentials. The participants were students, teachers and experts from Vietnam and Germany, with the Hoa Bac community as hosts.

2020 – Resource Assessment

Documentation of the Summer School: The results provided the first status quo assessment, ideas for sustainable tourism strategies and small-scale projects in Hoa Bac as well as insight into the requirements of visitors for ecotourism in the area.

Workshops on Community-based Tourism Development in Ta Lang and Gian Bi villages: Still under COVID restrictions in late 2020 and early 2021, DAU students proposed ideas related to local tourism products, available properties improvement and homestays development.

collected information about already existing community-based tourism activities, tourism infrastructure, as well as local capacities related to tourism development and tourism potentials.

Local Culture Course: This research by the DAU School of Tourism & Hospitality investigated the

Fig.3: Results of the first emplement! Summer School in 2019 and the second Summer School in 2022 (© Frankfurt UAS, Global Urbanization Research Team).

2021 – Resource Assessment and Community Engagement

Community Survey: A data collection survey was done on-site in a focus groups elicitation process answered by community leaders and residents through a semi-structured questionnaire. This allowed a better understanding of the Hoa Bac Commune, the socio-economic conditions, income generation activities and infrastructure needs. It also

cultural traditions and values of the Co Tu ethnic minority community.

Workshop on Design and Brand Identity: The co-design activities of DAU students with locals in Hoa Bac helped at increasing awareness for community tourism by providing two homestays with ideas to integrate local culture features into landscape design, interior design, and brand identity.

Workshops on Livelihood Improvement by Environmental Protection and Nature Conservation: The relevance of environmental, forest and water protection for livelihood improvement in the context of community-based tourism was the topic of several workshops throughout the year together with local community representatives.

2022 – Community Engagement and Empowerment, Community Capitals Assessment and Stakeholder Collaboration

Workshop with the Hoa Bac Community: During this activity with diverse stakeholders in spring 2022, the first draft of the Community-Based Ecotourism Concept for the Cu De River Valley, resulting from the assessment of the status quo, the community capitals analysis and the different activities so far, was presented and discussed.

Second emplement! Summer School: In September 2022, the second Summer School had the objective to identify the capacity development needs of the community for implementation of a CBET concept. The participants were Vietnamese and German students and experts with the Hoa Bac community as hosts. The result was an in-depth understanding of the existing capacities and local knowledge as well as the knowledge gaps related to specific ecotourism projects proposed by the community. A preliminary capacity development process blueprint could be provided for each one of the CBET

Fig.4: Knowledge transfer by local actors during the second Summer School in 2022 (© Frankfurt UAS, Global Urbanization Research Team).

Fig.5: Final presentation by a local community representative in the first workshop on a Sustainable Regional Tourism Network in 2022 (© Frankfurt UAS, Global Urbanization Research Team).

strategies, namely, cultural preservation, ecotourism, agroforestry and decentralised infrastructure, as well as the outlook on a regional tourism network.

First Workshop on a Sustainable Regional Tourism Network: This workshop, which took place on-site in Hoa Bac, mobilised regional stakeholders from community-based tourism initiatives, public administration, private tours operators and universities. The joint exchange on the strengths, weaknesses, opportunities and challenges of sustainable tourism in the region provided valuable insights into the current situation, including intra-regional differentiations, and became an important basis for the next steps of conceptualisation, transfer and monitoring of CBET in a regional perspective.

2023 – Stakeholder Collaboration and Capacity Development

Evaluation Survey of CBET Development in Hoa Bac: The impact of the project activities since 2019 was evaluated by CELC-DAU based on approximately 100 households. The results showed a significant increase of the number of visitors, considerable improvements in touristic services, infrastructure and people's livelihood, but still a low community involvement.

Community Meeting with the Cooperative: The results of the evaluation survey were discussed as well as ideas for income generation by an improved local fruit production.

Community Workshop on Capacity Development Needs for CBET: By discussing the capacity development needs of the community for implementing CBET, the workshop provided crucial information about the knowledge needs and priorities of the community, along with initiating a process of collective understanding of the idea of capacity development. The results were organised into a capacity development framework categorised according to the different CBET strategies and presented to the local administration in order to engage them in the capacity development process.

Workshop on Digital Marketing for CBET: The objectives of this workshop focused on raising awareness, sharing strategies and building the skills among the community to carry out effective digital marketing activities.

Workshop on Community Capacity Development: The workshop aimed at empowering the cooperative members to organise capacity development activities by themselves and share existing local knowledge among the community. The objective was promoting self-organisation strategies and self-development possibilities.

Workshop on Sustainable Agriculture and Agroforestry: After a knowledge-sharing activity with visits to different locations within the valley where approaches to organic agriculture and agroforestry had already been implemented, diverse options for sustainable agriculture, agroforestry, the related technologies as well as the inclusion of ecotourism projects were presented and discussed.

Second Workshop on a Sustainable Regional Tourism Network: The workshop, located in Cam Kim village in Quang Nam province, was attended by a large number of participants aiming at developing CBT approaches in villages in the wider region. It was a space for sharing knowledge about sustainable tourism practices, it helped to connect the community leaders, representatives, individuals, and organisations involved, and established a communication platform for transferability, knowledge sharing and coordination of activities.

“Community-Based Ecotourism (CBET) is a sustainable tourism approach to harness the benefits of tourism while preserving the environment and empowering local communities. It is a multifaceted endeavour that involves communities, administrations, non-governmental organisations, and other stakeholders in a collaborative effort.”

Workshop on Financial Management and Tax Accounting: It is important for cooperative members to learn how to best manage their finances and legalise their profits in order to equitably distribute the benefits of CBET among the community. The participants learned about the importance and benefits of personal financial management, planning and financial management tools, documents, policies and regulations related to tax accounting, VAT calculation, electronic invoices, tax declaration software, and other topics.

General Assessment of the Impact of the emplement! Project in the Cu De River Valley

The impact of emplement! in the Cu De River Valley can best be illustrated by the proliferation of CBET projects since the first Summer School in 2019, the official establishment of the “Hoa Bac Ecological Agriculture and Community Tourism Cooperative” in 2023, and the recognition of the Hoa Bac commune and the cooperative as an exemplary model in the development of a CBET approach in the region. The community leaders have recently been invited to several communities in the neighbouring regions as well as in the Mekong Delta to share their experiences and guide others in the process of initiating CBET projects in their areas.

Between 2019 to 2023, the number and quality of local tourism services has increased considerably,

including cultural performances, forest and agricultural tours, cooking classes, handicraft production, bike rental services, intra-valley transport services by an electrical car, water-related and other experience activities. Meanwhile, visitors can enjoy a larger number of restaurants and cafés and be hosted in homestays or camping of different standard. Thereby, the valley has also developed into a recreational area close to the city at weekends. One particular highlight was the regional Tourism Festival in Hoa Bac in early May 2023, which lasted several days.

Furthermore, with the support of the project, CELC-DAU and other local experts, the community has opened the door to host study groups in the valley with the perspective of becoming an open centre for education in community-based development and environmental protection. By generating a two-way knowledge exchange, the community benefits from the technical know-how of academia while the students gain practical experience in the real world.

Evaluation and Conclusions for the emplement! Research Process

Looking back at the research process since 2019, the early status quo analysis, established jointly with the community and local academic partners, paved the way for the development of well-rounded concepts adapted to local needs and conditions, which led to increased awareness and a significant activation of CBET potentials in the valley. A particular boost for the entire project had been provided by the idea of a cooperative as a basic organisational and management structure, which evolved since 2020 in collaboration with local stakeholders and was finally legalised last year.

Based on this trusting cooperation with the local community, since 2023 the project's focus has now been on the conceptualisation and implementation of the diverse capacity development measures needed for the empowerment of all stakeholders, specifically in the field of tourism management, self-organisation, entrepreneurship and marketing. Besides the ongoing support and coordination of such capacity development measures, a first pilot project for decentralised sanitation is scheduled to be implemented by the end of 2024. The activities until the completion of the project in 2025 will concentrate on the legal and policy support for the CBET initiative by the local administration and finally, on the lessons learnt, documentation, scaling-up and transfer of the process framework and implementation tools from the CBET pilot project in Hoa Bac to other communities in the Da Nang and Quang Nam region.

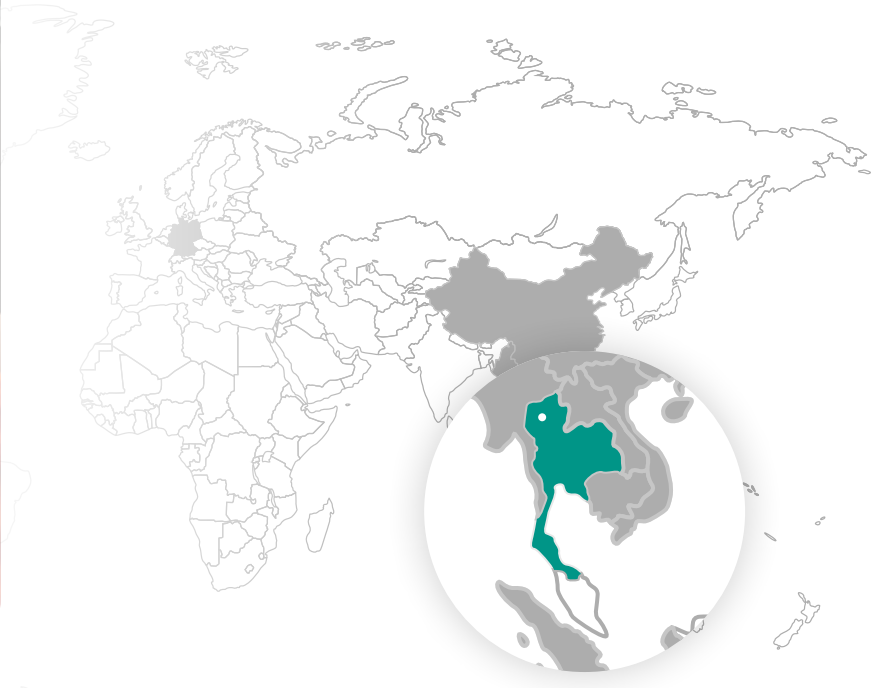
CHARMS

Seeking Qualitative Feedback: Making Sense of Preserving Residential Wooden Buildings in Thailand

Henrik Beermann & Urban Kaiser

Focus Group Discussion on the preservation of wooden houses in the Lam Chang District, Chiang Mai, April 2022 (photo credit: Urban Kaiser, Fraunhofer ISI).

The preservation of traditional wooden houses in Thailand extends beyond architecture, and intertwines with cultural identity, community heritage, and environmental sustainability. A significant challenge in balancing modernisation with heritage conservation lies in the lack of citizen engagement in decision-making processes. As emphasised by Mendez, Pegan, and Triga (2024), participatory governance is essential for policy legitimacy, yet many urban policies remain disconnected from the needs of local communities. This activity report examines the application of SenseMaker® within the CHARMS project to evaluate public attitudes towards the preservation of wooden residential houses in Chiang Mai. By analysing citizen-driven narratives, the approach reveals that preservation efforts are primarily community-led, with strong emotional ties to the buildings, while institutional support remains limited. SenseMaker®, by combining qualitative storytelling with structured data analysis, bridges the gap between top-down planning and local conservation efforts, offering a scalable tool for fostering participatory, data-informed urban policy development.



Chiang Mai, Thailand

Deutsch
Die Erhaltung traditioneller Holzhäuser in Thailand geht über die Architektur hinaus und ist eng mit der kulturellen Identität, dem gemeinschaftlichen Erbe und der ökologischen Nachhaltigkeit verbunden. Eine große Herausforderung bei der Vereinbarkeit von Modernisierung und Denkmalschutz liegt in der mangelnden Beteiligung der Bürgerinnen und Bürgern an Entscheidungsprozessen. Wie Mendez, Pegan und Triga (2024) betonen, ist partizipative Regierungsführung für die Legitimität von Politik unerlässlich, doch viele städtische Politiken sind nach wie vor nicht auf die Bedürfnisse der lokalen Gemeinschaften abgestimmt. Dieser Aktivitätsbericht untersucht die Anwendung von SenseMaker® im Rahmen des CHARMS-Projekts zur Bewertung der öffentlichen Meinung zur Erhaltung von Holzhäusern in Chiang Mai. Durch die Analyse von Bürgerberichten zeigt sich, dass die Erhaltungsbemühungen in erster Linie von der Gemeinde ausgehen, die eine starke emotionale Bindung zu den Gebäuden hat, während die institutionelle Unterstützung begrenzt bleibt. SenseMaker® verbindet qualitatives Storytelling mit strukturierter Datenanalyse und schließt so die Lücke zwischen Top-down-Planung und lokalen Erhaltungsbemühungen. Damit bietet es ein skalierbares Instrument zur Förderung einer partizipativen, datengestützten Stadtpolitik.

แบบไทย
การอนุรักษ์บ้านไม้แบบดั้งเดิมในประเทศไทยมิได้เป็นเพียงการคงไว้ซึ่งสถาปัตยกรรมเท่านั้น หากยังเชื่อมโยงกับอัตลักษณ์ทางวัฒนธรรม มรดกของชุมชน และความยั่งยืนด้านสิ่งแวดล้อมอย่างลึกซึ้ง ความท้าทายสำคัญในการสร้างสมดุลระหว่างความทันสมัยกับการอนุรักษ์มรดก คือการมีส่วนร่วมของประชาชนที่ยังขาดหายไปในกระบวนการตัดสินใจเชิงนโยบาย ดังที่ Mendez, Pegan และ Triga (๒๐๒๔) เน้นย้ำว่า รรมาภิบาลแบบมีส่วนร่วมเป็นสิ่งจำเป็นต่อความชอบธรรมของนโยบาย แต่ในทางปฏิบัตินั้น หลายนโยบายด้านเมืองยังคงไม่สอดคล้องกับความต้องการของชุมชนท้องถิ่น

รายงานกิจกรรมฉบับนี้นำเสนอการประยุกต์ใช้เครื่องมือ SenseMaker® ในโครงการ CHARMS เพื่อประเมินทัศนคติของประชาชนที่มีต่อการอนุรักษ์บ้านไม้ในจังหวัดเชียงใหม่ โดยการวิเคราะห์เรื่องเล่าที่เกิดจากประชาชน เครื่องมือดังกล่าวช่วยเปิดเผยว่า ความพยายามในการอนุรักษ์ส่วนใหญ่มาจากการขับเคลื่อนของชุมชน ซึ่งมีสายสัมพันธ์ทางอารมณ์ที่แน่นแฟ้นกับอาคารเหล่านั้น ขณะที่การสนับสนุนจากสถาบันภาครัฐยังมีอยู่อย่างจำกัด

SenseMaker® ในฐานะเครื่องมือที่ผสานการเล่าเรื่องเชิงคุณภาพเข้ากับการวิเคราะห์ข้อมูลเชิงโครงสร้าง จึงสามารถเชื่อมช่องว่างระหว่างการวางแผนนโยบายจากบนลงล่างกับความพยายามอนุรักษ์จากระดับท้องถิ่น และเสนอแนวทางที่สามารถปรับใช้ในวงกว้าง เพื่อส่งเสริมการพัฒนานโยบายเมืองที่มีข้อมูลรองรับและเปิดให้ประชาชนมีส่วนร่วมอย่างแท้จริง
(Automated translation)

Introduction

The preservation of traditional wooden houses in Thailand is more than an architectural concern; it is deeply tied to cultural identity, community heritage, and environmental sustainability. However, contemporary urban planning often prioritises economic metrics—such as land value, infrastructure efficiency, and market-driven development—while overlooking the lived experiences of residents (Cardoso, Sobhani, & Meijers, 2022). This economic bias results in urban transformations that emphasise short-term efficiency at the expense of long-term cultural and environmental sustainability.

This issue is particularly evident in Thailand, where modernisation has led to the widespread replacement of traditional wooden houses with high-density concrete structures. Anukulyudhathon (2017) highlights that the rising cost of land incentivises developers to maximise space, leading to the decline of vernacular wooden housing. This transition not only disrupts community cohesion but also reduces climate-adaptive building practices and increases reliance on carbon-intensive materials such as concrete (Pinijvarasin, 2017).

> **Even those who acknowledge the challenges of maintaining wooden houses express a deep emotional connection to them. These buildings are not merely architectural structures but also repositories of memory, cultural identity, and family heritage".**

A key challenge in balancing modernisation with heritage conservation is the lack of direct citizen engagement in decision-making. Mendez, Pegan, and Triga (2024) stress that participatory governance is crucial for policy legitimacy, yet many urban policies remain detached from community needs. Without meaningful input from residents, conservation efforts risk being perceived as technocratic interventions that do not reflect local priorities.

To address this gap, the CHARMS project employs SenseMaker®, an advanced qualitative research tool designed to collect and analyse citizen-driven insights. By capturing lived experiences, SenseMaker® provides a deeper, more contextualised understanding of public attitudes toward urban heritage conservation. This report examines SenseMaker®'s potential to bridge top-down planning and community-driven efforts, demonstrating how citizen narratives can shape more inclusive, sustainable, and culturally responsive urban policies.

A Human-Centred Approach to Urban Development

Urban development has traditionally been assessed through an economic lens, emphasising productivity, infrastructure expansion, and growth-oriented paradigms (Cardoso et al., 2022). However, a purely economic focus fails to account for the diverse social and cultural dimensions that contribute to urban well-being. As Cuff et al. (2020) argue, cities should not be designed solely for economic efficiency but should prioritise human needs, such as social cohesion, cultural continuity, and environmental resilience.

In Thailand, the transformation of urban landscapes illustrates this tension. The displacement of wooden houses in favour of modern high-rises not only alters the physical environment but also disrupts established communities and cultural traditions (Anukulyudhathon, 2017). Traditional Thai homes, built from bio-based materials such as wood and bamboo, were inherently sustainable and climate-responsive (Pinijvarasin, 2017). Their disappearance

Thailand (photo credit: Katharina M. Borgmann).

signifies the loss of vernacular architectural knowledge that supported both cultural identity and ecological balance.

A human-centred approach to urban planning requires shifting from top-down, data-driven decision-making to participatory models that incorporate citizen perspectives. Mendez et al. (2024) emphasise the importance of **co-creation** in policy design, advocating for governance models that empower communities to shape their urban environments. Tools like SenseMaker® facilitate this process by systematically collecting and analysing personal narratives, allowing policymakers to gain insights that extend beyond statistical indicators.

By integrating qualitative feedback into urban planning, cities can create policies that are not only economically viable but also socially inclusive and culturally grounded. This shift ensures that modernisation efforts do not erase historical and environmental wisdom but instead work in synergy with local values, fostering sustainable and adaptive urban futures.

SenseMaker®: A Narrative-Based Approach to Urban Insights

SenseMaker® operates through a structured multi-step process that integrates qualitative and quantitative methodologies to analyse public perceptions. The first step involves narrative collection, where participants share open-ended stories about their experiences with a given subject—in this case, traditional wooden houses in Chiang Mai. Unlike conventional surveys, this approach allows individuals to express their thoughts without being constrained by predefined response categories, capturing a richer and more authentic dataset (Snowden and Boone, 2007).

Following narrative collection, respondents engage in self-signification, categorising their own stories based on key dimensions such as emotional tone, perceived challenges, and thematic relevance. This step ensures that the analysis is guided by the perspectives of the contributors rather than external assumptions imposed by researchers (Kurtz & Snowden, 2003). The final stage, collective pattern analysis, aggregates individual responses to identify broader trends in public sentiment as well as emerging themes, allowing for the detection of underlying patterns that inform urban policy and planning decisions (van der Merwe et al., 2019).

By utilising this methodology, SenseMaker® provides a bottom-up approach to urban heritage conservation, ensuring that local voices are actively incorporated into decision-making processes. This enables policymakers to move beyond abstract planning frameworks and develop interventions that align with the lived experiences, cultural values, and practical concerns of the communities they serve (Cuff et al., 2020).

Applying SenseMaker® in the CHARMS Project

To explore public perceptions of traditional wooden houses in Chiang Mai, the CHARMS project implemented SenseMaker® as a narrative-based data collection tool in September 2023. The study aimed to capture firsthand experiences, uncover emotional and cultural associations, and identify broader community perspectives on the preservation of these historic structures. Participants were asked a central research question:

“If someone were considering buying an old wooden house in your area, what ONE experience would you share with them about what it’s like to use these buildings?”

Over the course of 11 days, 160 personal narratives were collected, providing rich qualitative insights into residents' experiences, concerns, and views on preserving wooden houses. Participants shared open-ended stories, which they then categorised to highlight key aspects such as the story's nature, perceived responsibilities, areas for improvement, and broader community concerns. These included problem-solving behaviours, the role of different groups in addressing challenges, and attitudes toward modernity.

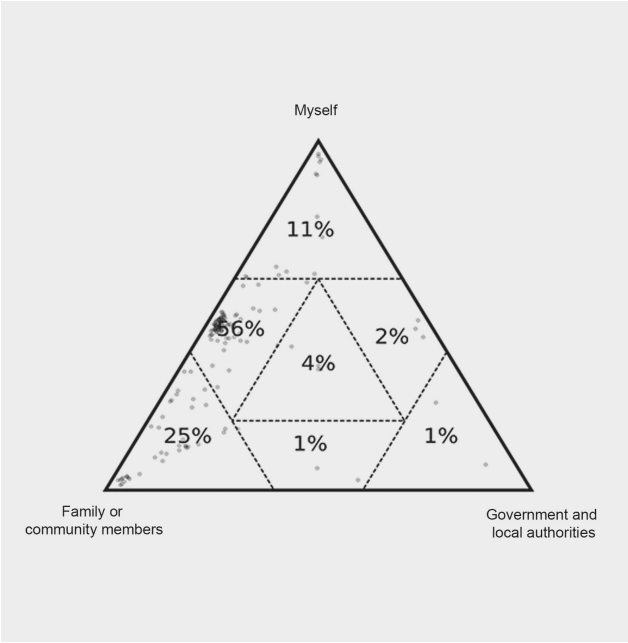


Fig.1: Distribution of responsibility for wooden building preservation.

Personal Narratives: The Lived Experience of Wooden House Ownership

A key strength of SenseMaker® is its ability to link qualitative narratives with structured analysis, capturing the emotional and cultural significance of urban heritage. One illustrative story exemplifies the complex relationship between nostalgia, practicality, and attachment that many residents feel toward their homes:

> #House of Memories
> *"[…] I have a lot of childhood memories with this house, both good and bad. Now that I've grown up, I rarely go. Even though the advantages are less than the disadvantages, I feel like I don't want to buy and build a new house because the condition of the house is still usable. Even though it looks old, the termites haven't chewed it up at all. Just a little repair and it's like new."*

This account reflects a wider pattern observed in the dataset: even those who acknowledge the challenges of maintaining wooden houses express a deep emotional connection to them. These buildings are not merely architectural structures but also repositories of memory, cultural identity, and family heritage. The findings suggest that conservation policies should extend beyond material preservation and recognize the intangible cultural value embedded in these homes. Ensuring that urban development policies integrate local narratives and lived experiences is crucial to fostering socially inclusive and sustainable heritage conservation strategies.

Collective Patterns: The Social System at the Centre of Preservation Efforts

The analysis of citizen narratives using SenseMaker® provides valuable insights into shared perceptions and collective trends regarding the preservation of traditional wooden houses in Chiang Mai. By allowing participants to categorise their stories through dyads (opposing concepts) and triads (three contrasting perspectives), the tool helps structure qualitative data into meaningful patterns.

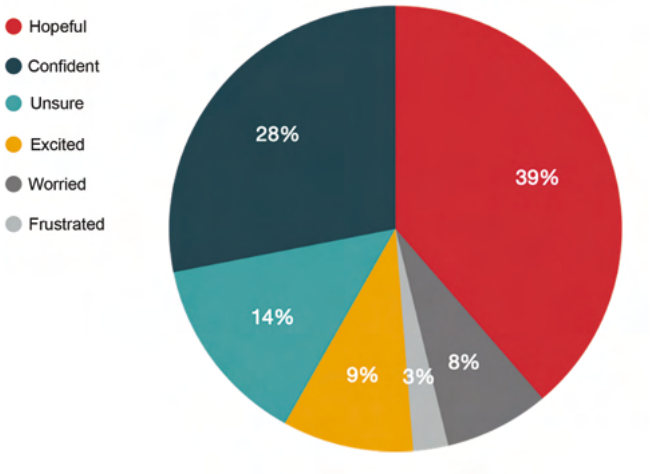


Fig.2: Emotional tone of the stories.

When necessary, these responses may be visualised in narrative landscapes, offering a graphic representation of how perceptions cluster around key themes and revealing dominant perspectives, tensions, and emerging shifts in public sentiment.

One of the most significant findings is the strong consensus that the responsibility for preserving wooden houses lies primarily with the community and individual homeowners, rather than with government institutions (Figure 2). This stands in contrast to conventional conservation policies,

which often position governmental agencies as the principal custodians of heritage sites. Instead, the SenseMaker® results indicate that in Chiang Mai, preservation is largely a grassroots effort, sustained by local engagement rather than state-led initiatives.

Emotional Tone: Public Sentiment Toward Wooden House Preservation

As part of the SenseMaker® analysis, participants categorised their stories based on emotional tone, which provided insight into how residents perceive the preservation of wooden houses in Chiang Mai. This assessment serves to demonstrate the tool's ability to capture not only what people think but also how they feel about urban heritage.

The findings reveal a predominantly positive outlook, with 39% of respondents expressing hope, indicating optimism about the future of these structures. Additionally, 28% conveyed confidence, reflecting a belief in the feasibility of conservation efforts. However, 14% of participants reported uncertainty, pointing to concerns over maintenance costs and economic pressures. Negative sentiments were minimal, with only 11% selecting "worry" or "frustration" (Figure 2).

Participatory governance is crucial for policy legitimacy, yet many urban policies remain detached from community needs. Without meaningful input from residents, conservation efforts risk being perceived as technocratic interventions that do not reflect local priorities".

These results illustrate how SenseMaker® enables an in-depth understanding of public sentiment beyond conventional survey responses. The findings highlight the emotional connection residents have to these buildings, suggesting that conservation efforts rooted in community participation and cultural identity are more likely to be embraced. This emotional assessment reinforces the importance of integrating lived experiences into policy discussions, ensuring that preservation strategies align with both practical concerns and local values.

Conclusion

This study demonstrates the effectiveness of SenseMaker® in bridging the divide between top-down urban planning and grassroots conservation efforts. As the CHARMS project shows, the preservation of traditional wooden houses in Chiang Mai is not merely an architectural challenge but one that involves deep social, cultural, and environmental dimensions. The findings indicate that while institutional support for heritage preservation remains limited, local communities take a leading role in advocating for conservation efforts, driven by strong emotional connections to these buildings. This aligns with the broader concept of human-centred urban development, where urban policies should not only focus on economic metrics but also consider the lived experiences, cultural identities, and environmental concerns of local populations. Participatory governance, as emphasised by Mendez, Pegan, and Triga (2024), is essential to ensure that policies are legitimate and responsive to community needs. SenseMaker® is a powerful tool for achieving this by providing a mechanism through which community-driven insights can inform urban planning. By incorporating local narratives and emotional assessments, SenseMaker® ensures that heritage conservation efforts are more inclusive, sustainable, and aligned with the aspirations of the communities they impact. Through this process, it highlights the potential of participatory, data-informed decision-making to foster more responsive and culturally sensitive urban policies.

URA

Introducing Dr. Xie Yuting

Lecturer and deputy director of the Institute of Landscape Architecture at Zhejiang University and a member of the Committee of Landscape Architecture in China. Currently, she plays the role of the principal investigator of WP4 “Urban-Rural Landscapes and Spatial Typologies” in the Urban-Rural Assembly (URA) project. In 2015, she co-founded the China Urban Landscape Lab at TU Munich, which is dedicated to managing landscape changes and developing historical landscape structures as a fundamental qualitative framework for China’s rapidly transforming urban environment. Since 2019, Dr. Xie has operated the collaborative research platform Jiangnan Lab, which uses regional design as a tool for bringing cross-sector spatial planning, landscape architecture and urban design, and multi-level governance together in the Yangtze River Delta integration process.

Dr. Xie joined the URA project in the research and development phase in October 2020. During the pandemic time of 2021, she led and coordinated the Urban Rural Living Lab (URLL) #1 in Beiyang Town Area. The URLL model explores regional community-driven pilot interventions addressing circular economies, cultural heritage, renewable resources, and food security. In cooperation with WPs 2-6, an open call for participation was launched which invited students from across China to an interdisciplinary workshop in Beiyang Township, Huangyan-Taizhou. Seventeen participants, organised into three groups, delved into the research topics of sustainable management of modern agriculture and water-sensitive rural development under territorial planning.

In May 2023, Dr. Xie's team visited Thuringia to attend the "StadtLand – from Thuringia to a planetary perspective" international conference and the Raumbild workshop at Bauhaus University Weimar. Moreover, she promoted WP4’s specialised work on “Urban-Rural Water Landscape” with Prof. Sigrun Langner through a week-long workshop. A spatial typology study and territorial transect analysis of the Huangyan Taizhou area were conducted, arriving at a regional vision of intertwined blue-green infrastructure to address water-related challenges of water supply, water pollution, and water accessibility.

In Sept 2023, Dr. Xie cooperated with the entire URA team to conduct the URLL #2 in Xinqian Neighborhood through a series of Raumbild workshops involving multiple stakeholders, which brought together academic insight, practical application, community engagement, and international perspectives. The workshops addressed key topics of the green mold industry and inclusive community at the urban-rural interface. Besides the URLL 2, the WP4 team conducted field trips and mapping along the Xinqian transect to identify its landscape characteristics and types. Human-water relationship in rural industrialisation areas was also investigated when focus areas were selected in one of the landscape types “collage landscape” that belongs the transect. This study revealed fragile ecological environments in the collage landscape and proposed strategies such as re-wilding industry-agriculture interfaces and improving the connectivity and storage capacity of pond systems.

Xie Yuting

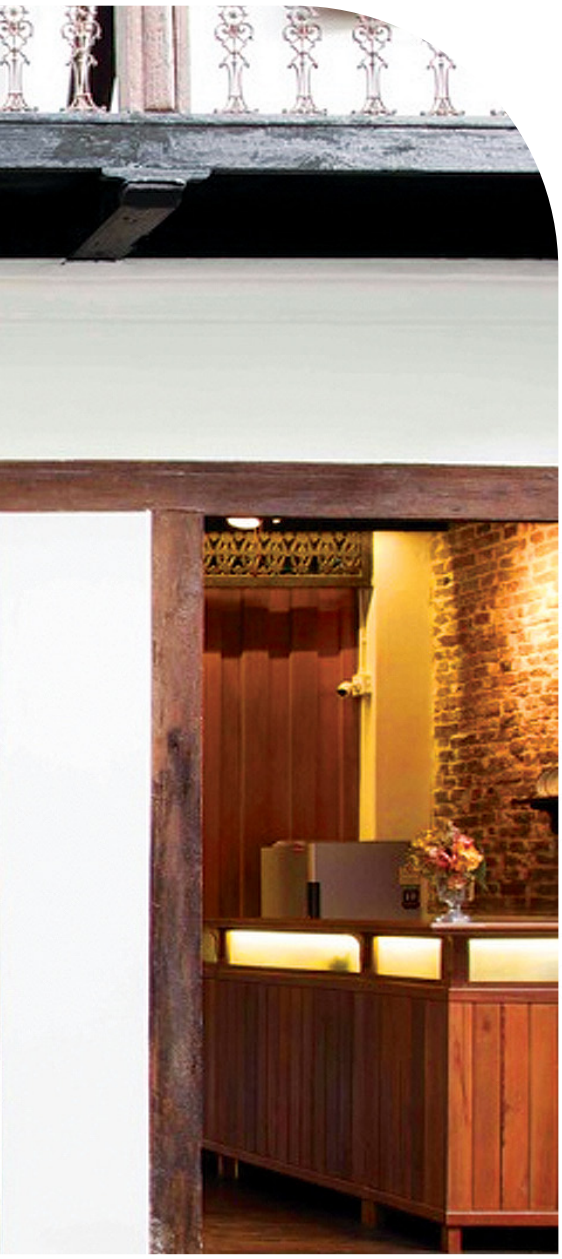
CHARMS

Financial Social Innovation for Heritage Preservation: The Case of the Chanthaboon Waterfront Community

Valeriya Sannikova & Henrik Beermann

Front site of the Baan Luang Rajamaitri Historic Inn (Source: www.baanluangrajamaitri.com 2024).

The revitalisation of the Chanthaboon Waterfront Community in Thailand exemplifies a novel approach to cultural heritage preservation and sustainable development. The project, initiated in 2009, emphasises a "culture-led regeneration" model, focusing on maintaining the community's traditional lifestyle and fostering collective ownership. The Chanthaboon Waterfront Community's transformation, which includes the restoration of the Baan Luang Rajamaitri Historic Inn, highlights the potential for blending economic vitality with cultural conservation. By establishing the Chanthaboon Rakdee Co., Ltd. as a social enterprise, the project successfully integrated participatory funding and community-driven initiatives. The innovative combination of social entrepreneurship and local engagement has allowed the community to balance modernisation with tradition. International recognition through the UNESCO Asia-Pacific Heritage Award underscores the broader relevance of the "Chanthaboon Model," which serves as a scalable and adaptable strategy for sustainable heritage preservation that can be replicated in diverse socio-economic contexts globally.



Chanthaburi Province, Thailand

Deutsch
Die Revitalisierung der Chanthaboon-Ufergemeinschaft (Chanthaboon Waterfront Community) in Thailand ist ein Beispiel für einen neuartigen Ansatz zur Erhaltung des kulturellen Erbes und zur nachhaltigen Entwicklung. Das 2009 ins Leben gerufene Projekt betont ein Modell der „kulturgeprägten Erneuerung“, dessen Schwerpunkt auf der Bewahrung der traditionellen Lebensweise der Gemeinschaft und der Förderung des kollektiven Eigentums liegt. Die Umgestaltung der Chanthaboon-Ufergemeinschaft, zu der auch die Restaurierung des historischen Gasthauses Baan Luang Rajamaitri gehört, verdeutlicht das Potenzial einer Verbindung von wirtschaftlicher Vitalität und kultureller Bewahrung. Durch die Gründung des Sozialunternehmens Chanthaboon Rakdee Co., Ltd. gelang es, partizipative Finanzierung und gemeindegetriebene Initiativen erfolgreich zu integrieren. Die innovative Kombination aus sozialem Unternehmertum und lokalem Engagement hat es der Gemeinde ermöglicht, Modernisierung und Tradition in Einklang zu bringen. Die internationale Anerkennung durch den UNESCO Asia-Pacific Heritage Award unterstreicht die allgemeine Relevanz des „Chanthaboon-Modells”, das als skalierbare und anpassungsfähige Strategie für die nachhaltige Erhaltung des Kulturerbes dient und in verschiedenen sozioökonomischen Kontexten weltweit repliziert werden kann.

Fig.1: News article reflecting the high public interest in the innovative preservation efforts driven by the local community (© Fraunhofer IMW).

แบบไทย
การฟื้นฟูชุมชนริมน้ำจันทบูรนับเป็นตัวอย่างของแนวทางใหม่ในการอนุรักษ์มรดกทางวัฒนธรรมควบคู่กับการพัฒนาอย่างยั่งยืน โครงการนี้ริเริ่มขึ้นเมื่อปี พ.ศ. ๒๕๕๒ โดยยึดแนวคิด "การฟื้นฟูโดยขับเคลื่อนด้วยวัฒนธรรม" (culture-led regeneration) โดยมุ่งเน้นการรักษาวิถีชีวิตดั้งเดิมของชุมชนและส่งเสริมความรู้สึกร่วมเป็นเจ้าของในหมู่สมาชิกในชุมชน
การเปลี่ยนแปลงของชุมชนริมน้ำจันทบูร ซึ่งรวมถึงการบูรณะโรงแรมประวัติศาสตร์บ้านหลวงราชไมตรี แสดงให้เห็นถึงศักยภาพในการผสานความมีชีวิตชีวาทางเศรษฐกิจเข้ากับการอนุรักษ์วัฒนธรรม การจัดตั้งบริษัทจันทบูรรักดี จำกัด ในรูปแบบกิจการเพื่อสังคม เป็นกลไกสำคัญที่ช่วยให้โครงการสามารถระดมทุนและดำเนินกิจกรรมโดยมีชุมชนเป็นศูนย์กลางอย่างแท้จริง
การผสมผสานอย่างสร้างสรรค์ระหว่างผู้ประกอบการเพื่อสังคมกับการมีส่วนร่วมของชุมชน ทำให้สามารถสร้างสมดุลระหว่างความทันสมัยและประเพณีท้องถิ่นได้อย่างยั่งยืน การได้รับรางวัลอนุรักษ์มรดกวัฒนธรรมระดับภูมิภาคเอเชีย-แปซิฟิกจากองค์การยูเนสโก เป็นการยืนยันถึงคุณค่าระดับนานาชาติของ “โมเดลจันทบูร” ซึ่งถือเป็นแนวทางที่สามารถขยายผลและปรับใช้ได้ในหลากหลายบริบททางเศรษฐกิจและสังคมทั่วโลก
(Automated translation)

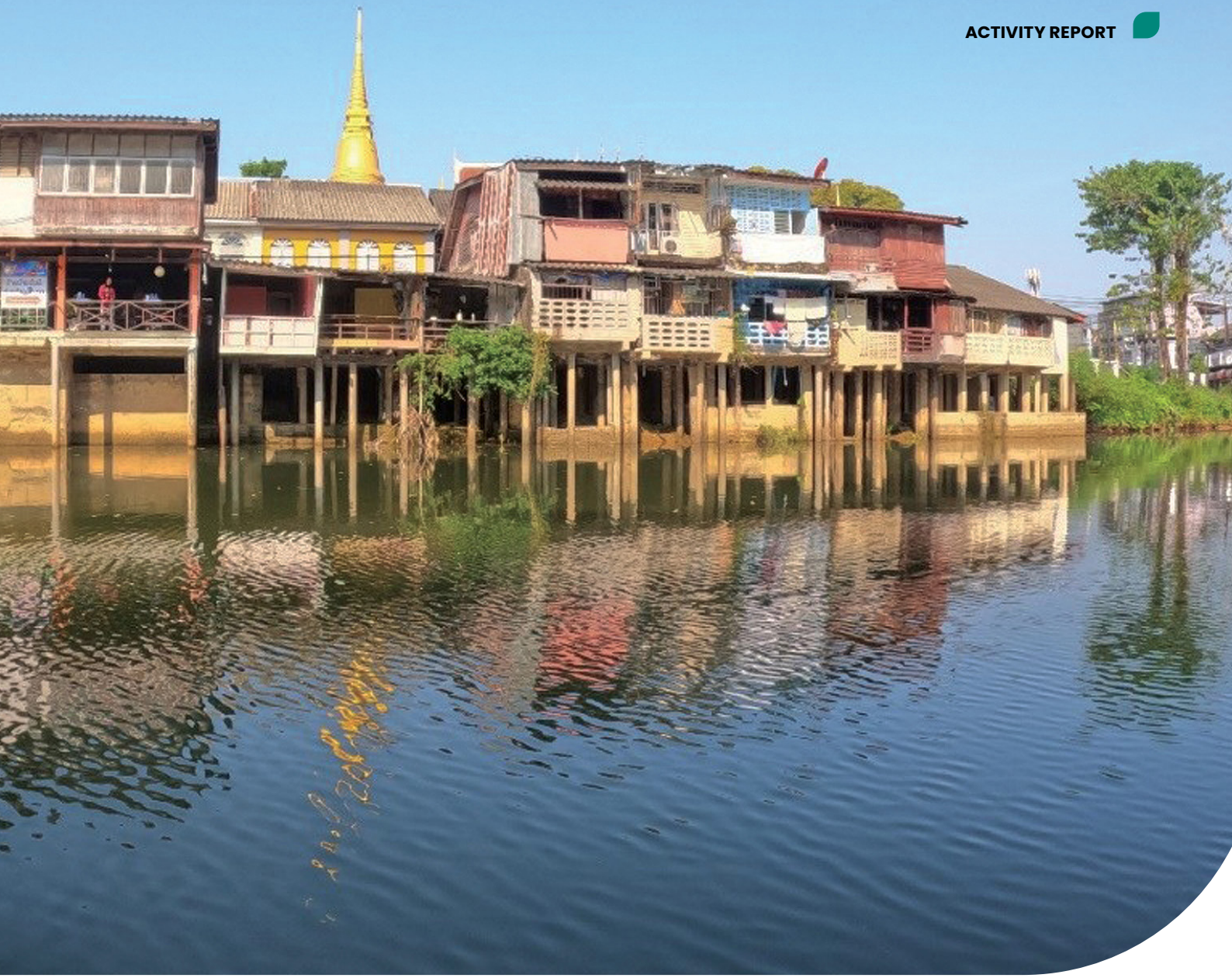


Fig.2: Scenery of the Chanthaboon Waterfront Community with the pagoda of Wat Bot Muang (วัดโบสถ์เมือง) in the background (© Fraunhofer IMW).

Introduction

The revitalisation of the Chanthaboon Waterfront Community stands as an innovative model of heritage conservation and sustainable development. The project began with the aim of rejuvenating the old commercial area, receiving substantial support from the Chanthaburi Provincial Commerce Office and significant contributions from the Arsom Silp Institute. This collaboration led to the establishment of a social enterprise model, centred around the adaptive reuse of the former residence of the Thai aristocrat Luang Rajamaitri into a historic inn in 2014, setting a precedent for community-driven business models. The restoration of the Baan Luang Rajamaitri historic inn, under the management of the social enterprise Chanthaboon Rakdee Company, won the UNESCO Asia-Pacific Award for Cultural Heritage Conservation in 2015. This initiative has ignited a passion for heritage preservation in the Chanthaboon Waterfront Community while focusing on balancing the benefits of tourism with sustaining the community's cultural identity and lifestyle.

Chanthaboon Waterfront Community

Chanthaboon Waterfront Community, a 1-kilometer-long street with over 300 years of history, nestled along the banks of the Chanthaburi River in Thailand, is a vibrant mosaic of cultural heritage, religion, and traditional livelihoods. Evident in its houses, shrines, and temples, the architectural style of the community represents a mix of Eastern

View from the balcony of the Baan Luang Rajamaitri Historic Inn (© Fraunhofer IMW).

and Western designs. This historical area, enriched with cultural heritage blending Thai, Chinese, and Vietnamese influences, was once a thriving hub of commerce and important centre for trading of gems, rubber, and herbs. However, over the years, the community encountered numerous challenges that led to a gradual erosion of its vibrancy and economic vitality. These included natural disasters such as frequent flooding and a devastating fire in 1990, which caused considerable destruction to the area's historic architecture and residential spaces (Srisankaew, 2017; UNESCO 2020).

In 2009, efforts to rejuvenate this once vibrant trading hub began with support from the Chanthaburi Provincial Commercial Office and students from the Arsom Silp Institute of Arts, marking a new chapter in the community's history. The Chanthaboon Waterfront Community decided to take a unique approach to its own development. Rather than becoming a street-food market, the community placed greater emphasis on preserving and celebrating its historical heritage under the vision "culture-led regeneration". It emphasised maintaining an authentic local lifestyle and fostering a sense of ownership and collective responsibility among residents, while reducing reliance on tourism as the sole driver of community well-being. The community aimed to transform into a living museum that would impart valuable knowledge to future generations (Baan Luang Rajamaitri Historic Inn, 2015).

"This model illustrates how participatory approaches can secure not only the material preservation of heritage but also empower local communities".

The process of revitalisation led to the formation of the Chanthaboon Waterfront Community Development Committee, spearheaded by local volunteers who were deeply invested in the preservation and enhancement of their cultural heritage. The committee together with students from Arsom Silp Institute started research within the community, gaining an in-depth understanding of the area's historical context, and identifying key cultural and architectural elements worth preserving.

Various activities were undertaken focusing on raising awareness and community engagement to instill a sense of pride and self-worth among the community members. The committee organised community events, among which were the *Big Cleaning Day* as well as a community name and logo competition. Efforts were also made to narrate the community's story through exhibitions, brochures, and media (Sukmanee, 2015).

"By combining social entrepreneurship with community engagement, the Chanthaboon Waterfront Community has achieved a balance between tradition and modernity. Flexible funding structures, openness to external involvement, and a long-term focus on social and economic sustainability were key to its success".

A significant milestone was the opening of the House No. 69 as a "House of Learning" in 2010, with the support of the homeowner who donated the space to the community. The house was then renovated to be a community learning centre that serves as a venue for discussing and coordinating community development work, as well as displaying stories, information, and photographs contributed by community members. However, this initiative faced limitations, as it did not generate direct profit, requiring funding from outside organisations for its renovation and exhibition development, not significantly broadening the community's conservation efforts.

Recognizing these limitations, the community, informed by experiences and the Arsom Silp Institute's knowledge, sought to overcome these challenges. They aimed to enhance conservation efforts within the community by merging business operations with community development strategies. The collaborative effort between the community and Arsom Silp Institute led to the creation of Chanthaboon Rakdee Co., Ltd as a social enterprise in 2013, aiming to renovate the old traditional house into a Historical Inn, embodying the concept of "preservation with care" (Srisakulchairak, 2023).

Baan Luang Rajamaitri Historic Inn

Luang Rajamaitri, known as the "Father of Eastern Rubber Trees", was a prominent figure whose contributions shaped the economic and social landscape of Chanthaburi. His residence, over 150 years old in Chino-Portuguese style, stands as a testament to his legacy and the architectural heritage of the area. The preservation project involved a unique rental agreement with the heir of Luang Rajamaitri, offering a 30-year lease for a nominal fee of 1 Baht per month. The enterprise was established with two key agreements: firstly, a portion of the profits (10%) would be reinvested into the community, and secondly, at least one community representative would sit on the company's executive board to ensure community involvement in critical decisions (Chatmalai, 2022; Srisakulchairak, 2023).
The funding initiative for renovation welcomed over 500 shareholders, including locals, and interested individuals, raising a total of 8.8 million Baht with shares priced 1000 Baht each. Feasibility study suggested that the project could yield returns within 10 years, with dividends. being distributed to shareholders from the first year. Profits were planned to be shared among shareholders, reinvested into the business, and used to support cultural activities in the community. This initiative aimed to cultivate a sense of ownership and care among community members and stakeholders, with shareholders

viewing their investments as contributions rather than seeking immediate financial gains. The goal was to balance income generation through tourism with the preservation of the community's historical and cultural essence (Chatmalai, 2022; Srisakulchairak, 2023).

Opened in October 2014, the historic residence, now a blend of traditional structure and modern interior, serves not just as accommodation but as a cultural conservation site. It offers a limited number of rooms to avoid overcrowding and preserve its historical essence. Each room in the residence is themed around significant stories related to Luang Rajamaitri and the community's history, creating a unique experience for guests. The Historic Inn also operates as a semi-museum, offering exhibits alongside accommodation. The museum, set up on the first floor, is not aimed at profit but at preserving community heritage and knowledge. The Baan Luang Rajamaitri Historic Inn boosted the local economy by promoting small community businesses, opting to buy daily meals from local shops instead of preparing food in-house. The hotel served as a gateway for guests to engage with and invest in the local community, as evidenced by the popularity of local eateries and stores among its guests. The influx of tourists has brought economic benefits, and the community's active involvement in the decision-making process has ensured that development aligns with their needs and aspirations (Chatmalai, 2022; Srisakulchairak, 2023).

"The «Chanthaboon Model» demonstrates how participatory funding and community-based social enterprises can contribute to the sustainable development of cultural heritage."

Conclusion

The "Chanthaboon Model" demonstrates how participatory funding and community-based social enterprises can contribute to the sustainable development of cultural heritage. The restoration of the Baan Luang Rajamaitri Historic Inn and the establishment of Chanthaboon Rakdee Co. Ltd. show that cultural identity and economic vitality can mutually reinforce each other. The close collaboration between local communities, educational institutions, and external supporters provides a blueprint for similar initiatives worldwide, highlighting the importance of partnerships in heritage preservation. By combining social entrepreneurship with community engagement, the Chanthaboon Waterfront Community has achieved a balance between tradition and modernity. Flexible funding structures, openness to external involvement, and a long-term focus on social and economic sustainability were key to its success. This model illustrates how participatory approaches can secure not only the material preservation of heritage but also empower local communities and raise awareness of cultural value. International recognition through the UNESCO Asia-Pacific Heritage Award underscores the global relevance of the "Chanthaboon Model" and encourages replication. Projects like the Punyashthiti Villa demonstrate the scalability of the model and its adaptability to different socio-economic contexts. Ultimately, the "Chanthaboon Model" serves as a benchmark for inclusive and sustainable development strategies that preserve cultural heritage while promoting the economic and social resilience of local communities.

Opposite page:
Bangkok, Thailand (photo credit: Katharina M. Borgmann).

FloodAdaptVN

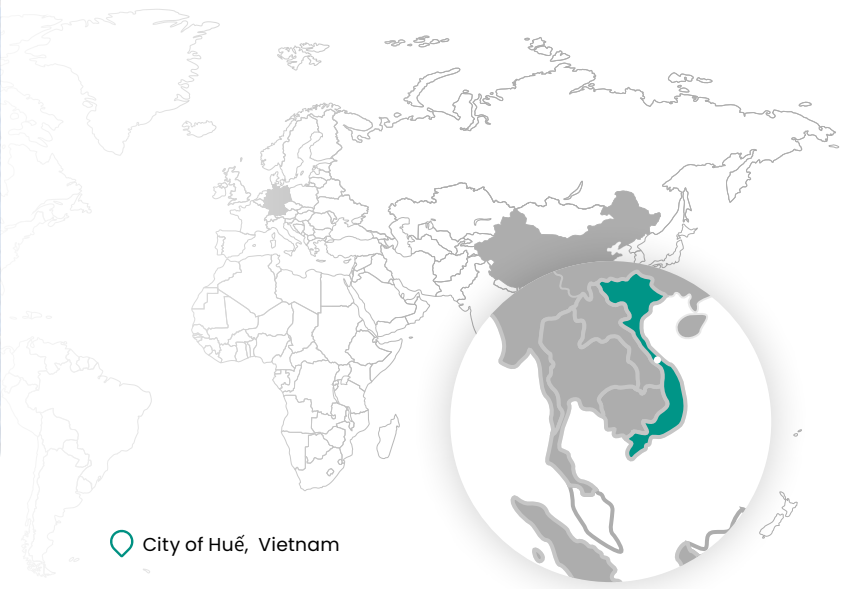
A Look beneath the Surface – Measurement Campaign for the Bathymetric Evaluation of Huong River and Bo River

Kerstin Büche, André Assmann & Phạm Gia Tùng

Vietnam (photo credit: FloodAdaptVN).

The FloodAdaptVN project focuses on flood risk reduction and adaptation measures in central Vietnam, particularly in small coastal cities experiencing rapid urbanisation and increased precipitation. The study, carried out around the City of Huế, includes the investigation of flood hazard in terms of hydrologic and hydraulic modeling, in the course of which a bathymetric evaluation of Huong River and Bo River was also conducted.
The study utilised a fishfinder[1] for bathymetric surveys, emitting sound waves into the water to measure depth and bottom conditions. The researchers collected cross-sectional profiles along Huong River and Bo River, aiming to complement existing data from a JICA project in 2000.
Challenges included sand theft affecting riverbed structure, limited boat maneuverability, and the absence of absolute height information in both datasets. After conducting surveys and employing software (Reefmaster TM), the recorded profiles were georeferenced and integrated into the hydraulic model software HEC-RAS. Results showed both similarities and significant differences between JICA's 2000 profiles and the new measurements. Despite these difficulties, the majority of cross-sections were successfully verified and incorporated into the hydraulic model.

1 Sonar device.



City of Huế, Vietnam

Deutsch
Das Projekt FloodAdaptVN konzentriert sich auf Maßnahmen zur Verringerung des Hochwasserrisikos und zur Anpassung an den Klimawandel in Zentralvietnam, insbesondere in kleinen Küstenstädten, die eine rasche Urbanisierung und zunehmende Niederschläge erleben. Die Studie, die in der Umgebung der Stadt Huế durchgeführt wurde, umfasst die Untersuchung der Hochwassergefahr anhand hydrologischer und hydraulischer Modelle, wobei auch eine bathymetrische Bewertung des Huong-Flusses und des Bo-Flusses vorgenommen wurde.

Für die bathymetrischen Vermessungen wurde ein Fischfinder (Sonargerät) verwendet, der Schallwellen ins Wasser aussendet, um die Tiefe und die Bodenbeschaffenheit zu messen. Die Forscher erstellten Querschnittsprofile entlang des Huong-Flusses und des Bo-Flusses, um die vorhandenen Daten aus einem Projekt der Japan International Cooperation Agency (JICA) aus dem Jahr 2000 zu ergänzen. Zu den Herausforderungen zählten Sanddiebstahl, der die Flussbettstruktur beeinträchtigte, die eingeschränkte Manövrierfähigkeit der Boote und das Fehlen absoluter Höhenangaben in beiden Datensätzen.

Nach Durchführung der Vermessungen und Einsatz einer Software (Reefmaster TM) wurden die aufgezeichneten Profile georeferenziert und in die hydraulische Modellierungssoftware HEC-RAS integriert. Die Ergebnisse zeigten sowohl Ähnlichkeiten als auch signifikante Unterschiede zwischen den Profilen der JICA aus dem Jahr 2000 und den neuen Messungen. Trotz der Schwierigkeiten konnte der Großteil der Querschnitte erfolgreich verifiziert und in das hydraulische Modell integriert werden.

Tiếng Việt
Dự án FloodAdaptVN tập trung vào các biện pháp thích ứng và giảm thiểu rủi ro lũ lụt ở miền Trung Việt Nam, đặc biệt là ở các thành phố nhỏ ven biển trải nghiệm qua quá trình đô thị hóa nhanh chóng và lượng mưa tăng lên. Khu vực nghiên cứu, tập trung xung quanh Thành phố Huế, bao gồm các công việc đánh giá độ sâu của sông Hương và sông Bồ để nâng cao mô hình thủy văn và thủy lực.

Nghiên cứu đã sử dụng máy dò cá (thiết bị siêu âm) để khảo sát độ sâu, phát hiện âm thanh nước để đo độ sâu và điều kiện đáy. Các nhà nghiên cứu đã thu thập cắt ngang dọc theo sông Bồ và Sông Hương, nhằm bổ sung cho hiện thực hóa dữ liệu từ dự án JICA năm 2000. Các công thức bao gồm cát cát ảnh hưởng đến cấu trúc lòng sông, khả năng cơ sở của thuyền được thiết lập ở chế độ hạn chế và thiếu thông tin về mức độ tuyệt đối trong cả hai bộ dữ liệu.

Sau khi tiến hành khảo sát và sử dụng phần mềm (Reefmaster TM), các dạng biên dịch được ghi lại đã được tham chiếu địa lý và tích hợp vào phần mềm mô hình thủy lực HEC-RAS. Kết quả đã tìm thấy cả những điểm tương đồng và khác biệt đáng kể giữa hồ sơ năm 2000 của JICA và các phép đo mới. Những công thức như bảo vệ cát và khả năng cơ khí hạn chế của thuyền đã ảnh hưởng đến công việc thu thập dữ liệu, nhưng không chấp nhận những khó khăn, phần lớn các mặt cắt đã được xác minh thành công và đưa vào mô hình thủy lực .
(Automated translation)

Introduction

Central Vietnam is experiencing rapid urbanisation, particularly in small and medium-sized coastal cities. Concurrently, the region is grappling with increased precipitation and heavy rainfall due to climate change, combined with land use changes, leading to more frequent and intense flooding. In response, the FloodAdaptVN research project assesses flood risk reduction and adaptation measures, focusing on their impact reduction, cost-efficiency, and sustainability.

For mapping and modelling hydrologic conditions, flood events and scenarios, hydrologic and two-dimensional (2D) hydraulic models are widely used tools. Detailed terrain information is required for 2D hydraulic modelling; digital terrain models are usually used for this purpose. However, not only is the terrain surface decisive for hydraulic modelling, but also the heights of the riverbed need to be considered. For highly detailed studies, the river is typically surveyed every few hundred meters using complex surveying methods and mapped using

so-called cross-sections. With the help of these cross-sections, the river channel can be mapped and modelled with high accuracy in the hydraulic model.

gentle, meandering river strongly influenced by tides and salinity. In the flood season, the hilly and mountainous section experiences high current, velocity, and water levels; while in the dry season, these features reach very low levels, revealing a riverbed with many pebbles and boulders. Beyond

Dragon Boat on Huang River (photo credit: FloodAdaptVN).

Study Area

The research area is centred around the City of Huế and its hinterland in the Thua Thien Huế province. The Huong River system has a catchment area of 2'830 km², covering almost 3/5 of the province's area and a river length of 104 km, and it plays a significant role in the hydrological dynamics of the region. The system comprises three main tributaries: River Huu Trach and River Ta Trach (forming Huong River), and River Bo, originating from a mountainous area, entering the coastal plain and eventually flowing into the Tam Giang Lagoon. Morphologically, the Huong River system can be divided into two sections: one flowing through hills and mountains with a steep riverbed, rapids, and untouched tides; the other flowing through the coastal plain with a

the natural tributaries, there are also artificial channels connecting the Huong River to the Bo River, linking the Huong River to the Cau Hai Lagoon, and connecting the Bo River to the Tam Giang Lagoon.

> **"The functionality of a fishfinder is based on sonar technology".**

This comprehensive understanding of the hydrological and hydraulic characteristics, including cross-sectional profiles and river morphology, contributes to a holistic analysis of flood conditions in the study area. A JICA project conducted in the

year 2000 provided 142 cross-sectional profiles for both rivers. Due to the unavailability of JICA profiles at that time and the need for additional data, it was decided to collect further cross-sections and after receiving the JICA cross-sections verify those with the measured ones.

Methodology

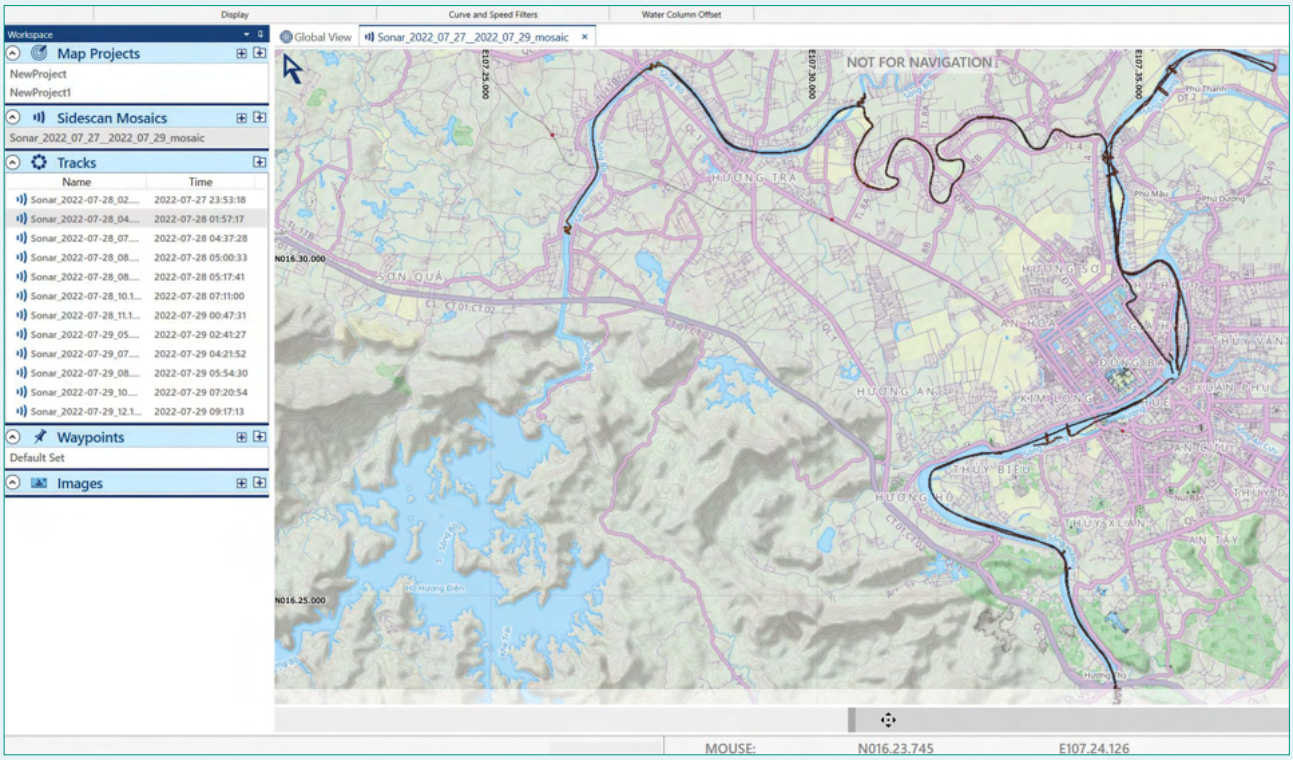
Due to budget limitations as well as transportability of equipment a simple method originally developed for finding fish has been used, therefore the bathymetric surveys have been carried out with the help of a fishfinder. A fishfinder, also known as a sonar device, is normally used by anglers and fishermen to locate fish and other objects under water. The functionality of a fishfinder is based on sonar technology: by emitting sound waves into the water and measuring the returned echo, water depth and bottom conditions can be recorded. Most fishfinders have a screen on which this information is displayed in real-time. Fishfinders can also have various features, such as GPS functions to pinpoint the user's exact location or display maps informing the user about water structures such as depth contours, underwater hills, or obstacles.

Fishfinder device mounted on the side of the boat (photo credit: FloodAdaptVN).

“The Huong River system has a catchment area of 2’830 km², covering almost 3/5 of the province´s area and a river length of 104 km, plays a significant role in the hydrological dynamics of the region.”

Most fishfinders are portable or can be mounted on boats, and are available in different sizes, prices, and feature configurations to suit the needs and preferences of different users. A fishfinder uses sonar probes to scan the bottom of the water and can, therefore, record precise information about water depth and bottom conditions. Horizontal and vertical sound waves are emitted and reflected towards the bottom. Depending on the echo's travel time, the depth of the water can be determined. For the purposes of the campaign a GO9 XSE sonar device with Active Imaging™ 3-in-1 transducer has been used.

After an initial test in Germany using a canoe on an oxbow lake of the Rhine, the measurement campaign has been conducted in Thua Thien Huế province in July 2022. After some initial difficulties, the battery needed to be replaced with a smaller battery last minute in order to comply with airline



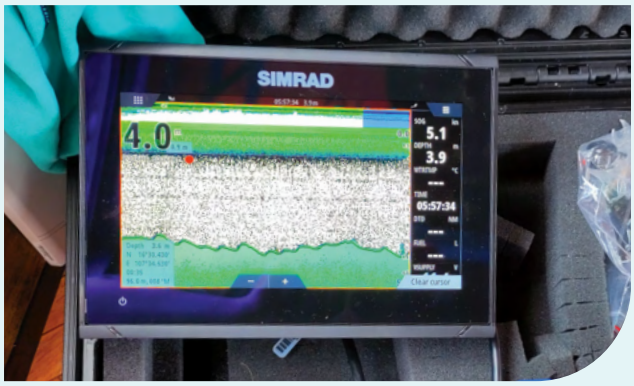


Fig. 1 (Top): Tracks and waypoints recorded by the fishfinder device during the measurement campaign (source: FloodAdaptVN). (Bottom): Fishfinder device monitoring during the measurement campaign (photo credit: FloodAdaptVN).

regulations. A second battery has been purchased in Vietnam, in a scooter battery store. Thanks to the Vietnamese partners, a boat has been available for the measurement campaign that has been envisaged for two days. After installing the sonar unit in the aft part of the hull, the measurements have been started on Bo River covering a total of 14 cross-sections. On the second day, additional 23 cross-sections have been measured on Huong River. With the help of dedicated analysis software (ReefMaster 2.0), the recorded profiles have been imported into the computer and exported into a georeferenced format in order to integrate the cross-sections into the hydraulic model software HEC-RAS. The measured transverse profiles were subsequently compared with the existing transverse profile data from JICA from the year 2000.

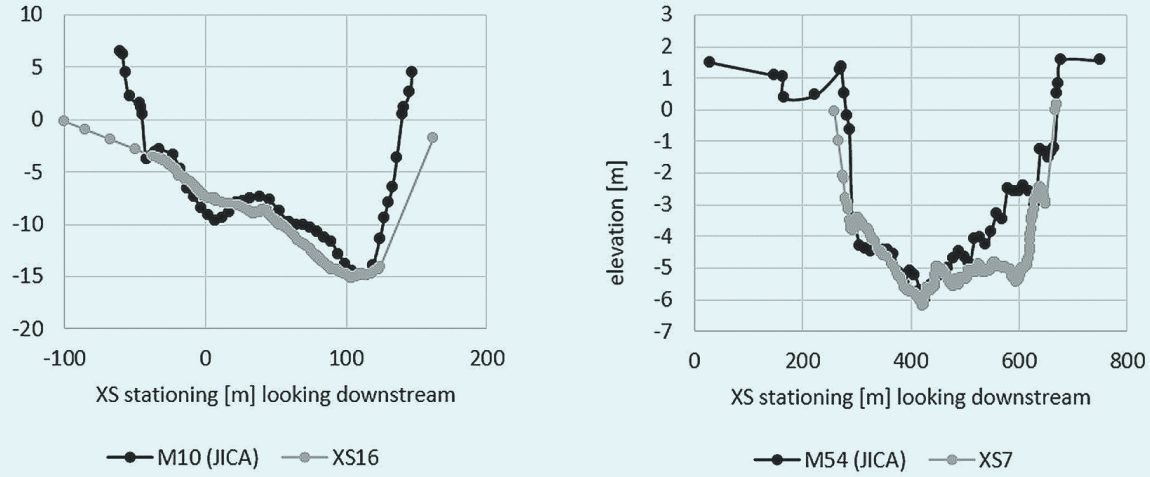


Fig.2: Comparison of two measured cross-sections by JICA (2010) in black color and geomer (2022) in grey color.

Results & Discussion

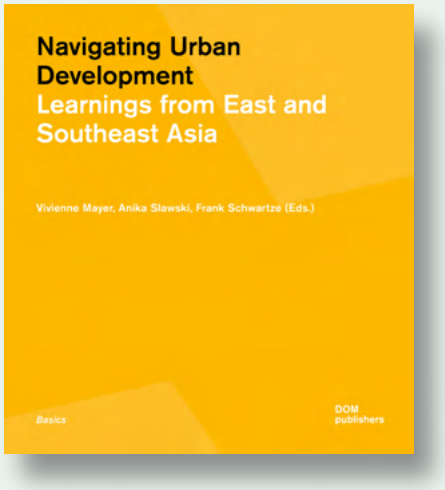
Most of the cross-sectional profiles of JICA from the year 2000 match the newly measured profiles, but some of them differ significantly. The evaluation is made considerably more difficult by the lack of height information of both data sets. The JICA profiles do not contain any absolute height information, nor do the newly measured profiles. As the sonar device does not store any absolute height information, only relative height comparisons to the prevailing water surface are possible. The mobile GPS data taken proved to be not accurate enough. This could be optimised by using real differential GPS equipment. This means that there is no accurate vertical comparability, and mainly the structure and basic shape of the water bed can be compared. In some cross-sections, despite the lack of absolute elevation information, it can be seen that the river depth appears to differ by several meters and/or the shape of the bottom differs significantly, for example due to the presence of hills in the newer cross-sections, but mostly due to existing depressions or significantly lower depths. At this point, however, it should also be mentioned that the cross-sections within the river can change considerably if the location changes by several tens of meters. One explanation can be sand theft, well-known in the region, where in some places tons of sand are illegally removed. However, depending on the gradient, erosion and sedimentation processes occur that also naturally influence the riverbed.

The recording of the data was also made more difficult by the limited maneuverability of the boat, which meant that it was only possible to record marginal areas on the banks to a limited extent, as a minimum tidal flat depth was required to navigate the boat. A higher water level in the rivers would have been helpful here, however for Bo River the navigability of individual bridges was already critical at the prevailing water level, as the boat could only pass under some bridges with the intervention of the captain and passengers. Nevertheless, the activity was successful, and most of the cross-sections were successfully verified and incorporated into the hydraulic model.

SURE F&SR

Book Preview: Navigating Urban Development – Learnings from East and Southeast Asia

In a time when urban regions across the globe face intensifying pressures—from an escalating climate crisis to growing inequality—the need for transformative, impact-oriented approaches is more urgent than ever. The question is no longer whether cities and their regions must change, but how they can do so effectively and impactfully to really achieve the necessary change.



Book Preview: Navigating Urban Development – Learnings from East and Southeast Asia (SURE F&SR).

Recognising this, the SURE Facilitation & Synthesis Research (F&SR) team brings together insights, experiences, and reflections from across the SURE funding priority in the upcoming book: *Navigating Urban Development – Learnings from East and Southeast Asia,* to be published by DOM publishers in autumn 2025.

The book has been conceptualised as a transfer instrument, intended to share learnings across contexts and provide practical orientation for those working toward sustainable, inclusive, and resilient urban transformation. Drawing from ten SURE research projects—each rooted in diverse urban conditions and challenges—the volume showcases how a wide range of actors are co-creating solutions for more inclusive and resilient urban futures.

At the heart of the book is the complex question: How can we understand, track, and strengthen the impact of sustainable urban research projects in complex, rapidly changing environments? This guiding question led the F&SR team to design REframe, an innovative, impact-oriented monitoring framework that underpins the book. Built on two core components—*References*, which refer to the long-term goals or intended impacts of a project, and *Reflection*, which refers to the ongoing process of learning, adaptation, and realignment as conditions evolve, the framework is designed to support a deeper understanding of how change occurs in complex urban systems, moving beyond traditional input-output models.

Navigating Urban Development is designed to support ongoing exchange and mutual learning—within the SURE context and beyond.

By offering both conceptual grounding and practical tools, the book seeks to contribute to the broader discourse on how impact in urban sustainability transitions can be better understood and supported over time.

The development of the book has been a collaborative effort involving close engagement with the individual SURE projects. Their contributions, ranging from case studies to interviews and reflections, form the empirical foundation of the volume. The F&SR team would like to warmly thank all project teams and partners for their valuable input and cooperation throughout the process, as well as the German Federal Ministry of Research, Technology and Space for funding the book.

Vivienne Mayer, Anika Slawski & Frank Schwartze

FloodAdaptVN

Joining Hands for Resilience: Options for Inter-provincial Cooperation and Mutual Learning in Flood and Disaster Risk Reduction in Central Vietnam

Ulrike Schinkel, Simon Spath, Nguyen Hoang Khanh Linh & Felix Bachofer

Participants of the 1st Regional Networking Forum (photo credit: HUIS Media Team).

The FloodAdaptVN project is dedicated to promoting forward-looking, risk-informed planning and flood risk management in the Thừa Thiên Huế province and Central Vietnam. The primary goal of the project is to strengthen cooperation among stakeholders in these domains, both within the province and with counterparts in neighbouring provinces. Serving as an initial networking event extending beyond provincial borders, the 1st Regional Networking Forum on Climate Change Adaptation, Flood and Disaster Risk Reduction took place in April 2023. The forum aimed to facilitate the exchange of experiences of past flooding events and to explore potential collaborative initiatives for the future. The activity report provides a comprehensive overview of the key outcomes of the discussion and an outlook on potential interprovincial collaborations for climate change adaptation, flood and disaster risk reduction.

Deutsch
Das Projekt FloodAdaptVN widmet sich der Förderung einer vorausschauenden, risikobewussten Planung und eines Hochwasserrisikomanagements in der Provinz Thừa Thiên Huế und in Zentralvietnam. Ein vorrangiges Ziel des Projekts ist die Stärkung der Zusammenarbeit zwischen den Akteuren in diesen Bereichen, sowohl innerhalb der Provinz als auch mit den Partnern in den benachbarten Provinzen. Als erste Netzwerkveranstaltung über die Provinzgrenzen hinaus fand im April 2023 das 1. Regionale Netzwerkforum zu Klimawandeilanpassung, Hochwasser- und Katastrophenvorsorge statt. Ziel des Forums war es, den Erfahrungsaustausch über vergangene Hochwasserereignisse zu erleichtern und mögliche Kooperationsinitiativen für die Zukunft zu erkunden. Der Tätigkeitsbericht bietet einen umfassenden Überblick über die wichtigsten Ergebnisse der Diskussion und einen Ausblick auf mögliche interprovinzielle Kooperationen zur Anpassung an den Klimawandel sowie zur Hochwasser- und Katastrophenvorsorge.

Thừa Thiên Huế Province, Central Vietnam

Tiếng Việt
Dự án FloodAdaptVN được thực hiện để thúc đẩy việc lập kế hoạch hướng tới tương lai, lường trước rủi ro và quản lý rủi ro lũ lụt ở tỉnh Thừa Thiên Huế và miền Trung Việt Nam. Mục tiêu chính của dự án là tăng cường hợp tác giữa các bên liên quan trong các lĩnh vực này, cả trong tỉnh và với các đối tác ở các tỉnh lân cận. Với vai trò là sự kiện kết nối ban đầu vượt ra ngoài ranh giới tỉnh, Diễn đàn kết nối khu vực lần thứ nhất về thích ứng với biến đổi khí hậu, giảm thiểu rủi ro lũ lụt và thiên tai đã diễn ra vào tháng 4 năm 2023. Diễn đàn nhằm tạo điều kiện trao đổi kinh nghiệm về các sự kiện lũ lụt trong quá khứ và khám phá tiềm năng hợp tác sáng kiến cho tương lai. Báo cáo hoạt động cung cấp cái nhìn tổng quan toàn diện về các kết quả chính của cuộc thảo luận và triển vọng về khả năng hợp tác liên tỉnh nhằm thích ứng với biến đổi khí hậu, giảm nhẹ rủi ro lũ lụt và thiên tai.
(Automated translation)

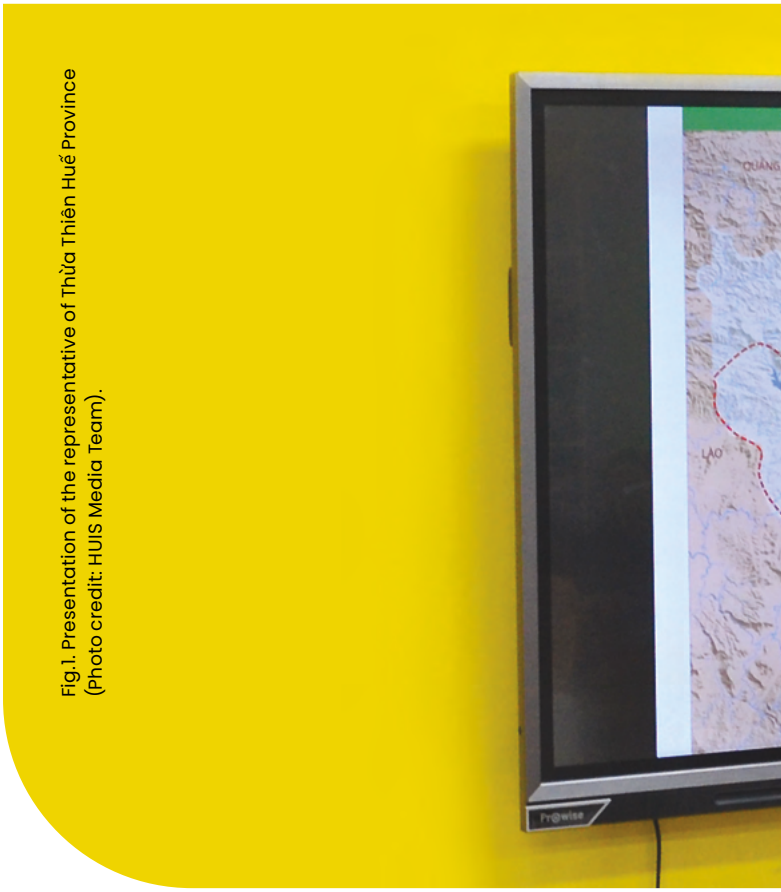


Fig.1. Presentation of the representative of Thừa Thiên Huế Province (Photo credit: HUIS Media Team).

Introduction

Central Vietnam is currently undergoing rapid urbanisation, particularly in small and medium-sized coastal cities. The rapidly growing settlements have to deal with flooding events as a result of increasing precipitation, which are exacerbated by changes in land use and growing soil sealing. These factors pose additional challenges for residents, their assets and income generating activities as well as for the environment, for businesses, for the building stock and for infrastructures.

The research project "FloodAdaptVN – Integrating ecosystem-based approaches into flood risk management for adaptive and sustainable urban development in Central Viet Nam", funded by the German Federal Ministry of Research, Technology and Space (BMFTR) as one of the projects under the funding priority "Sustainable Development of Urban Regions" (SURE), supports risk-informed urban planning and development. Furthermore, the project promotes the application of ecosystem-based adaptation measures as an approach for flood risk management.

While FloodAdaptVN's research activities focus on the Thừa Thiên Huế province and on the city of Huế, the outscaling of the results to other provinces and the fostering of inter-provincial cooperation related to flood and disaster risk management is one of the main objectives of the project. Therefore, in order to facilitate the exchange between the stakeholders from neighbouring provinces, two Regional Networking Forums are an integral part of the research and networking activities of the FloodAdaptVN project.

This Activity Report outlines the methodology and the structure of the 1st Regional Networking Forum on Climate Change Adaptation, Flood and Disaster Risk Reduction. It summarises the results of the discussion and gives an outlook on future networking activities and potential interprovincial collaborations.

Methodology and Structure of the 1st Regional Networking Forum

The 1st Regional Networking Forum on Climate Change Adaptation, Flood and Disaster Risk Reduction was held on April 25, 2023 with relevant stakeholders from Thừa Thiên Huế Province and the neighbouring provinces of Quảng Bình, Quảng Trị and Đà Nẵng City.

The event, organised at the International School of Huế University (HUIS), had two main objectives: firstly, to facilitate the exchange and sharing of experiences on past flood events and lessons learnt, and secondly, to identify topics for joint action and mutual learning in the region beyond current activities as well as for the future cooperation with research projects and institutions. The event was enriched by the active participation of a representative of the water management associations Emschergenossenschaft and Lippeverband and members of the FloodAdaptVN consortium.

The event consisted of two parts. In the first part, the representatives of the various provinces spoke about their experiences from past flooding events and about their lessons learned (see Figure 1). The second part focused on the direct interaction of the participants and on the discussion about potential further interprovincial cooperation and exchange activities.

Fig. 2: Presentation of the representative of Thừa Thiên Huế Province (Photo credit: HUIS Media Team).

The World Café method guided and supported the discussion. At three themed tables, the participants discussed which challenges and fields of action in relation to climate adaptation, flood and disaster risk reduction require direct cooperation between neighbouring provinces (see Figures 2). They also explored areas where stakeholders can learn from their peers in the other provinces and what contribution practical partners, universities and research institutions could make. The results of the World Café Tables were then presented in a plenary session. The event concluded with a joint excursion to current adaptation and flood protection projects in the Thừa Thiên Huế Province.

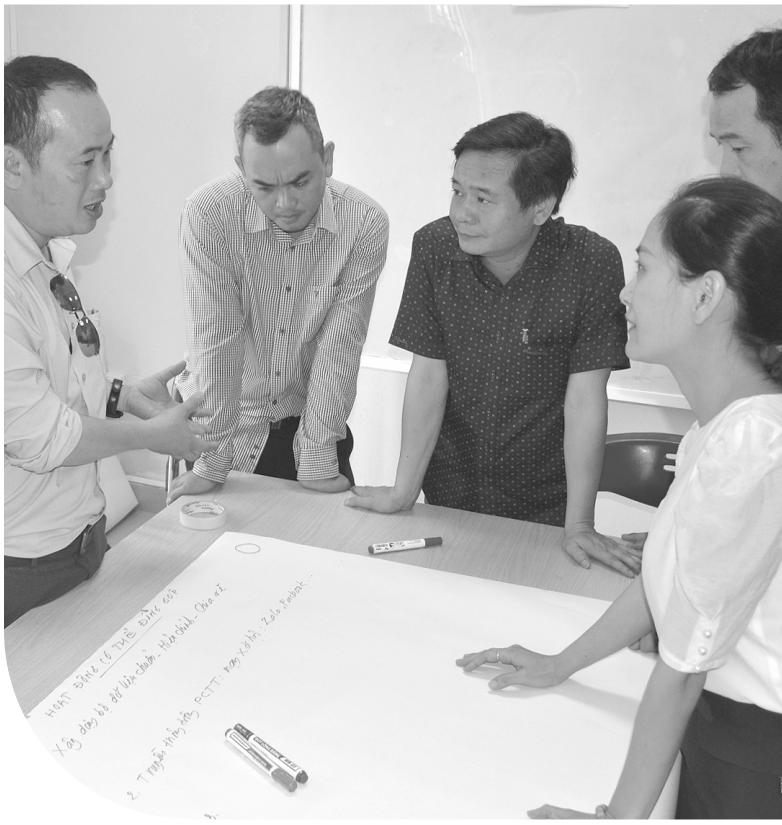
Results of the 1st Regional Networking Forum

The 1st Regional Networking Forum on Climate Change Adaptation, Flood and Disaster Risk Reduction strengthened the ties between stakeholders of the different provinces. Discussions within the frameworks of the World Café session have generated clear ideas for further interprovincial and research activities.

At the World Café Table 1, the brainstorming discussions focused on fields of activity that would benefit from direct cooperation among neighbouring provinces. Besides the increased interprovincial cooperation at the political level, the participants emphasised that, in particular, the joint management of interprovincial rivers, forests and ecosystems as well as the joint management of reservoirs could make a positive contribution to flood and disaster risk reduction in the region. Furthermore, the participants highlighted the need for the improvement of data sharing and warning dissemination and for the establishment of a consultation system involving experts, consultants and municipalities in planning and management processes.

World Café Table 2 aimed to identify topics for exchange between the provinces and for mutual learning. The participants expressed interest in intensified exchanges related to successful strategies and approaches for flood prevention and management, for information transmission, for urban and infrastructure development including the adaptation of the drainage system as well as for the operation of reservoirs and for the management of river basins.

World Café Table 3 focussed on potential contributions of practitioners, universities and think tanks to climate change adaptation, flood and disaster risk management in the provinces. In the course of the discussion, three key topics were identified, namely the development of a standard set of data which can be used as a basis for planning by all departments and authorities, the improvement of communication on flood and disaster risk management through the expansion of the network and in particular, capacity building for authorities of all levels and for students as a part of their university education.



World Café Table 3 (Photo credit: IZES gGmbH).

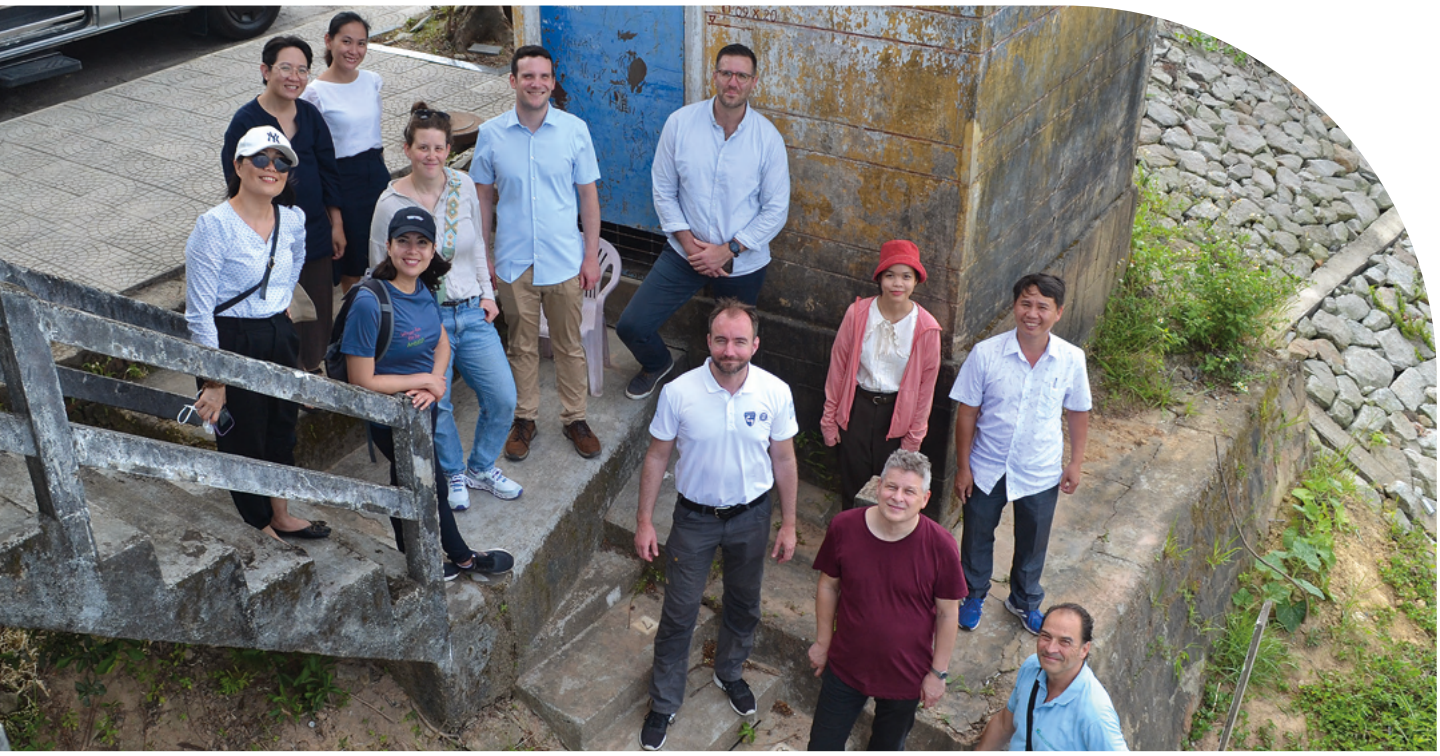
The results of the discussions will be taken up in the further course of the FloodAdaptVN project in order to support their implementation. The participants will be involved in further exchange formats in order to ensure and intensify the continuation of activities.

“Discussions within the frameworks of the World Café session have generated clear ideas for further interprovincial and research activities.”

Conclusion

The 1st Regional Networking Forum on Climate Change Adaptation, Flood and Disaster Risk Reduction facilitated informal discussions among stakeholders responsible for flood and disaster risk management in the provinces Thừa Thiên Huế, Quảng Bình, Quảng Trị and in Đà Nẵng City. The forum allowed them to share personal experiences related to past flooding events. In the discussions, numerous topics for future direct interprovincial cooperation, for the mutual exchange of experiences and for the involvement of research and practice partners in activities for flood and disaster risk reduction were identified. The Regional Networking Forum has thus achieved its goal and supported the joining of hands for resilience in Central Vietnam.

The results will be taken up for further work by the FloodAdaptVN project in several ways. Firstly, the results and outcomes of the research project will be structured in such a way that they can be used in other provinces in Central Vietnam. Secondly, the exchange between stakeholders on themes related to flood and disaster risk reduction will continue in further workshop formats, including the 2nd Regional Networking Forum in early 2025. Thirdly, the project will offer capacity development activities and further training courses for authorities, practitioners and students.



Impressions from the excursion (Photo credit: IZES gGmbH).

SURE F&SR

The SURE atlas: A Synthesis Research Instrument

The SURE Solutions Magazine, focused on the transfer of strategies and solutions for the sustainable development of urban regions, and under the overarching umbrella of the BMFTR´s SURE Funding Priority, the SURE Facilitation and Synthesis Research (F&SR) Project has been carried out with the goal of consolidating a conceptual framework for conducting synthesis research. This initiative supports the integration of knowledge and the development of solutions aimed at promoting sustainable and resilient urban and rural development in Southeast Asia and China, through the implementation of its ten collaborative projects. The F&SR project emphasises a transdisciplinary synthesis of findings from the SURE collaborative efforts, identifying knowledge gaps, and advancing methods for knowledge generation and management, to facilitate the implementation of sustainable solutions. Its core mission is to advance transdisciplinary knowledge integration, sustainability science, and urban research. To achieve this, the F&SR has adopted a multi-method strategy that blends empirical research with artificial intelligence to analyse both qualitative and quantitative data.

The result of this effort has been the conceptualisation and development of the SURE atlas, a digital instrument designed to organise synthesised data into comprehensible formats, enabling deeper cross-sectoral analysis to facilitate applications of sustainable-development measures via the SURE projects. The SURE atlas functions as a web-based, digital platform comprised of a collection of interactive tools. Its core components are: The *Cross-Project Analysis* tool, which offers a dashboard overview of key performance indicators and achievements across individual projects; the *Reflection Toolbox,* which helps active stakeholders navigate and reflect on their pathways toward sustainability; and the *Stakeholder Ecosystem*, a dynamic visualisation of actors and areas of expertise within the broader SURE network. In addition to these primary tools, the atlas also features a range of supplementary resources, including localised

Showcase of the SURE atlas digital interface (photo credit: SURE F&SR).

mappings of the Sustainable Development Goals (SDGs), thematic info-radars, and deep-dive consultations that span over multiple focus areas. It also highlights innovative solutions developed within the SURE framework and provides key information about the overarching goals and structure of the umbrella SURE project.

The purpose of the SURE atlas is to synthesise and streamline the understanding of vast amounts of information, based on the contribution of updatable data, provided by the 10 participating SURE projects and processed by the F&SR team, through background analytic processes. It allows its users to have a deeper dive into the SURE projects, from diverse perspectives, thus enabling ease of access to information, adjustable to the different types of stakeholders and their levels of expertise. Through higher interaction, the atlas is capable of transgressing silos among all involved disciplines, from science, to practice, to decision-making policies.

The F&SR team envisions the SURE atlas as a lasting instrument that continues to generate impact beyond the project's lifetime. Rather than serving solely as a showcase for individual projects, the atlas is designed to highlight the interconnected nature of the SURE network, emphasising the collective efforts and synergies among the participating initiatives. By enabling users to explore projects not individually but as part of a larger, integrated framework, the tool gains greater significance and relevance. Its long-term value lies in its potential to support ongoing knowledge-exchange, management, and collaboration well beyond the formal end of the funding period.

By the end of 2025, the SURE atlas will consolidate an important knowledge-transfer milestone, once a first version of the tool will be made available for the members of the SURE projects. It aims to pioneer a novel research approach to synthesising knowledge in the field of urban sustainability, translated into an operational and customisable knowledge platform designed to support integration and collaboration across the SURE initiative and with the potential to go beyond, on to further contexts on their way to sustainable development.

Maria Moleiro Dale & Katharina M. Borgmann

SURE F&SR

Reflections on Reflection. Towards a Reflective Research Practice as a Catalyst for Transformative Urban Research

Anika Slawski, Vivienne Mayer & Frank Schwartze

**In these days of cool reflection
You come to me
and everything seems alright."**

(Queen,
Heaven for Everyone).

Prototype of the SURE Toolbox for Reflection, featuring tools designed to assist project teams in planning future actions, tracking project progress, facilitating collaborative learning, and collecting outcomes (Source: Authors, 2024).

How can progress and the impact of transnational and transdisciplinary urban research projects be monitored effectively? This contribution explores the role of reflective research practices in the context of sustainable urban development. Based on literature and four years of practical experience in Facilitation and Synthesis Research within the SURE project, the authors developed a framework for impact-oriented monitoring consisting of self-set references, where projects define their own objectives as guiding criteria, and a culture of reflection, which ensures continuous (re)alignment of these objectives in response to evolving real-world conditions. To initiate and foster a culture of reflection, the SURE Toolbox, a set of reflection tools is presented. The tools provide a practical guide to reflection, assist project teams in guiding future actions, tracking project progress, facilitating collaborative learning and collecting outcomes. Overall, the framework provides a dynamic alternative to conventional monitoring methods: Rather than relying on static indicators, it emphasizes continuous reflection on self-set objectives, offering a more flexible and adaptive way to observe progress toward impact and guide the path of transformative urban research.

Deutsch
Wie kann die Entwicklung überwacht und die Auswirkungen transnationaler und transdisziplinärer Stadtforschungsprojekte effektiv gemessen werden? Dieser Beitrag untersucht die Rolle reflektierter Forschungspraktiken im Kontext einer nachhaltigen Stadtentwicklung. Basierend auf Literatur und vier Jahren praktischer Erfahrung in der Moderation und Syntheseforschung (Facilitation and Synthesis Research) im Rahmen des SURE-Projekts haben die Autor*innen einen Rahmen für wirkungsorientiertes Monitoring entwickelt, der aus selbst gesetzten Referenzen besteht, bei denen Projekte ihre eigenen Ziele als Leitkriterien definieren, und einer Kultur der Reflexion, die eine kontinuierliche (Neu-)Ausrichtung dieser Ziele auf die sich verändernden realen Bedingungen gewährleistet. Um eine Kultur der Reflexion zu initiieren und zu fördern, wird die SURE Toolbox vorgestellt, eine Reihe von Reflexionsinstrumenten. Die Tools bieten einen praktischen Leitfaden für die Reflexion, unterstützen Projektteams bei der Steuerung künftiger Maßnahmen, verfolgen den Projektfortschritt, erleichtern das gemeinsame Lernen und sammeln Ergebnisse. Insgesamt bietet der Rahmen eine dynamische Alternative zu herkömmlichen Monitoring-Methoden: Anstatt sich auf statische Indikatoren zu stützen, betont er die kontinuierliche Reflexion über selbst gesetzte Ziele und bietet so eine flexiblere und anpassungsfähigere Möglichkeit, Fortschritte auf dem Weg zur Wirkung zu beobachten und den Weg für transformative Stadtforschung zu ebnen.

မြန်မာ
တိုးတက်မှုကို မည်သို့စောင့်ကြည့်ပြီး နိုင်ငံဖြတ်ကျော်နှင့် စည်းကမ်းထိန်းသိမ်းရေးဆိုင်ရာ မြို့ပြသုတေသနစီမံကိန်းများ၏ အကျိုးသက်ရောက်မှုများကို ထိထိရောက်ရောက် စောင့်ကြည့်စစ်ဆေးနိုင်မည်နည်း။ ဤပုံပိုးကူညီမှုသည် ရေရှည်တည်တံ့သောမြို့ပြဖွံ့ဖြိုးတိုးတက်မှုအခြေအနေတွင် ရောင်ပြန်ဟပ်သောသုတေသနအလေ့အကျင့်များ၏အခန်းကဏ္ဍကို စူးစမ်းလေ့လာပါသည်။ SURE ပရောဂျက်အတွင်း အထောက်အကူဖြစ်စေရေးနှင့် ပေါင်းစပ်သုတေသနတွင် လက်တွေ့ကျကျ လေးနှစ်ကြာ စာပေနှင့် လက်တွေ့အတွေ့အကြုံကို အခြေခံ၍ စာရေးဆရာများသည် လက်တွေ့ကမ္ဘာအခြေအနေများကို တုံ့ပြန်ရာတွင် ၎င်းတို့၏ကိုယ်ပိုင်သတ်မှတ်အကိုးအကားများပါဝင်သော သက်ရောက်မှု-အသားပေးစောင့်ကြည့်ခြင်းဆိုင်ရာ မူဘောင်တစ်ရပ်ကို ရေးဆွဲခဲ့ပါသည်။ ရောင်ပြန်ဟပ်မှုယဉ်ကျေးမှုကို စတင်ရန်နှင့် မွေးမြူရန်အတွက် SURE Toolbox၊ ရောင်ပြန်ဟပ်မှုကိရိယာအစုံကို တင်ဆက်ထားသည်။ ကိရိယာများသည် ရောင်ပြန်ဟပ်ခြင်းအတွက် လက်တွေ့ကျသောလမ်းညွှန်ချက်၊ ပရောဂျက်အဖွဲ့များအား အနာဂတ်လုပ်ဆောင်မှုများကို လမ်းညွှန်ရန်၊ ပရောဂျက်တိုးတက်မှုကို ခြေရာခံခြင်း၊ ပူးပေါင်းလေ့လာသင်ယူခြင်းနှင့် ရလဒ်များစုဆောင်းခြင်းတို့ကို လွယ်ကူချောမွေ့စေရန် ကူညီဆောင်ရွက်ပေးပါသည်။ ယေဘုယျအားဖြင့်၊ မူဘောင်သည် သမားရိုးကျစောင့်ကြည့်ရေးနည်းလမ်းများအတွက် တက်ကြွသောအခြားရွေးချယ်စရာတစ်ခုကို ပံ့ပိုးပေးသည်- တည်ငြိမ်မှုညွှန်ကိန်းများကို အားကိုးမည့်အစား၊ ၎င်းသည် မိမိကိုယ်တိုင်သတ်မှတ်ထားသော ရည်မှန်းချက်များပေါ်တွင် စဉ်ဆက်မပြတ် ရောင်ပြန်ဟပ်မှုကို အလေးပေးကာ အကျိုးသက်ရောက်မှုဆီသို့ တိုးတက်မှုဆီသို့ လိုက်လျောညီထွေဖြစ်စေရန်နှင့် အသွင်ပြောင်းမြို့ပြသုတေသနလမ်းကြောင်းကို လမ်းညွှန်ရန် ပိုမိုပြောင်းလဲလွယ်သော၊
(Automated translation)

中文（简体）
如何有效监测跨国、跨学科城市研究项目的进展及其影响?本文以可持续城市发展为背景，探讨了省思性研究实践在其中的作用。基于相关文献和在“SURE”项目中四年的促进与综合研究经验，作者提出了一个以影响为导向的监测框架。该框架包含两个核心要素：一是“自定参照”，即项目团队依据自身设定的目标作为评估标准；二是“省思文化”，通过持续的省思与调整，使项目目标能够灵活应对不断变化的现实环境。为推动

和培育这种省思文化，作者开发了“SURE 工具箱”——一套省思工具，用于指导实践中的反省性思考。这些工具可帮助项目团队明确下一步行动方向、追踪项目进展、促进协作学习，并收集阶段性成果。总体来看，该框架为传统以静态指标为主的监测方法提供了一种动态性的替代路径。它强调围绕自定目标进行持续省思，从而以更灵活、适应性更强的方式来观察影响进展，并指引转型城市研究。
(Automated translation)

Filipino
Paano masusubaybayan ang pag-unlad at mabisang masusubaybayan ang epekto ng transnational at transdisciplinary urban research projects? Ang kontribusyong ito ay nagsasaliksik sa papel ng mapanimdim na mga kasanayan sa pananaliksik sa konteksto ng napapanatiling pag-unlad ng lunsod. Batay sa literatura at apat na taon ng praktikal na karanasan sa Facilitation and Synthesis Research sa loob ng SURE na proyekto, ang mga may-akda ay bumuo ng isang balangkas para sa impact-oriented na pagsubaybay na binubuo ng mga self-set na sanggunian, kung saan ang mga proyekto ay tumutukoy sa kanilang sariling mga layunin bilang gabay na pamantayan, at isang kultura ng pagmuni-muni, na nagsisiguro ng tuluy-tuloy na (muling) pagkakahanay ng mga layuning ito bilang tugon sa umuusbong na mga kondisyon sa totoong mundo. Upang simulan at pagyamanin ang isang kultura ng pagmuni-muni, ang SURE Toolbox, isang hanay ng mga tool sa pagmuni-muni ay ipinakita. Nagbibigay ang mga tool ng praktikal na gabay sa pagmuni-muni, tulungan ang mga team ng proyekto sa paggabay sa mga aksyon sa hinaharap, pagsubaybay sa pag-unlad ng proyekto, pagpapadali sa pagtutulungang pag-aaral at pagkolekta ng mga resulta. Sa pangkalahatan, ang balangkas ay nagbibigay ng isang dinamikong alternatibo sa mga kumbensyonal na pamamaraan ng pagsubaybay: Sa halip na umasa sa mga static na tagapagpahiwatig, binibigyang-diin nito ang tuluy-tuloy na pagmumuni-muni sa mga itinakda sa sarili na mga layunin, na nag-aalok ng isang mas nababaluktot at umaangkop na paraan upang obserbahan ang pag-unlad patungo sa epekto at gabayan ang landas ng pagbabagong pananaliksik sa lunsod.
(Automated translation)

Indonesia
Bagaimana cara memantau kemajuan dan dampak proyek penelitian perkotaan transnasional dan interdisipliner secara efektif? Kontribusi ini mengeksplorasi peran praktik penelitian reflektif dalam konteks pengembangan perkotaan berkelanjutan. Berbasis pada literatur dan empat tahun pengalaman praktis dalam Penelitian Fasilitasi dan Sintesis dalam proyek SURE, para penulis mengembangkan kerangka kerja pemantauan berorientasi dampak yang terdiri dari acuan yang ditetapkan sendiri, di mana proyek mendefinisikan tujuan mereka sendiri sebagai kriteria panduan, dan budaya refleksi, yang memastikan penyesuaian berkelanjutan (re-alignment) tujuan-tujuan tersebut sebagai respons terhadap kondisi dunia nyata yang terus berkembang. Untuk memulai dan memupuk budaya refleksi, SURE Toolbox, seperangkat alat refleksi, diperkenalkan. Alat-alat ini menyediakan panduan praktis untuk refleksi, membantu tim proyek dalam mengarahkan tindakan masa depan, melacak kemajuan proyek, memfasilitasi pembelajaran kolaboratif, dan mengumpulkan hasil. Secara keseluruhan, kerangka kerja ini menawarkan alternatif dinamis terhadap metode pemantauan konvensional: Alih-alih mengandalkan indikator statis, kerangka kerja ini menekankan refleksi berkelanjutan terhadap tujuan yang ditetapkan sendiri, menawarkan cara yang lebih fleksibel dan adaptif untuk memantau kemajuan menuju dampak dan mengarahkan arah penelitian urban transformatif.
(Automated translation)

ខ្មែរ
តើការវិឌ្ឍអាចត្រូវបានត្រួតពិនិត្យយ៉ាងដូចម្តេច ហើយផលប៉ះពាល់នៃគម្រោងស្រាវជ្រាវទីក្រុងឆ្លងដែន និងអន្តរវិន័យត្រូវបានត្រួតពិនិត្យប្រកបដោយប្រសិទ្ធភាព? ការរួមចំណែកនេះស្វែងយល់ពីតួនាទីនៃការអនុវត្តការស្រាវជ្រាវឆ្លុះបញ្ចាំងនៅក្នុងបរិបទនៃការអភិវឌ្ឍន៍ទីក្រុងប្រកបដោយនិរន្តរភាព។ ដោយផ្អែកលើអក្សរសិល្ប៍ និងបទពិសោធន៍ជាក់ស្តែងរយៈពេល 4 ឆ្នាំក្នុងការស្រាវជ្រាវសម្របសម្រួល និងសំយោគនៅក្នុងគម្រោង SURE អ្នកនិពន្ធបានបង្កើតក្របខ័ណ្ឌសម្រាប់ការត្រួតពិនិត្យការតម្រង់ទិសផលប៉ះពាល់ដែលរួមមានឯកសារយោងដែលកំណត់ដោយខ្លួនឯង ដែលគម្រោងកំណត់គោលបំណងផ្ទាល់ខ្លួនរបស់ពួកគេជាលក្ខណៈវិនិច្ឆ័យណែនាំ និងវប្បធម៌នៃការឆ្លុះបញ្ចាំងដែលធានាឱ្យមានការបន្ត (ឡើងវិញ) នៃគោលបំណងទាំងនេះក្នុងការឆ្លើយតបទៅនឹងការវិវត្តនៃស្ថានភាពជាក់ស្តែង។ ដើម្បីផ្តួចផ្តើម និងជំរុញវប្បធម៌នៃការឆ្លុះបញ្ចាំង ប្រអប់ឧបករណ៍ SURE សំណុំឧបករណ៍ឆ្លុះបញ្ចាំងត្រូវបានបង្ហាញ។

ឧបករណ៍ផ្តល់ការណែនាំជាក់ស្តែងសម្រាប់ការឆ្លុះបញ្ចាំង ជួយក្រុមគម្រោងក្នុងការដឹកនាំសកម្មភាពនាពេលអនាគត តាមដានការវិវត្តនៃគម្រោង សម្របសម្រួលការរៀនសូត្ររួមគ្នា និងការប្រមូលលទ្ធផល។ សរុបមក ក្របខ័ណ្ឌផ្តល់នូវជម្រើសដ៏ស្វាហាប់ចំពោះវិធីសាស្ត្រត្រួតពិនិត្យជម្មតា៖ ជាជាងការពឹងផ្អែកលើសូចនាករបិតិវន្ត វាសង្កត់ធ្ងន់ទៅលើការឆ្លុះបញ្ចាំង ជាបន្តបន្ទាប់លើគោលដៅដែលបានកំណត់ដោយខ្លួនឯង ដោយផ្តល់នូវវិធីដែលអាចបត់បែនបាន និងសម្របខ្លួនជាងមុន ដើម្បីសង្កេតមើលវឌ្ឍនភាព ឆ្ពោះទៅរកផលប៉ះពាល់ និងណែនាំផ្លូវនៃការស្រាវជ្រាវទីក្រុងដែលផ្លាស់ប្តូរ។
(Automated translation)

ພາສາລາວ
ຈະມີການຕິດຕາມຄວາມຄືບໜ້າແນວໃດ ແລະ ຜົນກະທົບຂອງໂຄງການຄົ້ນຄວ້າຕົວເມືອງຂ້າມຊາດ ແລະ ຂ້າມຜ່ານຈະຖືກຕິດຕາມຢ່າງມີປະສິດທິພາບ? ການປະກອບສ່ວນນີ້ຄົ້ນຄວ້າບົດບາດຂອງການປະຕິບັດການຄົ້ນຄວ້າສະທ້ອນໃຫ້ເຫັນໃນສະພາບການຂອງການພັດທະນາຕົວເມືອງແບບຍືນຍົງ. ໂດຍອີງໃສ່ວັນນະຄະດີແລະປະສົບການປະຕິບັດ 4 ປີໃນການຄົ້ນຄວ້າການອຳນວຍຄວາມສະດວກແລະການສັງເຄາະພາຍໃນໂຄງການ SURE, ຜູ້ຂຽນໄດ້ພັດທະນາກອບສຳລັບການຕິດຕາມຜົນກະທົບທີ່ປະກອບດ້ວຍການອ້າງອີງທີ່ກຳນົດເອງ, ບ່ອນທີ່ໂຄງການກຳນົດຈຸດປະສົງຂອງຕົນເອງເປັນເງື່ອນໄຂການຊີ້ນຳ, ແລະ ວັດທະນະທຳຂອງການສະທ້ອນ, ເຊິ່ງຮັບປະກັນຢ່າງຕໍ່ເນື່ອງ (re) ສອດຄ່ອງຂອງຈຸດປະສົງເຫຼົ່ານີ້ເພື່ອຕອບສະຫນອງສະພາບຕົວຈິງຂອງໂລກ. ເພື່ອເລີ່ມຕົ້ນແລະສົ່ງເສີມວັດທະນະທຳຂອງການສະທ້ອນ, ກ່ອງເຄື່ອງມື SURE, ຊຸດຂອງເຄື່ອງມືສະທ້ອນໄດ້ຖືກນຳສະເຫນີ. ເຄື່ອງມືສະຫນອງຄູ່ມືພາກປະຕິບັດເພື່ອສະທ້ອນ, ຊ່ວຍເຫຼືອທີມງານໂຄງການໃນການຊີ້ນຳການປະຕິບັດໃນອະນາຄົດ, ຕິດຕາມຄວາມຄືບຫນ້າຂອງໂຄງການ, ອຳນວຍຄວາມສະດວກໃນການຮຽນຮູ້ການຮ່ວມມືແລະເກັບກຳຜົນໄດ້ຮັບ. ໂດຍລວມແລ້ວ, ໂຄງຮ່າງການສະຫນອງທາງເລືອກແບບເຄື່ອນໄຫວຕໍ່ກັບວິທີການຕິດຕາມແບບດັ້ງເດີມ: ແທນທີ່ຈະອີງໃສ່ຕົວຊີ້ວັດຄົງທີ່, ມັນເນັ້ນຫນັກໃສ່ການສະທ້ອນຢ່າງຕໍ່ເນື່ອງກ່ຽວກັບຈຸດປະສົງທີ່ກຳນົດເອງ, ສະເຫນີວິທີການທີ່ມີຄວາມຍືດຫຍຸ່ນແລະປັບຕົວຫຼາຍກວ່າເກົ່າເພື່ອສັງເກດເຫັນຄວາມຄືບຫນ້າໄປສູ່ຜົນກະທົບແລະນຳພາເສັ້ນທາງຂອງການຄົ້ນຄວ້າຕົວເມືອງທີ່ຫັນປ່ຽນ.
(Automated translation)

แบบไทย
เราจะติดตามความก้าวหน้าและผลกระทบของโครงการวิจัยเมืองข้ามชาติและสหวิทยาการได้อย่างมีประสิทธิภาพได้อย่างไร บทความชิ้นนี้สำรวจบทบาทของแนวปฏิบัติการวิจัยเชิงสะท้อนในบริบทของการพัฒนาเมืองอย่างยั่งยืน จากวรรณกรรมและประสบการณ์ภาคปฏิบัติสี่ปีด้านการวิจัยการอำนวยความสะดวกและการสังเคราะห์ภายในโครงการ SURE ผู้เขียนได้พัฒนากรอบการทำงานสำหรับการติดตามผลกระทบ ซึ่งประกอบด้วยการอ้างอิงที่ตั้งขึ้นเอง โดยโครงการต่างๆ จะกำหนดวัตถุประสงค์ของตนเองเป็นเกณฑ์ชี้นำ และวัฒนธรรมแห่งการสะท้อน ซึ่งรับประกันการปรับ (หรือปรับ) วัตถุประสงค์เหล่านี้อย่างต่อเนื่องเพื่อตอบสนองต่อสภาพการณ์จริงที่เปลี่ยนแปลงไป เพื่อริเริ่มและส่งเสริมวัฒนธรรมแห่งการสะท้อน จึงได้นำเสนอชุดเครื่องมือการสะท้อน SURE Toolbox ซึ่งเป็นคู่มือปฏิบัติสำหรับการสะท้อน เครื่องมือเหล่านี้มอบแนวทางปฏิบัติในการสะท้อน ช่วยให้ทีมโครงการสามารถกำหนดทิศทางการดำเนินการในอนาคต ติดตามความคืบหน้าของโครงการ ส่งเสริมการเรียนรู้ร่วมกัน และรวบรวมผลลัพธ์ โดยรวมแล้ว กรอบงานนี้ให้ทางเลือกแบบไดนามิกต่อวิธีการตรวจสอบแบบเดิม แทนที่จะพึ่งพาตัวบ่งชี้แบบคงที่ กรอบงานนี้เน้นที่การไตร่ตรองอย่างต่อเนื่องเกี่ยวกับวัตถุประสงค์ที่ตั้งไว้เอง ซึ่งมอบวิธีการที่ยืดหยุ่นและปรับตัวได้มากกว่าในการสังเกตความคืบหน้าในการสร้างผลกระทบ และชี้นำเส้นทางของการวิจัยในเมืองที่สร้างการเปลี่ยนแปลง
(Automated translation)

Tiếng Việt
Làm thế nào để theo dõi tiến độ và đánh giá hiệu quả của các dự án nghiên cứu đô thị xuyên quốc gia và liên ngành? Bài viết này khám phá vai trò của các thực hành nghiên cứu phản ánh trong bối cảnh phát triển đô thị bền vững. Dựa trên các tài liệu nghiên cứu và bốn năm kinh nghiệm thực tiễn trong nghiên cứu điều phối và tổng hợp trong khuôn khổ dự án SURE, các tác giả đã phát triển một khung giám sát hướng tới tác động, bao gồm các tiêu chí tự đặt ra, nơi các dự án xác định mục tiêu của mình làm tiêu chí hướng dẫn, và một văn hóa phản ánh, đảm bảo sự điều chỉnh liên tục các mục tiêu này để phù hợp với điều kiện thực tế thay đổi. Để khởi xướng và thúc đẩy văn hóa phản ánh, bộ công cụ SURE Toolbox, một bộ công cụ phản ánh, được giới thiệu. Các công cụ này cung cấp hướng dẫn thực tiễn cho quá trình phản ánh, hỗ trợ các nhóm dự án định hướng hành động tương lai, theo dõi tiến độ dự án, thúc đẩy học tập hợp tác và thu thập kết quả. Tổng thể, khung làm việc này cung cấp một giải pháp linh hoạt thay thế cho các phương pháp giám sát truyền thống: Thay vì dựa vào các chỉ số tĩnh, nó nhấn mạnh vào việc phản ánh liên tục về các mục tiêu tự đặt ra, mang lại cách tiếp cận linh hoạt và thích ứng hơn để quan sát tiến trình hướng tới tác động và định hướng con đường nghiên cứu đô thị chuyển đổi..
(Automated translation)

"We would like to emphasize two things: first, that reflection is a learning exercise that is intended to be used in future actions; and second, that others are crucial to this process."

Background

The SURE Facilitation and Synthesis Research project (SURE F&SR) provides scientific and organisational support for the funding priority and its collaborative projects in Southeast Asia and China. A central concern of SURE F&SR's synthesis research is the question: How to observe impact in the context of sustainable development of urban regions?

To answer this question, the authors have developed a framework for impact-oriented monitoring consisting of self-set references that serve as criteria and tools to promote a culture of reflection[1]. The references present a collection of the project's intentions, programmes and actions and offer a customised alternative to a purely indicator-based monitoring system in order to meet the high degree of flexibility required in a rapidly changing world (Albert, 2022). However, as research indicates a significant disparity between our aspirations and our actions (Raelin, 2002), the reference picture is only useful when accompanied by reflection tools that enable constant alignment and adjustment (Fig. 2). This contribution focuses on exploring the culture of reflection from both a theoretical and a practical perspective.

Reflection - A Theoretical Perspective

We are inclined to think of reflection as something quiet and personal. My argument here is that reflection is action-oriented, social and political. Its 'product' is praxis (informed, committed action). (Kemmis, 1985, p.141).

Reflection is an integral practice in our daily lives. In personal contexts, we intuitively reflect to make sense of our experiences, learn from them, and manage our expectations (Boud et al., 1985, p.8). The process involves engaging in "learning dialogues", which Raelin (2002) defines as *"discussions […] [that] bring to surface – in the safe presence of trusting peers – the social, political, and emotional data that arise from direct experience with one another. Often these data are precisely those that might be blocking operating effectiveness. Learning dialogues also are concerned with creating mutual caring relationships."* (Raelin, 2002, p.66). All factors that are crucial for research aiming to be truly intercultural, transdisciplinary, and transformative.

Fig. 2: Interplay between references and reflection - reflection tools to reflect on and (re)align the references, ensuring they remain responsive to evolving conditions. (Source: Authors, 2024)

While there are diverse definitions for reflection, we like to adapt Raelin's term "reflective practice", which he defines as *"the practice of periodically stepping back to ponder the meaning of what has recently*

1 For an introduction of the framework see SURE Solutions I or Slawski et al., 2022.

transpired to ourselves and to others in our immediate environment. It illuminates what the self and others have experienced, providing a basis for future action." (Raelin, 2002, p.66). In light of this, we would like to emphasise two things: first, that reflection is a learning exercise that is intended to be used in future actions; and second, that others are crucial to this process.

Firstly, reflection is a key element of experiential learning, leading to new insights and a deeper understanding of one's own experience (Plack et al., 2005, p. 200 ff.). Moreover, reflection is not purely "internal" to the actor but is highly context-dependent and intertwined with action (Kemmis, 1985, p. 143). On the one hand, reflection cannot be understood without reference to action (Kemmis, 1985, p. 143) and on the other hand, reflection enhances one's own experience by raising consciousness and awareness (Knights, 1985, p. 138).

Secondly, Knights (1985) highlights that reflection is most effective when it is verbalised and done with the conscious attention of another person. It is a two-way process that requires a suitable "reflector" – in other words, a counterpart that mirrors one's own reflection.

In transnational and transdisciplinary research projects—especially those aiming for transformative change, like the SURE funding priority—reflection is crucial. It helps researchers to go beyond existing solutions, expand problem-solving skills and effectively engage in research that steers actions and drives change (Raelin, 2002).

For teams working across borders and cultures, it's essential to create a culture of continuous learning and reflection. This helps team members recognize and understand each other's positionality—a term used to describe how one's background, culture, and experiences shape one's perspective and understanding (Sensoy & DiAngelo, 2018). By acknowledging these differences, teams can address biases or assumptions they might hold (Kemmis, 1985). In an intercultural context, being aware of one's behaviour and its consequences is key to keeping cooperation open and productive (Raelin, 2002, p. 67). Moreover, reflection allows the researchers to observe progress towards impact in a more flexible and application-oriented manner, which is particularly important in complex environments where indicator-based measurement systems may not yield promising results (Albert, 2022).

Reflection - A Practical Perspective

Fig. 3: Engaging in World Cafe Sessions during the Status Seminar in Bangkok (photo credit: Colin Dunjohn, 2023).

To observe the impact of sustainable development in urban regions and provide scientific and organisational support for the ten SURE projects, the SURE F&SR team is in regular contact with each project. The reference pictures, which serve as a baseline of the framework for impact-oriented monitoring, were developed in a participatory way with multiple feedback rounds. To gain an initial understanding of the extent to which reflection occurs in the projects, the status conference held in Bangkok in September 2023, where all projects presented their current state, was used. During a World Cafe session, projects discussed various levels of reflection and the challenges they face when reflecting (see Fig. 3). The key findings and challenges that emerged from the discussions are as follows:

1. Importance of Active and Unbiased Listening

In a general sense, but especially in transnational, transdisciplinary contexts in which the SURE projects operate, it is important to acknowledge each other's different positionality, practice active listening, and leave personal biases behind. In particular, it is important to ensure sufficient space so that local concerns and knowledge can be communicated continuously and repeatedly throughout the project. Ideally, there should be sufficient time and appropriate methods to comprehend each other's perspective and establish trust. Intercultural skills are crucial for good research results, and projects with a long-term trustful relationship with their local partners report that in their case the interdisciplinary challenges outweigh the intercultural ones.

2. Creating a Common Language

Closely tied to the first point of active listening is the need to develop a common language. The experience shows that especially stakeholders from different disciplines and areas of work (science / practice) tend to understand terms and methods differently, and that a dialogue about each other's assumptions is important. This applies to both the project team and to communication with external stakeholders.

3. Harvesting the Value of Informal Reflection

A lot of reflection takes place in informal, small-group meetings, which are often self-organised, such as socialising outside working hours. In these informal settings, people report that they share more openly, honestly and directly than in meetings with the entire team or in virtual formats. However, this approach presents challenges as not all team members may be present, and the learnings may not be captured. Although informal discussions can influence the attitudes and actions of those involved, the potential of these informal discussions is often overlooked. Formalising these discussions, anchoring them in the project's course, and sharing them at various levels can lead to greater benefits.

4. Creating a Safe Space

To facilitate an honest and open reflection and assessment of a single activity or the overall project, team members must feel secure. Two levels should be considered: who participates in the reflection and where it takes place.

Firstly, there is a difference between internal reflection within the team and external reflection where external stakeholders are involved. For the latter, project members report that a higher degree of formality is maintained as projects and their performance are often presented in best light possible. Internal reflection usually bears the chance to achieve a higher degree of openness, but this also depends on team dynamics, familiarity, and everyone's willingness to cooperate. In general, creating a safe space is easier with flat hierarchies and a long-term relationship that has allowed trust to be built.

Secondly, the location of the meeting is also important as it determines who can listen to the meeting. In an open or public space, reflections tend to be less critical because it is not clear who is listening to the conversation, whereas a private space naturally creates more security.

5. Encouraging a Solution-driven Mindset

Although it is important to identify and address problems, it is beneficial to focus on solutions rather than dwelling on the problem. Additionally, highlighting what works well or what has already been achieved and making it visible and tangible, such as through exhibitions, can boost motivation.

In order to address these and other challenges and to maximise learning from each other's experiences, the SURE F&SR team compiled the SURE Toolbox for Reflection.

The SURE Toolbox for Reflection

The SURE Toolbox for Reflection is an invitation and guide to reflection, designed to initiate and foster a reflective research practice. It comprises 19 different tools that address diverse challenges and can be employed depending on the project's state and the capacity of participants in terms of time and resources (see overview Fig. 4).

The toolbox (see article cover photo) is organised according to different stages of the project:

- Planning the Future: Tools for envisioning and strategising project goals

- Tracking Progress: Tools for monitoring and assessing development throughout the project

- Learning from Each Other: Tools for fostering knowledge sharing and collaboration

- Collecting Data: Tools for gathering insights and harvesting outcomes, especially toward the end of the project

Each tool within the toolbox is then carefully described, providing a concise overview, guidance on when and how to apply it, estimated time requirements, recommended team size, and difficulty level.

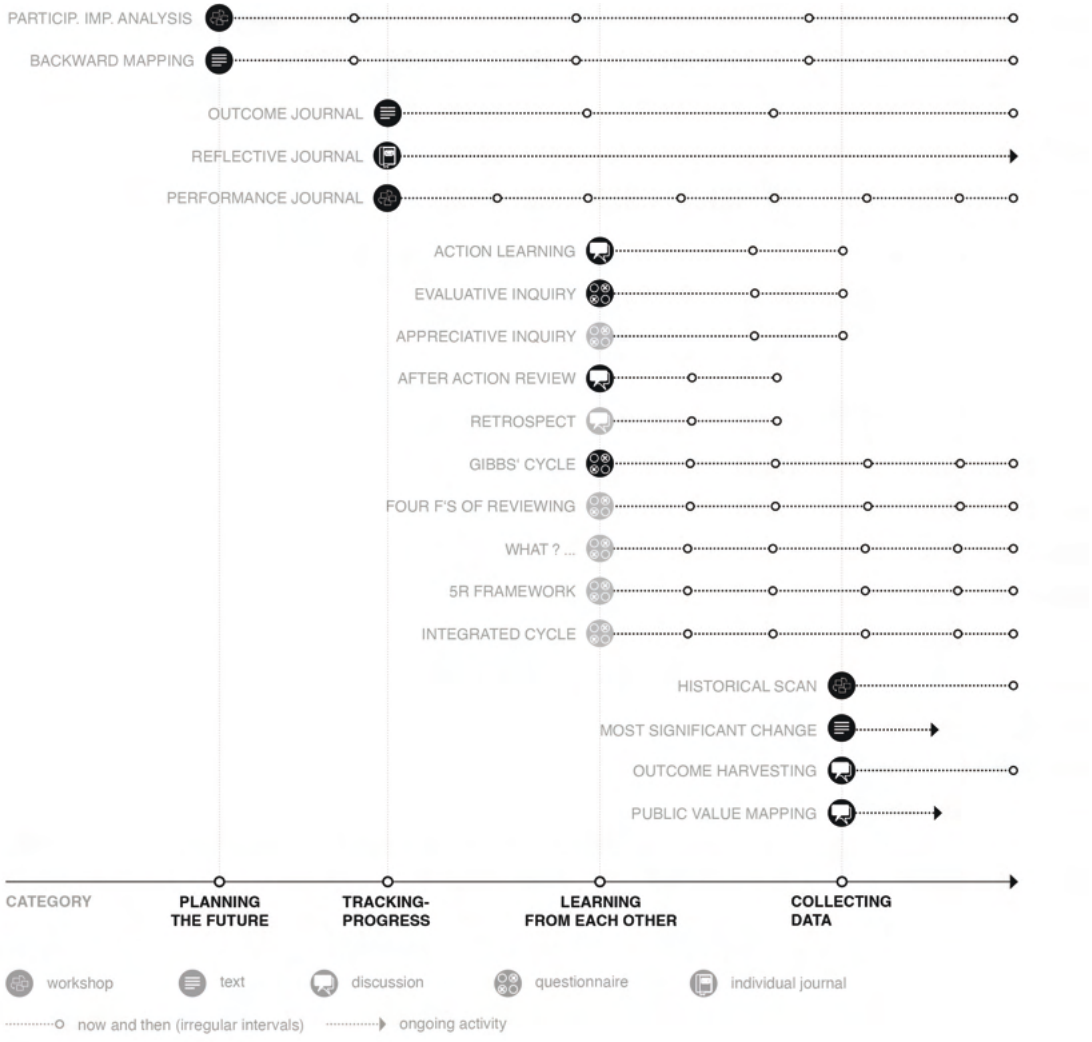
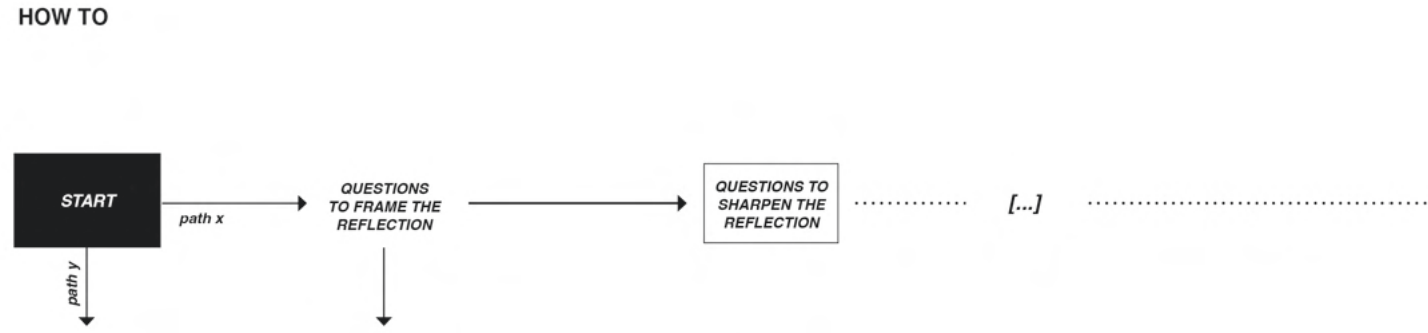


Fig. 4: The Galaxy of Tools provides an overview of the tools, organised according to the different stages of the project: planning, tracking, learning and collecting (Source: Authors, 2024).



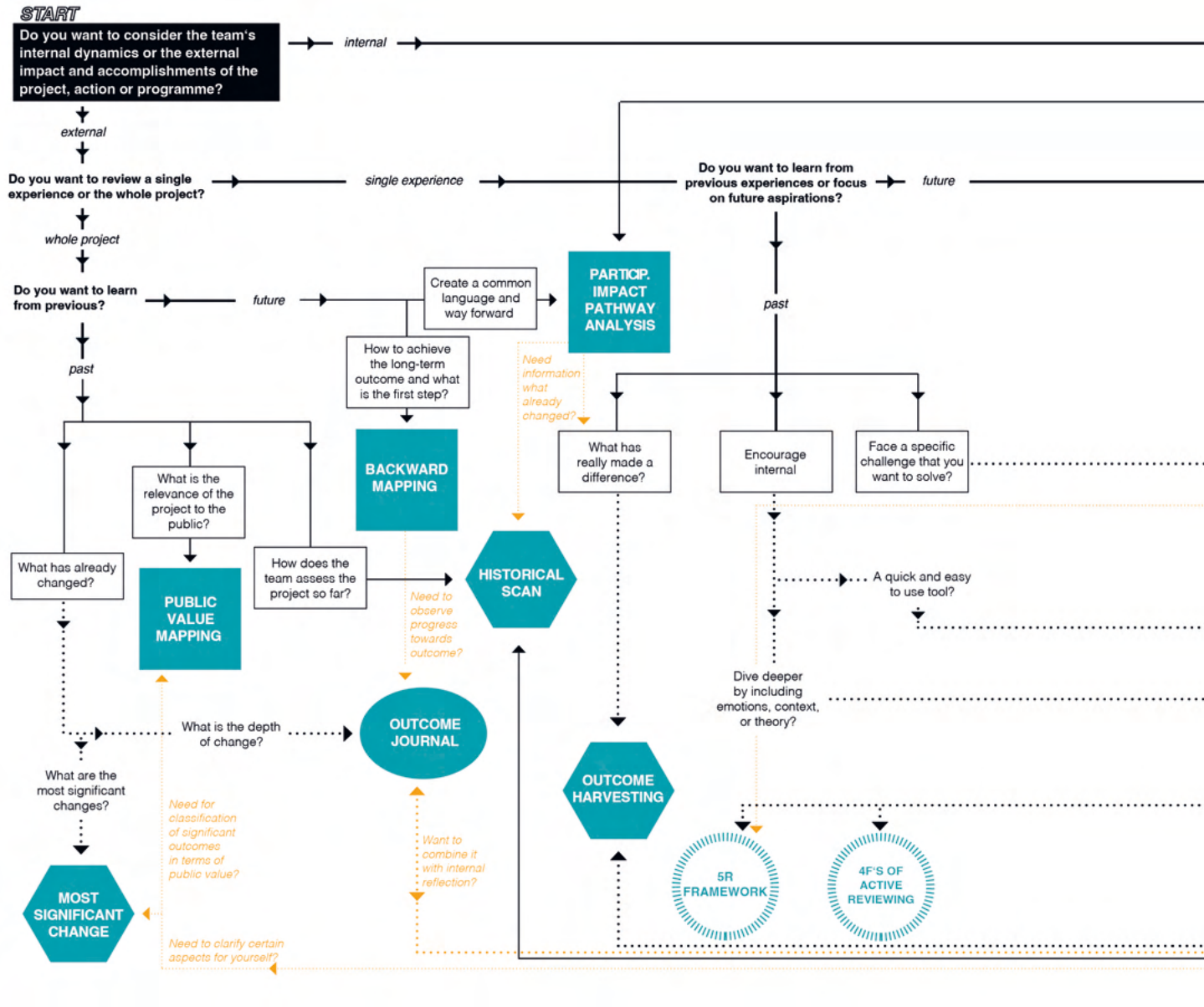
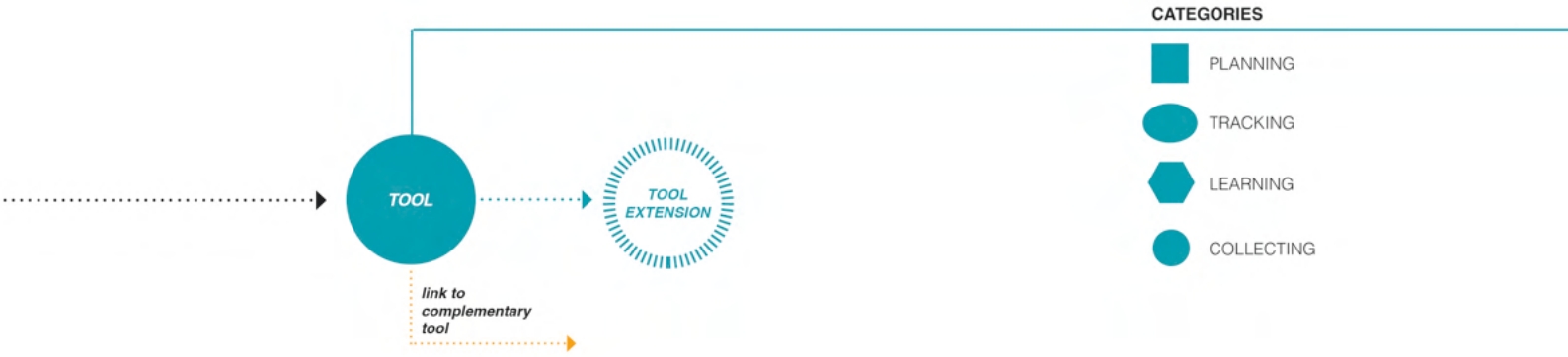
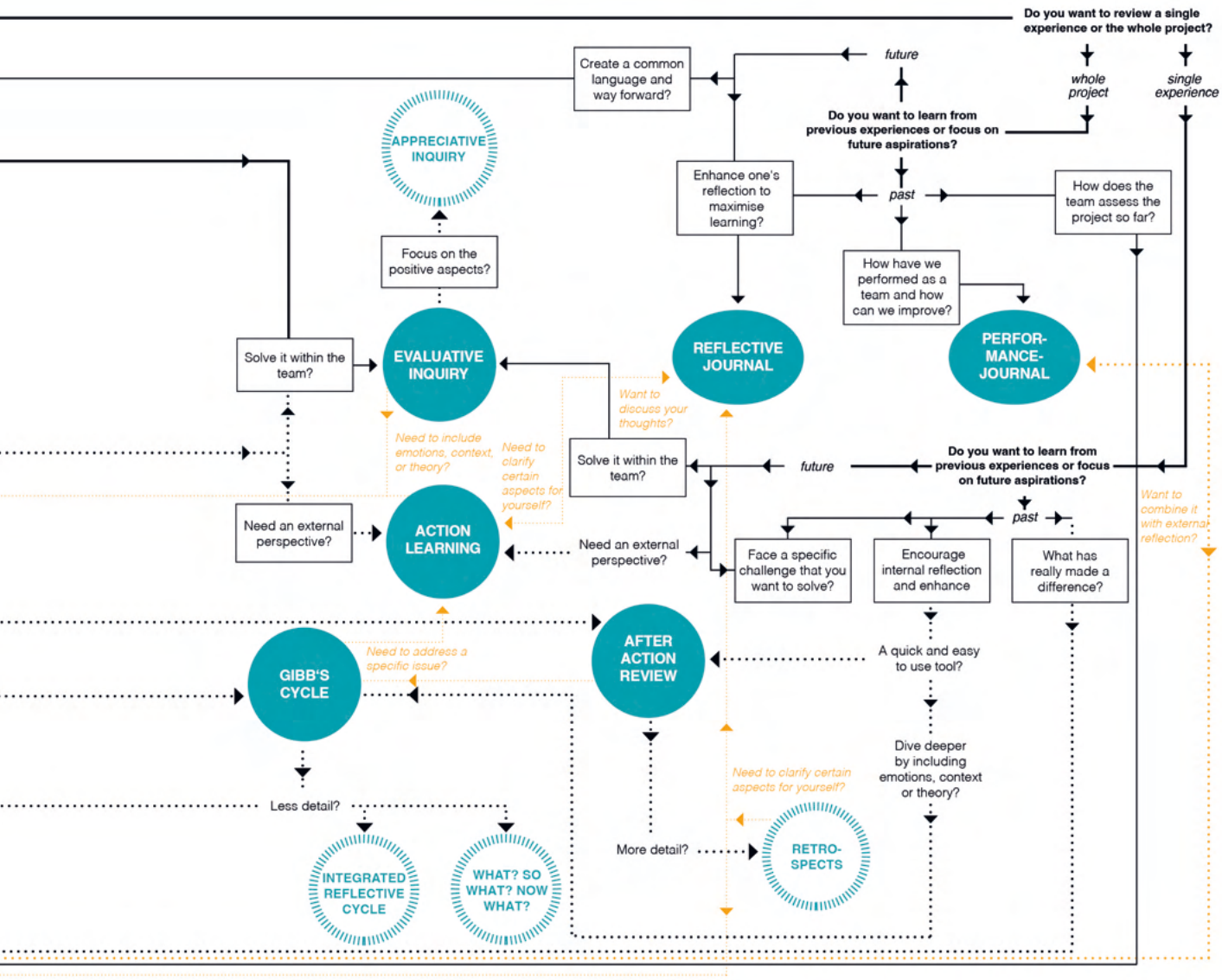


Fig. 5: Decision pathways to identify the most suitable tool quickly (Source: Authors, 2024).


CATEGORIES
PLANNING
TRACKING
LEARNING
COLLECTING
TOOL
TOOL EXTENSION
link to complementary tool


Do you want to review a single experience or the whole project?
whole project
single experience
future
Create a common language and way forward?
Do you want to learn from previous experiences or focus on future aspirations?
APPRECIATIVE INQUIRY
Enhance one's reflection to maximise learning?
past
How does the team assess the project so far?
Focus on the positive aspects?
How have we performed as a team and how can we improve?
Solve it within the team?
EVALUATIVE INQUIRY
REFLECTIVE JOURNAL
PERFOR-MANCE-JOURNAL
Want to discuss your thoughts?
Need to include emotions, context, or theory?
Need to clarify certain aspects for yourself?
Solve it within the team?
future
Do you want to learn from previous experiences or focus on future aspirations?
Want to combine it with external reflection?
Need an external perspective?
ACTION LEARNING
Need an external perspective?
past
Face a specific challenge that you want to solve?
Encourage internal reflection and enhance
What has really made a difference?
AFTER ACTION REVIEW
A quick and easy to use tool?
GIBB'S CYCLE
Need to address a specific issue?
Dive deeper by including emotions, context or theory?
Need to clarify certain aspects for yourself?
Less detail?
More detail?
RETRO-SPECTS
INTEGRATED REFLECTIVE CYCLE
WHAT? SO WHAT? NOW WHAT?

Moreover, if a team or project member faces a specific issue or wants to reflect on one of the intended references from the reference picture, the pathways (Fig. 5) can help guide them toward the appropriate tool in a playful way.

While there's plenty of room to play with the pathways, here are some examples that show how the toolbox can be applied to address challenges raised by SURE projects:

- Creating a common language: The Historical Scan tool can be used to reflect on past achievements and build a shared understanding among team members, helping to develop a consistent terminology for future work.

- Harvesting the value of informal reflections: The Reflective Journal is recommended to document insights from informal discussions and encourage critical, analytical thinking. It is usually written by an individual after an informal conversation. To expand these reflections and gather different perspectives, teams can prepare a Performance or Outcome Journal together.

- The Performance Journal is ideal for internal reflections, such as improving communication strategies or refining internal project processes.

- The Outcome Journal focuses on external reflections, recording changes in stakeholder behaviour or project circumstances and exploring the reasons behind them.

- Creating a safe space for reflection: The Action Learning tool is useful for discussing challenges—whether they are personal or project-related—within a small group, where members can share issues and explore possible solutions.

- Fostering a solution-driven mindset: Emphasising team strengths is important for motivation. The Most Significant Change tool collects and systematically reviews stories from individual team members, helping to highlight what is working well and inspire further success.

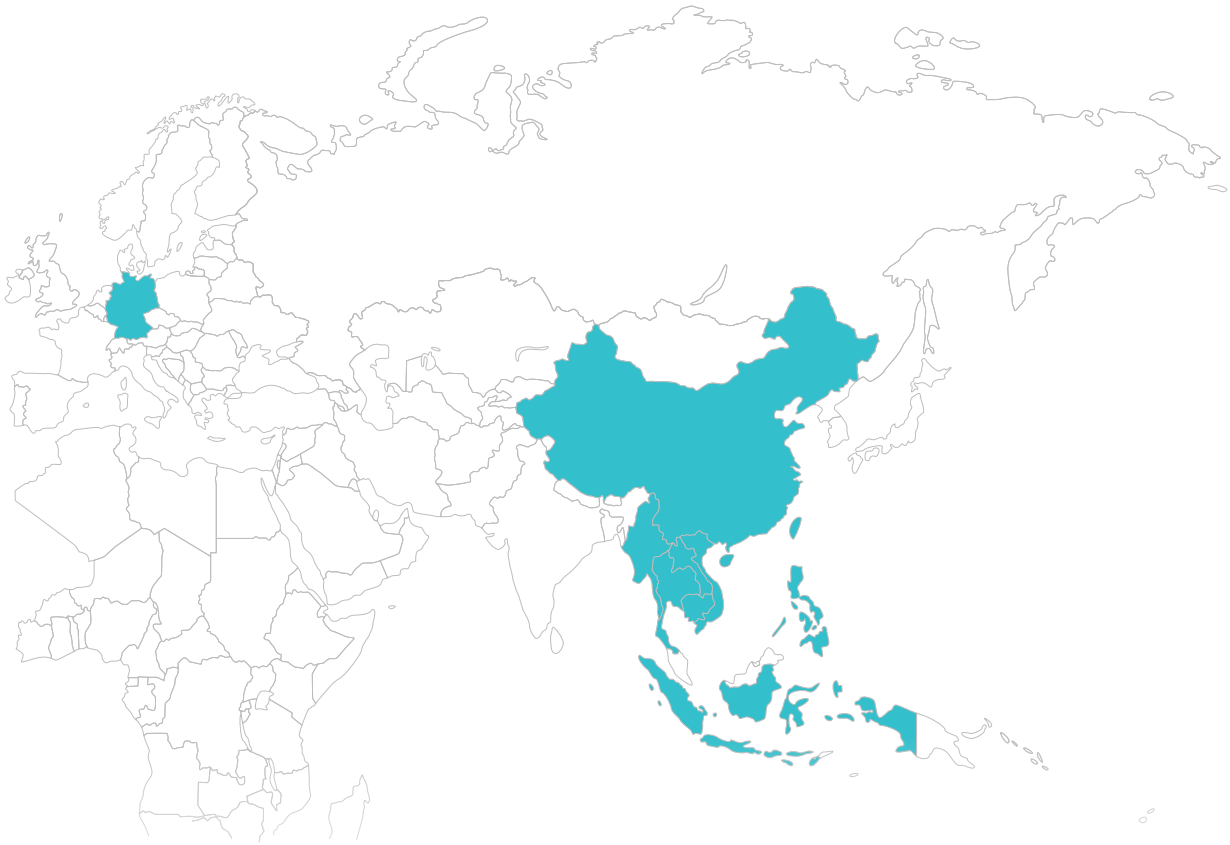
The toolbox can be applied to address challenges raised by SURE projects: creating a common language, harvesting the value of informal reflections, creating a safe space for reflection and fostering a solution-driven mindset."

Since reflection is a highly personal and dynamic process and observing progress in transdisciplinary, transnational research can be complex, users are encouraged to combine tools or adapt them to fit their local context, available time, and resources. While the physical prototype of the SURE Toolbox (article cover photo) is just the beginning, the full details of the tools will soon be available in an open access book to be published in 2025.

Key Takeaways

The presented Toolbox offers a practical guide to reflection, enabling teams to easily embed reflection into their project work with tools that meet their needs at different stages of the project: from envisioning and strategising project goals, to tracking progress, promoting knowledge sharing and collaboration, to tools for gathering insights and capturing outcomes, especially towards the end of the project. These tools are not only practical but also adaptable, allowing teams to reflect at individual, team, and stakeholder level, ensuring that critical insights are captured, shared, and acted upon.

The reflection tools, combined with the references, bring the framework for impact-oriented monitoring to life. This framework offers an alternative to traditional monitoring systems by focusing on real changes in people's lives, communities, and the environment over the course of the project. By emphasising continuous reflection, it facilitates deeper engagement, uncovers fresh insights, and opens new pathways for urban transformation. Ultimately, the framework aims at long-lasting, transformative change, equipping teams to navigate the complexities of urban regions with greater agility and awareness. Through reflective practices and structured monitoring, it empowers transformative urban research to achieve meaningful, sustainable impacts in complex, ever-evolving settings.

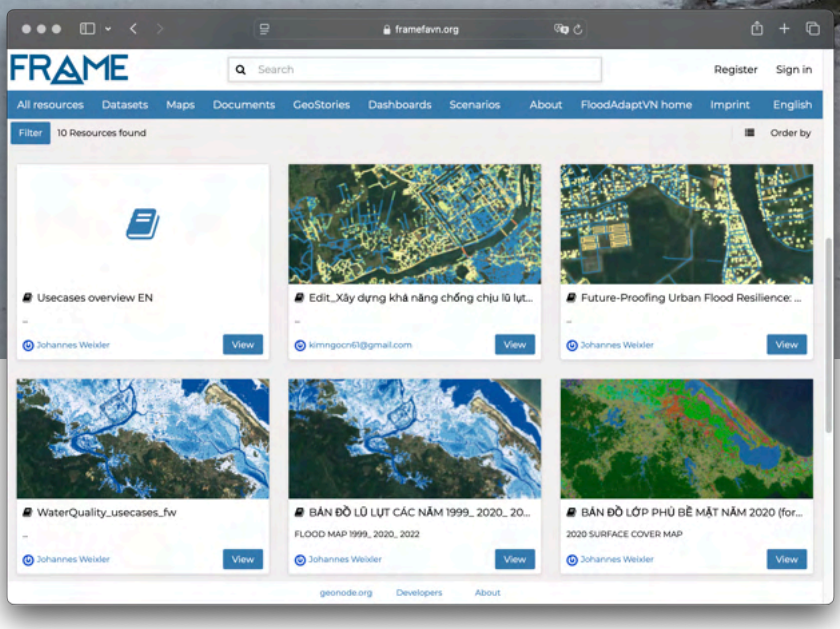


Southeast Asia, China and Germany

FloodAdaptVN

Flood Risk Information System for Adaptation Measures and Evaluation in Central Vietnam – (FRAME) – GeoNode Facilitation

Michael Schultz, Christian Bick, Felix Bachofer, Andreas Braun & Volker Hochschild



Background photo: Vietnam (photo credit: DLR).
FRAME online platform landing page (Retrieved from framefavn.org).

The Flood Risk Information System for Adaptation Measures and Evaluation (FRAME) is an online tool developed for Thừa Thiên Huế province in Central Vietnam, aimed at helping local decision-makers plan for floods more effectively. It's part of the Integrating Ecosystem-based Approaches into Flood Risk Management for Adaptive and Sustainable Urban Development in Central Viet Nam (FloodAdaptVN) project, designed to address the growing challenges of climate change and flooding. FRAME provides easy access to data on land use, urban assets, and flood scenarios, including the costs of different adaptation measures. The tool evaluates measures for reducing and adapting to flood risk, emphasising their effectiveness in impact mitigation, cost-efficiency, and sustainability, and serves as decision support tool. It uses GeoNode technology, making it easy to deploy and customise for other regions if needed. This paper explains how FRAME works, its key features, and its potential benefits for flood risk management. This is the first of a series of publications revolving around the functionalities of FRAME and focus here is set on technical necessities and orchestration aspects within GeoNode, to support the requirements defined within FloodAdaptVN.

Deutsch
Das Hochwasserrisikokennzeichnungssystem für Anpassungsmaßnahmen und Bewertung (FRAME) ist ein Online-Tool, das für die Provinz Thừa Thiên Huế in Zentralvietnam entwickelt wurde, um lokale Entscheidungsträger bei der effektiveren Planung von Hochwasserschutzmaßnahmen zu unterstützen. Es ist Teil des Projekts „Integration ökosystembasierter Ansätze in das Hochwasserrisikomanagement für eine adaptive und nachhaltige Stadtentwicklung in Zentralvietnam (FloodAdaptVN)“, dass sich mit den wachsenden Herausforderungen des Klimawandels und der Hochwassergefahr befasst. FRAME bietet einfachen Zugang zu Daten über Landnutzung, städtische Vermögenswerte und Hochwasserszenarien, einschließlich der Kosten verschiedener Anpassungsmaßnahmen. Das Tool bewertet Maßnahmen zur Verringerung und Anpassung an Hochwasserrisiken unter Berücksichtigung ihrer Wirksamkeit bei der Schadensminderung, ihrer Kosteneffizienz und ihrer Nachhaltigkeit und dient als Entscheidungshilfe. Es nutzt die GeoNode-Technologie, wodurch es bei Bedarf leicht in anderen Regionen eingesetzt und angepasst werden kann. In diesem Beitrag werden die Funktionsweise von FRAME, seine wichtigsten Merkmale und seine potenziellen Vorteile für das Hochwasserrisikomanagement erläutert. Dies war die erste einer Reihe von Veröffentlichungen zu den Funktionen von FRAME, wobei der Schwerpunkt auf den technischen Anforderungen und den Koordinationsaspekten innerhalb von GeoNode lag, um die im Rahmen von FloodAdaptVN definierten Anforderungen zu erfüllen.

Tiếng Việt
Hệ thống Thông tin Nguy cơ Lũ lụt cho các Biện pháp Thích ứng và Đánh giá (FRAME) là một công cụ trực tuyến được phát triển cho tỉnh Thừa Thiên Huế ở miền Trung Việt Nam, nhằm mục đích giúp các nhà quyết định địa phương lên kế hoạch đối phó với lũ lụt một cách hiệu quả hơn. Đây là một phần của dự án Tích hợp Các Phương pháp Tiếp cận Dựa trên Hệ sinh thái vào Quản lý Rủi ro Lũ lụt cho Sự phát triển Đô thị Thích ứng và Bền vững ở miền Trung Việt Nam (FloodAdaptVN), được thiết kế để giải quyết những thách thức ngày càng tăng của biến đổi khí hậu và lũ lụt. FRAME cung cấp quyền truy cập dễ dàng vào dữ liệu về sử dụng đất, tài sản đô thị và các kịch bản lũ lụt, bao gồm cả chi phí của các biện pháp thích ứng khác nhau. Công cụ này đánh giá các biện pháp giảm thiểu và thích ứng với rủi ro lũ lụt, nhấn mạnh vào hiệu quả của chúng trong việc giảm thiểu tác động, hiệu quả chi phí và tính bền vững, và phục vụ như một công cụ hỗ trợ quyết định. Nó sử dụng công nghệ GeoNode, làm cho việc triển khai và tùy chỉnh cho các khu vực khác nếu cần trở nên dễ dàng. Bài báo này giải thích cách FRAME hoạt động, các tính năng chính của nó và lợi ích tiềm năng của nó đối với quản lý rủi ro lũ lụt. Đây là bài đầu tiên trong một loạt các bài công bố xoay quanh các chức năng của FRAME và tập trung vào các nhu cầu kỹ thuật và khía cạnh điều phối trong GeoNode, để hỗ trợ các yêu cầu được định nghĩa trong FloodAdaptVN.
(Automated translation)

Introduction

Flood Risk Information System for Adaptation Measures and Evaluation in Central Vietnam (FRAME) is an online tool designed for decision-makers in Thừa Thiên Huế province to assist in climate-resilient planning against flood risks, potentially extendable to other areas. Developed within the Integrating Ecosystem-based Approaches into Flood Risk Management for Adaptive and Sustainable Urban Development in Central Viet Nam (FloodAdaptVN) project, it addresses the increased frequency and impact of disasters due to climate change. FRAME provides spatial insights on land use, urban assets, and environmental effects of flood scenarios, including cost estimations for adaptation strategies. It emphasises ecosystem-based disaster risk reduction (EcoDRR) and adaptation (EbA) measures, offering a strategic approach to flood adaptation planning and integrating ecosystem services to mitigate vulnerabilities. The tool facilitates interdisciplinary assessments, targeting Vietnamese local administration in Thừa Thiên Huế for effective planning. It features a secure, web-based data infrastructure with access to data, maps, statistics, and visualisations for flood impact assessment. FRAME incorporates research insights, foundational maps, remote sensing data, and information on current and projected flood hazards, infrastructure, and land use. It empowers stakeholders by allowing system ownership, personal data integration, and customisation to meet specific needs. FRAME is based on GeoNode and can be deployed as Docker, enhancing its ease of transfer and adaptability for use by other organisations or regions. A Docker container is a all-in-one software package that includes the application, libraries, and dependencies needed to run it anywhere. Figure 1 provides a conceptual overview of the system and the different features it offers within the context of FloodAdaptVN. Within this paper we provide details on the technical workings of FRAME and highlight GeoNode context and features.

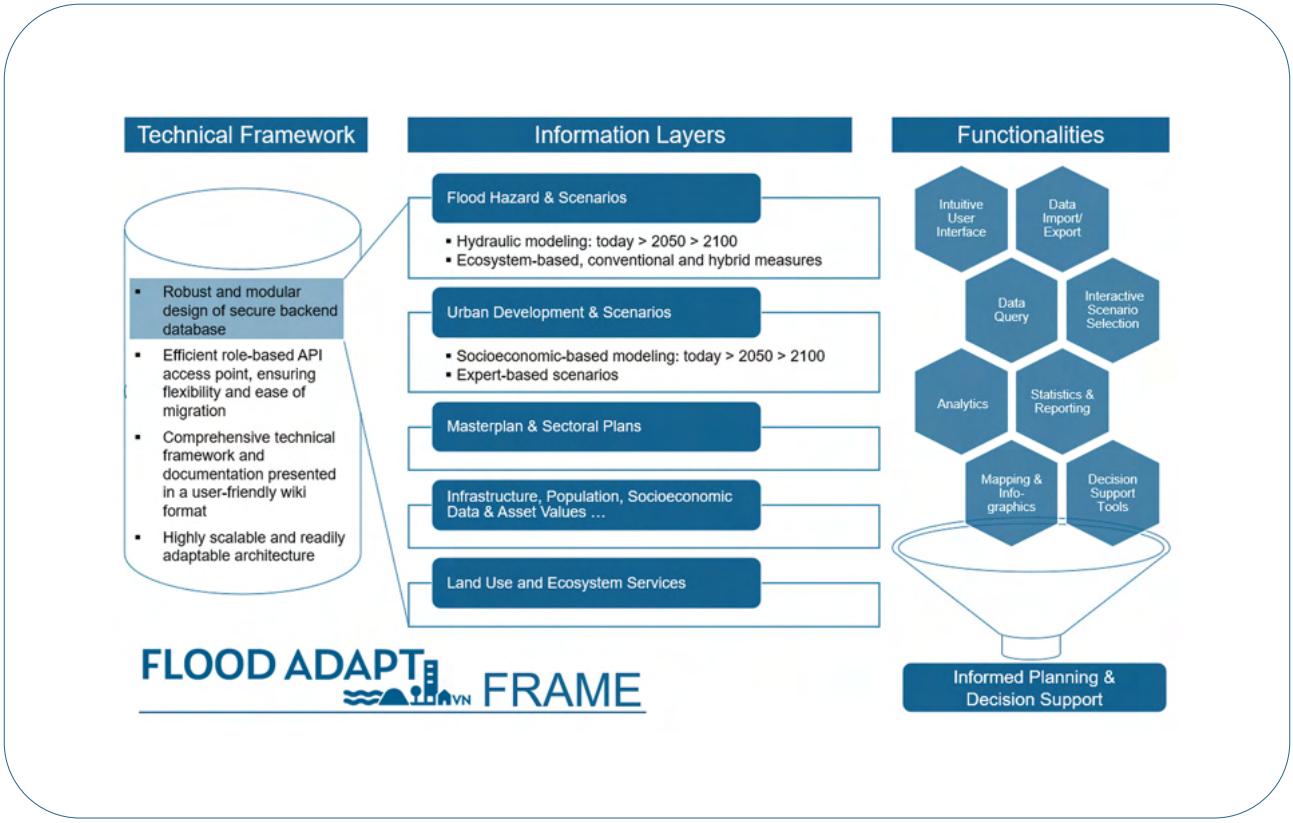


Fig. 1: Conceptual overview of FRAME.

Unlike proprietary GIS solutions (e.g., ESRI's ArcGIS), open-source platforms like GeoNode offer transparency, cost-effectiveness, and community-driven support. They provide flexibility for users with diverse technical backgrounds, enabling local agencies or NGOs to tailor the system to specific flood risk challenges without steep licensing costs.

Implementation of FRAME using GeoNode

GeoNode was chosen as a solution to facilitate FRAME. GeoNode orchestrates components interaction to provide a web-based comprehensive geospatial content management system. Django offers the web framework, facilitating rapid development and serving as the backbone for user interfaces and functions interaction logic. GeoServer handles spatial data, enabling map rendering and data downloading. GeoExplorer supports map composition and publishing. PostgreSQL/PostGIS stores and manages spatial data, while pycsw implements metadata catalogue services. Geospatial Python Libraries gsconfig and OWSLib, integrate GeoNode with GeoServer's configuration and OGC services (GeoSolutions, n.d). Django Pluggables extend GeoNode's functionality, jQuery enhances UI interactivity, and Bootstrap ensures consistent styling across browsers. Each component plays a crucial role in the GeoNode ecosystem, supporting data management, user interaction, and system functionality for flood management (Cristofori et al., 2015). Within the following subsections relevant aspects of FRAME and GeoNode are presented.

Functionalities and Features

GeoNode provides a wide range of functionalities for geospatial data management and analysis. Users can upload and download geospatial data in formats such as Shapefiles, GeoTIFFs, GeoJSON, Keyhole Markup Language (KML), or comma-separated values file (CSV). The platform includes built-in search capabilities based on keywords, categories, regions, and filters, while detailed metadata entry enables consistent cataloguing. Visualisation and editing are possible through an integrated map composer (GeoExplorer) or external GIS tools including QGIS and GeoTools. Data sharing among user groups or the public fosters collaboration, and OGC-compliant services plus a Django-based architecture allow for easy integration with external applications.

Compared to commercial solutions such as ArcGIS Online, GeoNode's open-source design emphasises cost-effectiveness, transparency, and adaptability. Organisations can tailor the software to specific project requirements without incurring high licensing fees, making it accessible to both technical specialists and non-expert stakeholders. The open and modular design also supports rapid updates through community-driven enhancements (GeoSolutions, 2024).

Architecture and Design

GeoNode relies on several key components that work together. GeoServer is a Java-based server for sharing and editing geospatial data through Open Geospatial Consortium (OGC) standards including Web Map Service WMS, Web Feature Service WFS, Web Coverage Service WCS, and Web Map Tile Service WMTS. It integrates with OpenLayers for map rendering and GeoTools for spatial data handling. Django, a Python-based web framework, manages user authentication, data uploads, and interactions between GeoServer, metadata services such as pycsw or GeoNetwork, and the database. FRAME uses PostgreSQL with the PostGIS extension for efficient spatial storage and querying. Web front-ends (OpenLayers or Leaflet) offer interactive map displays, layer controls, and data exploration. Integration with desktop GIS tools ensures interoperability.

By using Docker, these components are containerised, simplifying installation and updates. The hosting environment, with open ports such as 80 and 443, ensures both internal and external accessibility. Let's Encrypt can handle SSL certificates for secure traffic. The FRAME system can thus operate as a robust decision-support tool for flood risk management, combining technical flexibility with user-friendly access.

The client side of GeoNode includes web browsers or applications that access GeoNode's functionalities

through its web interface or APIs. It supports a wide array of tools and libraries for geospatial data display and interaction, including OpenLayers, Leaflet, Mapbox, and integration with external GIS software, facilitating a versatile and user-friendly experience for accessing and simple manipulating geospatial data (vectors). Each of these components plays a pivotal role in the overall functionality and user experience of GeoNode, illustrating the platform's comprehensive approach to geospatial data management and analysis. For a deeper understanding of GeoServer's capabilities and standards, see the GeoServer User Manual and documentation on OGC API (Green, 2021; Corti et al., 2019).

GeoServer

- Java-based engine for serving and editing geospatial data under OGC standards (WMS, WFS, WCS, WMTS).
- Integrates with OpenLayers and the GeoTools library for robust map rendering and spatial data handling.

Django

- Python-based web framework orchestrating user authentication, data workflows, and communication with GeoServer and metadata services.
- Maintains a unified interface to link databases, geospatial services, and the client-facing application.

Database (PostgreSQL/PostGIS)

- Ensures reliable storage of spatial data and supports advanced querying, improving performance in multi-user environments.
- Scales effectively for large datasets, vital for extensive flood maps and asset registries.

Metadata Management (pycsw or GeoNetwork)

- Facilitates cataloguing and compliance with ISO 19115 standards, enabling efficient data discovery.
- Ensures traceability and standardisation across various datasets.

Client Interface

- Web-based front end using libraries such as OpenLayers or Leaflet for interactive maps, layer toggling, and data exploration.
- Compatible with external GIS clients, so users can view or edit data in desktop tools.

Docker Deployment

- Containers wrap each component (GeoServer, Django, etc.) to streamline installation, updates, and scalability.
- Requires open ports (80 for HTTP, 443 for HTTPS) and SSL (Secure Sockets Layer) certificate integration (e.g., Let's Encrypt) for secure external access.

Data Models and Formats

Geonode employs a variety of data models and formats for the storage and exchange of geospatial data and metadata. A data layer represents geospatial features or rasters and contains attributes including name, type, geometry, and value. A data store acts as a repository for one or more data layers and can be a file, folder, database, or web service, characterised by parameters such as name, type, location, and connection. Each layer or workspace has a URI (Uniform Resource Identifier) that provides a standardised address for data retrieval. Workspaces serve as namespaces to group data stores, featuring properties name, prefix, and URI, and are utilised to organise data according to project, domain, or owner. Styles define the visual appearance of data layers on maps through elements: symbol, colour, size, label, and filter, and are adaptable to other formats SLD, CSS, or YSLD. Maps integrate data layers and styles on a canvas, including classic GIS components such as base map, zoom level, centre, extent, and legend, with storage options in formats such as JSON, XML, or WMC. Lastly, metadata describes the various elements of GeoNode, including data layers, stores, workspaces, styles, and maps, with fields covering title, abstract, keywords, licence, owner, date, and spatial extent, and can be formatted in ISO 19115 standards, Dublin Core, and FGDC. GeoNode is built upon several key components, each offering unique

functionalities and enabling integration with external services and clients (Green, 2021; Corti et al., 2019).

Security, Authentication, and Relevance for Stakeholders

Within FRAME, the security and authentication mechanisms ensure that different user groups—ranging from local authorities to non-technical stakeholders—can access only the relevant data and functionalities. This safeguards sensitive information (e.g., infrastructure plans) while allowing broader project teams and the public to view general flood risk data.

GeoNode handles FRAME security and authentication mechanisms to safeguard and manage access to its resources, including data layers, data stores, workspaces, styles, maps, and metadata. The core elements of GeoNode's security framework encompass users, groups, permissions, policies, authentication, and authorisation. Users, defined by attributes such as username and password, can assume roles ranging from administrator to staff. Groups bring together users with shared interests, equipped with attributes of name and members, and roles such as manager or editor that can be freely configured. Permissions specify the actions users or groups can perform on resources, articulated through parameters of resource type and action. Policies aggregate permissions under conditions related to resource ownership or user roles. Authentication verifies user identities through a password and if necessary tokens, while authorisation determines access rights, relying on Django permissions and GeoServer security to grant or restrict resource usage (GeoSolutions, 2024; Corti et al., 2019).

Features Integrated into FRAME

The FRAME tool enhances decision-making across several domains by offering research-backed insights and evidence-based recommendations for the stakeholders of FloodAdaptVN. In decision support, it aids planning units and institutions with data for infrastructure and urban planning, focusing on adapting to and predicting future socio-economic and urban vulnerabilities to extreme events. For flood scenarios, FRAME provides detailed spatial analyses of flood extents and inundation depths, assessing current hazards, future changes due to climate and economic factors, and the effectiveness of adaptation measures. This approach enriches flood risk management and assessment strategies. In urban development, FRAME facilitates informed land use and development strategies through cost-benefit analyses, ensuring resilient infrastructure against future challenges. It also enables comparative analysis of adaptation options, weighing ecosystem-based approaches against conventional engineering solutions, highlighting long-term socio-economic impacts. Furthermore, FRAME conducts thorough analyses of agricultural and ecosystem impacts, focusing on the financial aspects of land use changes. Similarly, its infrastructure impact analysis covers a wide range of assets, supporting various sector-specific assessments of healthcare accessibility and flood risk for tourism. Through these applications, FRAME significantly contributes to strategic planning and risk management in a changing environmental and socio-economic landscape. Table 1 outlines the applications we have or are currently realising for FRAME using GeoNode technologies. By clearly defining roles and permissions, FRAME helps maintain data integrity and fosters collaboration among diverse stakeholders, ensuring reliable and secure access.

Figure 2 comprises two facets (A and B) illustrating dynamic aggregation in FRAME's flood damage test use case. Facet A demonstrates on-the-fly spatial aggregation, where right-hand tables automatically update according to the current zoom level, reflecting ward- or district-level summaries. Facet B shows individual buildings, with corresponding aggregation also sensitive to map scaling. These multi-layered, zoom-dependent widgets allow stakeholders to seamlessly transition from broad overviews (e.g., total damage per district) to granular building-level estimates. This flexible design, exemplified by the flood damage scenario, highlights FRAME's capacity for real-time data aggregation and interactive exploration across multiple spatial scales.

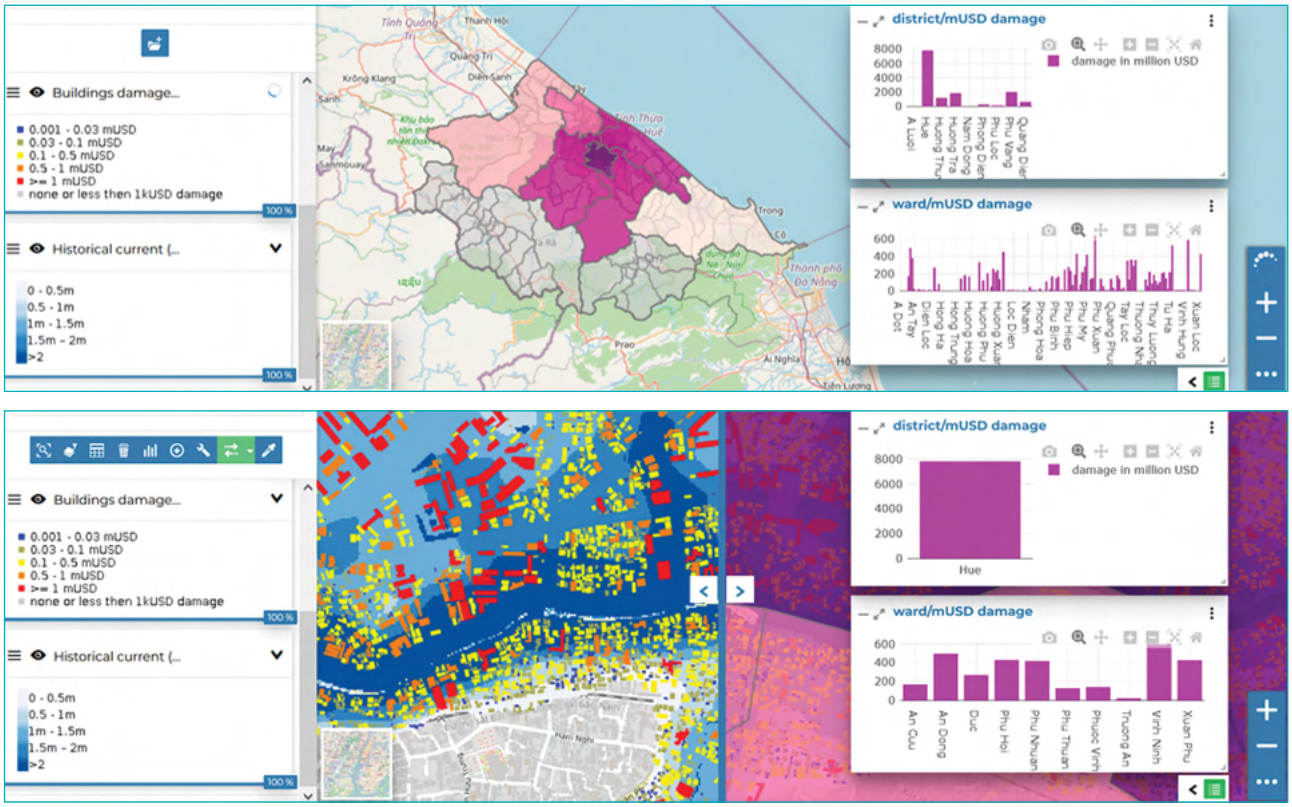


Fig.2 Example of GeoNode feature use for FRAME. On the fly data aggregation via widgets (top) and individual buildings and flood impact analysis (bottom).

These interactive maps and charts underscore FRAME's capacity as a user-friendly WebGIS:

- **Layer Swapping and Swiping:** Users can compare various scenarios (e.g., historic flood vs. future flood) or layer combinations by simply dragging the swipe bar.
- **Granular vs. Aggregated Insights:** Building-level data illuminates specific assets at risk, while aggregated ward or district damage totals inform broader-scale adaptation strategies.
- **Automatic Chart Updates:** As users zoom in or switch layers, the bar charts recalculate accordingly, ensuring real-time, scenario-based analytics.

FRAME goes beyond flood risk. By containerizing GeoNode, it unites data for housing, transport, or environment, all in one flexible ecosystem."

Table 1 FRAME application options

Applications	FRAME contribution or use case
Decision Support	Research-backed decision support, tailored to provide insights for spatial plans and the five-year socio-economic development plans (SEDP). It equips planning units and institutions with evidence-based recommendations for infrastructure and urban planning, combining prediction and adaptation of exposure and vulnerability of socioeconomic and urban developments to future extreme events.
Flood Scenarios	Offers a detailed spatial depiction of flood modelling results, including flood extents and inundation depths. Evaluates current hazards, potential climate-driven changes, and adaptation outcomes to strengthen flood risk assessment.
Urban Development	Supports cost-benefit analyses of land-use strategies, guiding resilient and economically viable infrastructure investments against future challenges and uncertainties.
Comparative Analysis of Adaptation Options	Comparative analysis of adaptation measures like Ecosystem-based Adaptation (EbA) against conventional engineered solutions such as dam construction, considering long-term benefits, challenges, and socio-economic impacts.
Agricultural and Ecosystem Impact Analysis	Analysis of agricultural impacts, delving into the financial implications of various land use modifications, particularly regarding agricultural lands and ecosystems.
Infrastructure Impact Analysis	Investigates the flood risk to buildings, roads, and electricity infrastructure, supporting assessments of healthcare and education accessibility, transport route safety, and tourism vulnerability under various flood scenarios.

Conclusion

GeoNode based FRAME is a powerful and flexible content management system for spatial data that enables users to create, share, and manage geospatial data and is well suited for the use on FloodAdaptVNs FRAME. GeoNode is built on top of GeoServer and Django, and provides a web-based interface for data discovery, visualisation, editing, and analysis. GeoNode supports interoperability and integration with other geospatial systems and applications through the use of standards and protocols such as OGC, WMS, WFS, WCS, CSW, and REST. The use significantly boosts our project by offering cross-platform support, including smartphones, ensuring high responsiveness. The tool's features, such as GeoStories, dashboards, and maps, are customisable, enhancing its utility. The dockerised deployment simplifies sharing with partners, making it accessible for those without GIS expertise.

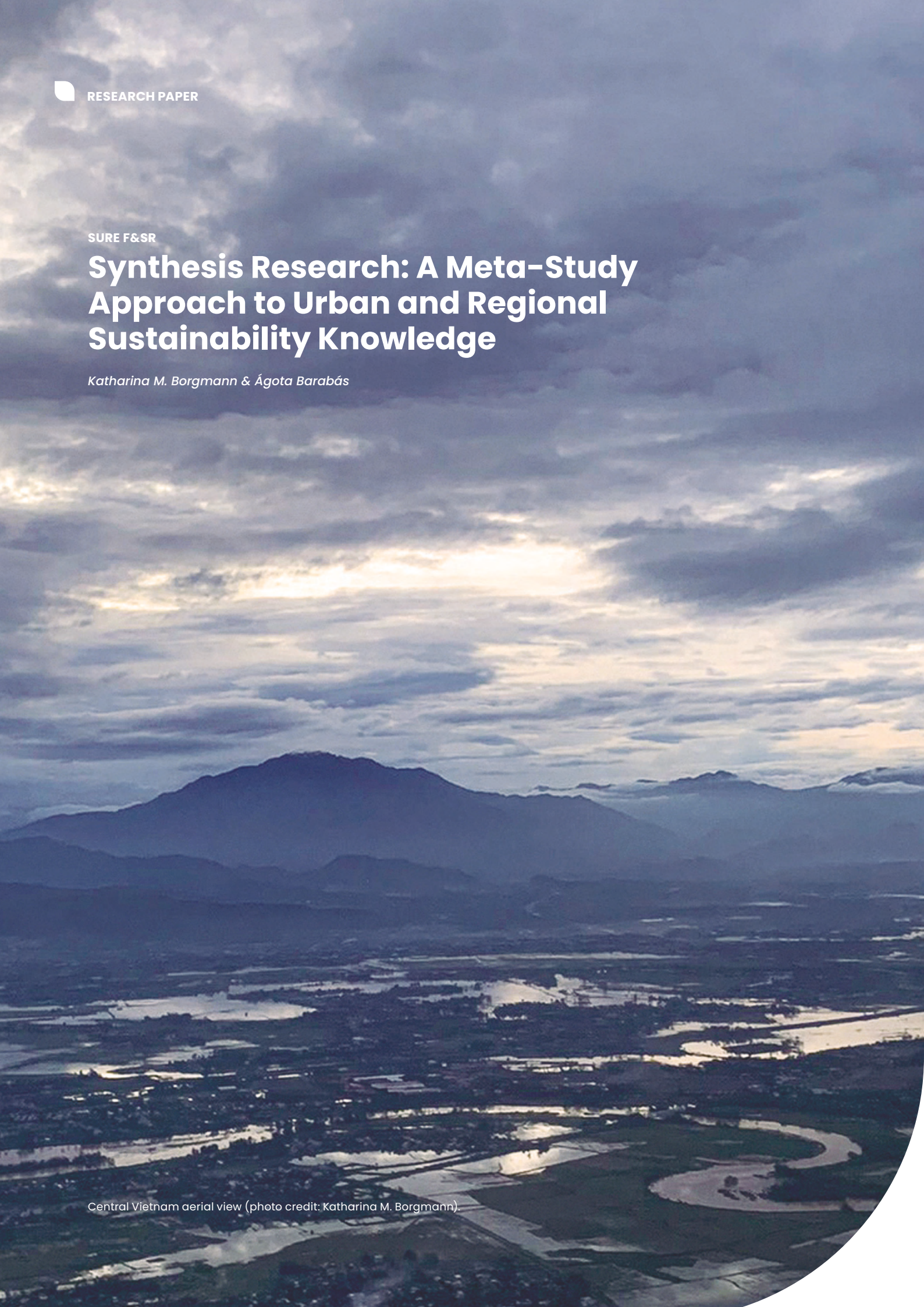
Thừa Thiên Huế Province, Central Vietnam

RESEARCH PAPER

SURE F&SR

Synthesis Research: A Meta-Study Approach to Urban and Regional Sustainability Knowledge

Katharina M. Borgmann & Ágota Barabás



Central Vietnam aerial view (photo credit: Katharina M. Borgmann).

Synthesis research provides a structured overview of the current state of knowledge on a given topic and serves to identify gaps, limitations, and opportunities for further investigation. In the context of the SURE Facilitation and Synthesis Research Project, this work consolidates conceptual, methodological, and empirical insights drawn from academic literature and the ten transdisciplinary projects within the SURE funding programme. Through cross-project integration, the research identifies thematic patterns and relationships that extend beyond the scope of individual studies.
The synthesis architecture developed for the project offers a comprehensive foundation for understanding sustainable urban development in diverse contexts. By mapping existing knowledge and highlighting research voids, it informs future scholarly inquiry and supports evidence-based policy design. Moreover, the framework fosters innovations—conceptual, theoretical, methodological, and translational—that transcend disciplinary boundaries and contribute to practical knowledge integration.
This work aims to advance the field of sustainability science by enabling transferable knowledge creation and providing strategic guidance for research and decision-making. With continued development, the SURE Facilitation and Synthesis Research Project is positioned to influence urban sustainability policies and support transformative action across stakeholder communities.

Deutsch
Die Syntheseforschung bietet einen strukturierten Überblick über den aktuellen Wissensstand zu einem bestimmten Thema und dient dazu, Lücken, Grenzen und Möglichkeiten für weitere Untersuchungen zu identifizieren. Im Rahmen des SURE-Forschungsprojekts „Facilitation and Synthesis Research" werden konzeptionelle, methodische und empirische Erkenntnisse aus der wissenschaftlichen Literatur und den zehn transdisziplinären Projekten des SURE-Förderprogramms zusammengeführt. Durch die projektübergreifende Integration identifiziert die Forschung thematische Muster und Zusammenhänge, die über den Rahmen einzelner Studien hinausgehen.
Die für das Projekt entwickelte Synthese-Architektur bietet eine umfassende Grundlage für das Verständnis nachhaltiger Stadtentwicklung in unterschiedlichen Kontexten. Durch die Kartierung des vorhandenen Wissens und die Aufdeckung von Forschungslücken liefert sie Impulse für die zukünftige wissenschaftliche Forschung und unterstützt die evidenzbasierte Politikgestaltung. Darüber hinaus fördert der Rahmen konzeptionelle, theoretische, methodische und translatorische Innovationen, die Disziplingrenzen überschreiten und zur Integration von Praxiswissen beitragen.
Diese Arbeit zielt darauf ab, den Bereich der Nachhaltigkeitswissenschaften voranzubringen, indem sie die Schaffung übertragbarer Kenntnisse ermöglicht und strategische Leitlinien für Forschung und Entscheidungsfindung liefert. Mit seiner kontinuierlichen Weiterentwicklung ist das SURE-Forschungsprojekt zur Förderung und Synthese in der Lage, die Politik im Bereich der städtischen Nachhaltigkeit zu beeinflussen und transformative Maßnahmen in allen Interessengruppen zu unterstützen.

မြန်မာ
Synthesis research သည် ပေးထားသော အကြောင်းအရာတစ်ခု ပေါ်ရှိ အသိပညာ၏ လက်ရှိအခြေအနေကို ခြုံငုံသုံးသပ်ကာ ကွာဟချက်၊ ကန့်သတ်ချက်များနှင့် နောက်ထပ် စုံစမ်းစစ်ဆေးမှုများ အတွက် အခွင့်အလမ်းများကို ရှာဖွေဖော်ထုတ်ရန် လုပ်ဆောင်သည်။
SURE Facilitation and Synthesis Research Project ၏ အခြေအနေတွင်၊ ဤလုပ်ငန်းသည် ပညာရပ်ဆိုင်ရာ စာပေများမှ ရေးဆွဲထားသော သဘောတရားနှင့် လက်တွေ့ကျသော ထိုးထွင်းအမြင်များနှင့် SURE ရန်ပုံငွေ အစီအစဉ်အတွင်း စည်းကမ်းထိန်းသိမ်းရေးဆိုင်ရာ ပရောဂျက်ဆယ်ခုတို့ကို စုစည်းထားသည်။ ပရောဂျက်နှစ်ခုပေါင်းစည်းခြင်းအားဖြင့်၊ သုတေသနသည် တစ်ဦးချင်း လေ့လာမှု၏နယ်ပယ်ထက်ကျော်လွန်သော အကြောင်းအရာပုံစံများနှင့် ဆက်ဆံရေးများကို ခွဲခြားသတ်မှတ်သည်။
ပရောဂျက်အတွက် ပေါင်းစပ်ဖန်တီးထားသော ဗိသုကာသည် ကွဲပြားသောအခြေအနေများတွင် ရေရှည်တည်တံ့သော မြို့ပြဖွံ့ဖြိုးတိုးတက်မှုကို နားလည်ရန်အတွက် ပြည့်စုံသောအခြေခံအုတ်မြစ်ကို ပေးဆောင်သည်။ ရှိပြီးသားအသိပညာကို မြေပုံဆွဲပြီး သုတေသနပျက်ကွက်များကို မီးမောင်းထိုးပြခြင်းဖြင့်၊ ၎င်းသည် အနာဂတ် ပညာတော်သင်စုံစမ်းမေးမြန်းမှုကို အကြောင်းကြားပြီး အထောက်အထားအခြေပြုမူဝါဒဒီဇိုင်းကို ပံ့ပိုးပေးပါသည်။ ထို့အပြင်၊ မူဘောင်သည် အယူအဆ၊ သီအိုရီ၊ နည်းစနစ်ပိုင်းနှင့် ဘာသာပြန်ဆိုမှု- ဆန်းသစ်တီထွင်မှုများကို မြှင့်တင်ပေးပြီး စည်းကမ်းဘောင်များကို ကျော်လွန်ကာ လက်တွေ့ကျသော အသိပညာပေါင်းစပ်မှုကို အထောက်အကူပြုသည်။

ဤလုပ်ငန်းသည် လွှဲပြောင်းနိုင်သော အသိပညာဖန်တီးမှုကို ပံ့ပိုးပေးပြီး သုတေသနနှင့် ဆုံးဖြတ်ချက်ချခြင်းအတွက် ဗျူဟာမြောက်လမ်းညွှန်မှုပေးခြင်းဖြင့် ရေရှည်တည်တံ့သော သိပ္ပံနယ်ပယ်ကို တိုးတက်စေရန် ရည်ရွယ်ပါသည်။ ဆက်လက်ဖွံ့ဖြိုးတိုးတက်မှုနှင့် အတူ၊ SURE Facilitation and Synthesis Research Project သည် မြို့ပြရေရှည်တည်တံ့ခိုင်မြဲရေးမူဝါဒများကို ဩဇာလွှမ်းမိုးရန်နှင့် အစုအဖွဲ့အသိုက်အဝန်းတစ်လျှောက် အသွင်ကူးပြောင်းရေးလုပ်ဆောင်မှုများကို ပံ့ပိုးပေးရန် နေရာချထားပါသည်။
(Automated translation)

中文（简体）
综合研究旨在对特定主题的知识现状进行系统梳理，并识别其中的空白、局限与进一步研究的机会。在“SURE促进与综合研究项目”背景下，本研究整合了学术文献以及SURE资助计划内十个跨学科项目中提炼的概念、方法论和实证洞见。通过跨项目整合，研究揭示了超越单一研究范畴的主题模式与关联。
这项工作构建的“综合研究架构”为理解不同背景下的可持续城市发展奠定了坚实基础。通过梳理现有知识并突出研究空白，该架构不仅为未来的学术探索提供方向，也为循证政策的制定提供支持。此外，该框架推动了跨学科的概念创新、理论发展、方法改进及知识转化，促进了实践知识的整合。
本研究旨在推动可持续科学的发展，通过促进可迁移知识的生成，为科研与决策提供战略指引。随着项目的持续推进，“SURE促进与综合研究项目”有望对城市可持续政策产生积极影响，并支持利益相关群体推动转型行动。
(Automated translation)

Filipino
Ang pananaliksik sa synthesis ay nagbibigay ng isang structured na pangkalahatang-ideya ng kasalukuyang estado ng kaalaman sa isang partikular na paksa at nagsisilbing tumukoy ng mga puwang, limitasyon, at pagkakataon para sa karagdagang pagsisiyasat. Sa konteksto ng SURE Facilitation and Synthesis Research Project, pinagsasama-sama ng gawaing ito ang mga konsepto, metodolohikal, at empirikal na mga insight na nakuha mula sa akademikong literatura at sampung transdisciplinary na proyekto sa loob ng SURE funding program. Sa pamamagitan ng cross-project integration, tinutukoy ng pananaliksik ang mga temang pattern at relasyon na lumalampas sa saklaw ng mga indibidwal na pag-aaral.
Ang synthesis architecture na binuo para sa proyekto ay nag-aalok ng isang komprehensibong pundasyon para sa pag-unawa sa napapanatiling pag-unlad ng lunsod sa magkakaibang konteksto. Sa pamamagitan ng pagmamapa ng umiiral na kaalaman at pag-highlight ng mga walang bisa sa pananaliksik, ito ay nagpapaalam sa hinaharap na pagtatanong ng iskolar at sumusuporta sa disenyo ng patakarang batay sa ebidensya. Higit pa rito, ang balangkas ay nagtataguyod ng mga inobasyon—konseptwal, teoretikal, metodolohikal, at pagsasalin—na lumalampas sa mga hangganan ng disiplina at nag-aambag sa praktikal na pagsasama ng kaalaman.
Ang gawaing ito ay naglalayong isulong ang larangan ng sustainability science sa pamamagitan ng pagpapagana ng paglilipat ng kaalaman sa paglikha at pagbibigay ng estratehikong gabay para sa pananaliksik at paggawa ng desisyon. Sa patuloy na pag-unlad, ang SURE Facilitation and Synthesis Research Project ay nakaposisyon upang maimpluwensyahan ang mga patakaran sa pagpapanatili ng lunsod at suportahan ang pagbabagong aksyon sa mga komunidad ng stakeholder.
(Automated translation)

Indonesia
Penelitian sintesis memberikan gambaran terstruktur tentang keadaan pengetahuan terkini pada suatu topik tertentu dan berfungsi untuk mengidentifikasi celah, keterbatasan, serta peluang untuk penelitian lebih lanjut. Dalam konteks Proyek Penelitian Sintesis dan Fasilitasi SURE, pekerjaan ini mengintegrasikan wawasan konseptual, metodologis, dan empiris yang diperoleh dari literatur akademik dan sepuluh proyek interdisipliner dalam program pendanaan SURE. Melalui integrasi lintas proyek, penelitian ini mengidentifikasi pola tematik dan hubungan yang melampaui cakupan studi individu.
Arsitektur sintesis yang dikembangkan untuk proyek ini menyediakan landasan komprehensif untuk memahami pengembangan perkotaan berkelanjutan dalam konteks yang beragam. Dengan memetakan pengetahuan yang ada dan menyoroti celah penelitian, arsitektur ini menginformasikan penyelidikan akademik di masa depan dan mendukung desain kebijakan berbasis bukti. Selain itu, kerangka kerja ini mendorong inovasi—konseptual, teoretis, metodologis, dan translasional—yang melampaui batas disiplin ilmu

dan berkontribusi pada integrasi pengetahuan praktis. Karya ini bertujuan untuk memajukan bidang ilmu keberlanjutan dengan memfasilitasi penciptaan pengetahuan yang dapat diterapkan dan memberikan panduan strategis untuk penelitian dan pengambilan keputusan. Dengan pengembangan berkelanjutan, Proyek Penelitian Fasilitasi dan Sintesis SURE berpotensi mempengaruhi kebijakan keberlanjutan perkotaan dan mendukung tindakan transformatif di kalangan komunitas pemangku kepentingan.
(Automated translation)

ខ្មែរ
ការស្រាវជ្រាវសំយោគផ្តល់នូវទិដ្ឋភាពទូទៅនៃរចនាសម្ព័ន្ធនៃចំណេះដឹងបច្ចុប្បន្នលើប្រធានបទដែលបានផ្តល់ឱ្យ និងបម្រើដើម្បីកំណត់ចន្លោះប្រហោង ដៃនកំណត់ និងឱកាសសម្រាប់ការស៊ើបអង្កេតបន្ថែម។ នៅក្នុងបរិបទនៃគម្រោង SURE Facilitation and Synthesis Research ការងារនេះរួមបញ្ចូលគ្នានូវការយល់ដឹងអំពីគំនិត វិធីសាស្ត្រ និងជាក់ស្តែងដែលដកចេញពីអក្សរសិល្ប៍សិក្សា និងគម្រោង transdisciplinary ទាំងដប់នៅក្នុងកម្មវិធីមូលនិធិ SURE ។ តាមរយៈការរួមបញ្ចូលគម្រោងឆ្លងកាត់ ការស្រាវជ្រាវកំណត់លំនាំតាមប្រធានបទ និងទំនាក់ទំនងដែលលាតសន្ធឹងហួសពីវិសាលភាពនៃការសិក្សាបុគ្គល។ ស្ថាបត្យកម្មសំយោគដែលត្រូវបានបង្កើតឡើងសម្រាប់គម្រោងផ្តល់នូវមូលដ្ឋានគ្រឹះដ៏ទូលំទូលាយសម្រាប់ការយល់ដឹងអំពីការអភិវឌ្ឍន៍ទីក្រុងប្រកបដោយនិរន្តរភាពនៅក្នុងបរិបទចម្រុះ។ តាមរយៈការគូសផែនទីចំណេះដឹងដែលមានស្រាប់ និងការរំលេចនូវចន្លោះប្រហោងនៃការស្រាវជ្រាវវាជូនដំណឹងដល់ការស៊ើបអង្កេតរបស់អ្នកសិក្សានាពេលអនាគត និងគាំទ្រការរចនាគោលនយោបាយផ្អែកលើភស្តុតាង។ ជាងនេះទៅទៀត ក្របខណ្ឌជំរុញការច្នៃប្រឌិត-គំនិត ទ្រឹស្តី វិធីសាស្ត្រ និងការបកប្រែ- ដែលឆ្លងកាត់ព្រំដែនវិន័យ និងរួមចំណែកដល់ការរួមបញ្ចូលចំណេះដឹងជាក់ស្តែង។ ការងារនេះមានគោលបំណងជំរុញវិស័យវិទ្យាសាស្ត្រនិរន្តរភាព ដោយអនុញ្ញាតឱ្យមានការបង្កើតចំណេះដឹងដែលអាចផ្ទេរបាន និងផ្តល់ការណែនាំជាយុទ្ធសាស្ត្រសម្រាប់ការស្រាវជ្រាវ និងការសម្រេចចិត្ត។ ជាមួយនឹងការអភិវឌ្ឍន៍ជាបន្តបន្ទាប់ គម្រោងស្រាវជ្រាវការសម្របសម្រួល និងសំយោគ SURE ត្រូវបានដាក់ឱ្យមានឥទ្ធិពលលើគោលនយោបាយនិរន្តរភាពទីក្រុង និងគាំទ្រសកម្មភាពផ្លាស់ប្តូរនៅទូទាំងសហគមន៍ភាគីពាក់ព័ន្ធ។
(Automated translation)

ພາສາລາວ
ການຄົ້ນຄວ້າສັງເຄາະໃຫ້ພາບລວມຂອງໂຄງສ້າງຂອງຄວາມຮູ້ໃນປະຈຸບັນກ່ຽວກັບຫົວຂໍ້ໃດຫນຶ່ງແລະໃຫ້ບໍລິການເພື່ອກໍານົດຊ່ອງຫວ່າງ, ຂໍ້ຈໍາກັດ, ແລະໂອກາດສໍາລັບການສືບສວນຕື່ມອີກ. ໃນສະພາບການຂອງໂຄງການຄົ້ນຄ້ວາການອໍານວຍຄວາມສະດວກ SURE ແລະສັງລວມ, ວຽກງານນີ້ລວມເອົາຄວາມເຂົ້າໃຈທາງດ້ານແນວຄວາມຄິດ, ວິທີການ, ແລະ empirical ທີ່ໄດ້ມາຈາກວັນນະຄະດີທາງວິຊາການແລະສິບໂຄງການ transdisciplinary ພາຍໃນໂຄງການສະຫນອງທຶນ SURE. ໂດຍຜ່ານການເຊື່ອມໂຍງຂ້າມໂຄງການ, ການຄົ້ນຄວ້າໄດ້ກໍານົດຮູບແບບ thematic ແລະຄວາມສໍາພັນທີ່ຂະຫຍາຍເກີນຂອບເຂດຂອງການສຶກສາສ່ວນບຸກຄົນ.
ສະຖາປັດຕະຍະກໍາສັງເຄາະທີ່ສ້າງຂຶ້ນສໍາລັບໂຄງການດັ່ງກ່າວໄດ້ສະເໜີພື້ນຖານອັນຄົບຖ້ວນເພື່ອເຂົ້າໃຈການພັດທະນາຕົວເມືອງແບບຍືນຍົງໃນສະພາບການທີ່ຫຼາກຫຼາຍ. ໂດຍການສ້າງແຜນທີ່ຄວາມຮູ້ທີ່ມີຢູ່ແລ້ວແລະເນັ້ນໃສ່ຊ່ອງຫວ່າງການຄົ້ນຄວ້າ, ມັນແຈ້ງໃຫ້ນັກວິຊາການສອບຖາມໃນອະນາຄົດແລະສະຫນັບສະຫນູນການອອກແບບນະໂຍບາຍໂດຍອີງໃສ່ຫຼັກຖານ. ຍິ່ງໄປກວ່ານັ້ນ, ກອບການສົ່ງເສີມການປະດິດສ້າງ - ແນວຄວາມຄິດ, ທິດສະດີ, ວິທີການ, ແລະການແປພາສາ - ທີ່ຂ້າມຂອບເຂດຂອງລະບຽບວິໄນແລະປະກອບສ່ວນເຂົ້າໃນການເຊື່ອມໂຍງຄວາມຮູ້ພາກປະຕິບັດ.
ວຽກງານນີ້ມີຈຸດປະສົງເພື່ອກ້າວຫນ້າທາງດ້ານວິທະຍາສາດທີ່ມີຄວາມຍືນຍົງໂດຍການສ້າງຄວາມຮູ້ທີ່ສາມາດໂອນໄດ້ແລະສະຫນອງຄໍາແນະນໍາຍຸດທະສາດສໍາລັບການຄົ້ນຄວ້າແລະການຕັດສິນໃຈ. ດ້ວຍການພັດທະນາຢ່າງຕໍ່ເນື່ອງ, ໂຄງການຄົ້ນຄ້ວາການອໍານວຍຄວາມສະດວກ ແລະ ສັງລວມ SURE ໄດ້ຖືກວາງໄວ້ເພື່ອໃຫ້ມີອິດທິພົນຕໍ່ນະໂຍບາຍຄວາມຍືນຍົງຂອງຕົວເມືອງ ແລະ ສະຫນັບສະຫນູນການຫັນປ່ຽນໃນທົ່ວຊຸມຊົນທີ່ມີສ່ວນກ່ຽວຂ້ອງ.
(Automated translation)

แบบไทย
การวิจัยแบบสังเคราะห์ให้ภาพรวมเชิงโครงสร้างเกี่ยวกับสถานะปัจจุบันของความรู้ในหัวข้อที่กำหนด และใช้เพื่อระบุช่องว่าง ข้อจำกัด และโอกาสในการศึกษาเพิ่มเติม ในบริบทของโครงการวิจัย SURE Facilitation and Synthesis Research งานวิจัยนี้ได้รวบรวมข้อมูลเชิงลึกเชิงแนวคิด เชิงระเบียบวิธี และเชิงประจักษ์ที่รวบรวมจากวรรณกรรมทางวิชาการและโครงการสหวิทยาการสิบโครงการภายใต้โครงการทุน SURE ผ่านการบูรณาการข้ามโครงการ งานวิจัยนี้ระบุรูปแบบและความสัมพันธ์เชิงหัวข้อที่ขยายออกไปนอกขอบเขตของการศึกษาแต่ละโครงการ
สถาปัตยกรรมการสังเคราะห์ที่พัฒนาขึ้นสำหรับโครงการนี้มอบรากฐานที่ครอบคลุมสำหรับการทำความเข้าใจการพัฒนาเมืองอย่างยั่งยืนในบริบทที่หลากหลาย ด้วยการจัดทำแผนที่ความรู้ที่มีอยู่และเน้นย้ำถึงช่องว่างของการวิจัย จึงช่วยให้สามารถสืบค้นทางวิชาการในอนาคตและสนับสนุนการออกแบบนโยบายที่อิงหลักฐานเชิงประจักษ์ นอกจากนี้ กรอบการทำงานนี้ยังส่งเสริมนวัตกรรม ทั้งเชิงแนวคิด เชิงทฤษฎี เชิงระเบียบวิธี และเชิงแปล ที่ก้าวข้ามขอบเขตของสาขาวิชาและนำไปสู่การบูรณาการความรู้เชิงปฏิบัติ งานวิจัยนี้มุ่งหวังที่จะพัฒนาสาขาวิทยาศาสตร์ความยั่งยืน โดยส่งเสริมการสร้างความรู้ที่สามารถถ่ายทอดได้ และให้คำแนะนำเชิงกลยุทธ์สำหรับการวิจัยและการตัดสินใจ ด้วยการพัฒนาอย่างต่อเนื่อง โครงการวิจัยการอำนวยความสะดวกและการสังเคราะห์ SURE พร้อมที่จะมีอิทธิพลต่อนโยบายความยั่งยืนในเมืองและสนับสนุนการดำเนินการเชิงปฏิรูปในชุมชนผู้มีส่วนได้ส่วนเสีย
(Automated translation)

Tiếng Việt
Nghiên cứu tổng hợp cung cấp một cái nhìn tổng quan có cấu trúc về tình trạng hiện tại của kiến thức trên một chủ đề cụ thể và giúp xác định những khoảng trống, hạn chế và cơ hội cho các nghiên cứu tiếp theo. Trong bối cảnh Dự án Nghiên cứu Tổng hợp và Hỗ trợ SURE, công trình này tổng

hợp các kiến thức lý thuyết, phương pháp luận và thực nghiệm được rút ra từ văn liệu học thuật và mười dự án liên ngành trong chương trình tài trợ SURE. Thông qua việc tích hợp giữa các dự án, nghiên cứu xác định các mô hình chủ đề và mối quan hệ vượt ra ngoài phạm vi của các nghiên cứu riêng lẻ.Khung tổng hợp được phát triển cho dự án cung cấp nền tảng toàn diện để hiểu về phát triển đô thị bền vững trong các bối cảnh đa dạng. Bằng cách lập bản đồ kiến thức hiện có và nhấn mạnh các khoảng trống nghiên cứu, nó định hướng cho các nghiên cứu học thuật trong tương lai và hỗ trợ thiết kế chính sách dựa trên bằng chứng. Hơn nữa, khung này thúc đẩy các đổi mới - khái niệm, lý thuyết, phương pháp luận và ứng dụng - vượt qua ranh giới ngành và góp phần vào việc tích hợp kiến thức thực tiễn. Công trình này nhằm mục tiêu nâng cao lĩnh vực khoa học bền vững bằng cách tạo ra kiến thức có thể chuyển giao và cung cấp hướng dẫn chiến lược cho nghiên cứu và ra quyết định. Với sự phát triển tiếp tục, Dự án Nghiên cứu Hỗ trợ và Tổng hợp SURE có vị thế để ảnh hưởng đến chính sách bền vững đô thị và hỗ trợ hành động chuyển đổi trong các cộng đồng bên liên quan.
(Automated translation)

Introduction

In an increasingly interconnected and urbanising world, the need for sustainable development in cities and regions has become both urgent and complex. Cities are expanding rapidly—especially across Southeast Asia and China—and the pressures of climate change, resource scarcity, and social inequality make urban sustainability not just a policy concern but a shared global imperative. Within this evolving landscape, the SURE Facilitation and Synthesis Research Project (SURE F&SR) has taken on a distinct task: to make sense of the emerging knowledge from ten collaborative urban research projects operating under the SURE programme.

These projects—supported by the German Federal Ministry of Research, Technology and Space (BMFTR)—work with local stakeholders in Asia to co-develop solutions for sustainable and resilient urban-rural development. The role of SURE F&SR is to help connect the dots: to collect, consolidate, and critically reflect on what this diverse programme is producing, and to support its transfer into usable, actionable knowledge.

What makes this challenge particularly complex is the need to operate across different disciplines, cultural settings, institutional environments, and stakeholder expectations. In this context, synthesis is not just a technical or academic exercise—it is a foundational process that shapes how knowledge is created, shared, and applied. The SURE F&SR project takes this task seriously, approaching it with methodological openness, a commitment to transdisciplinarity, and a strong emphasis on contextual sensitivity.

Building a Knowledge Architecture for Cross-Cultural Research

SURE F&SR functions as the meta-research project of the SURE programme, focusing on knowledge synthesis and cross-project facilitation. Its central aim is to turn the programme's distributed and heterogeneous knowledge landscape into something coherent and useful for both academic and non-academic audiences. This is done through a conceptual and technical architecture designed to structure the knowledge creation process while leaving room for adaptation and learning.

The SURE F&SR research architecture begins by gathering data from three overarching categories: scientific literature and policy documents; internal materials and observations from the ten SURE projects themselves and in the upcoming project duration non-academic sources such as media, spatial data, and professional platforms. The data sets connected to the SURE projects include project reports, workshop summaries, peer-to-peer exchanges, and even responses to reflection tools like the "Reflection Toolbox".

What makes this structure more than a database is how it is used. The collected data is processed, then analysed through a series of iterative steps involving both qualitative and quantitative insight and digital tools. From this, the SURE F&SR team formulates research hypotheses for the overall funding programme, explores key research questions, and feeds findings back into project teams and broader expert communities.

This approach helps the programme as a whole to stay reflexive and aligned despite the different partner structures, urban scales, and local logics that shape each project. Because the SURE projects have varied start dates, scopes, and geographies—from metropolitan flood resilience to circular neighbourhood economies—the architecture needs to support both synchronic (moment-by-moment) and diachronic (longitudinal) insights.

All of this is guided by six core questions that steer the architecture: Which results are being used, and by whom? Which insights can be transferred or scaled to other regions or contexts? Are there generalisable conclusions across the programme? How can the knowledge be consolidated and made accessible? How do the results interact with ongoing expert discourses? How are findings being translated into different stakeholder formats? These questions ensure that the architecture serves not only analytical purposes but also communication, coordination, and impact.

Why Synthesis? Theoretical Grounding and Practical Purpose

The motivation behind the SURE F&SR project lies in a particular view of knowledge: that it is constructed through interaction, embedded in context, and most valuable when it can cross boundaries—disciplinary, cultural, institutional, or linguistic. This framing draws on the principles of transdisciplinary research, as defined by scholars such as von Wehrden et al. (2018), who emphasise collaborative knowledge co-production involving both academic and societal actors.

But it also extends to the practice of *meta-research*: the study and improvement of research itself. Through meta-synthesis—especially of qualitative findings—SURE F&SR aims to identify patterns, uncover blind spots, and generate system-level insights that would not emerge from isolated project results. This means integrating conceptual, empirical, and methodological contributions into a layered understanding of urban sustainability in diverse regions.

This approach helps the programme as a whole to stay reflexive and aligned despite the different partner structures, urban scales, and local logics that shape each project."

In the literature, meta-synthesis is often praised for its ability to distill insights from fragmented studies (Walsh & Downe, 2005). Yet it also carries known risks: oversimplification, loss of context, or methodological mismatch. SURE F&SR addresses these by making the process as transparent and iterative as possible, including clear inclusion criteria, continuous documentation, and stakeholder feedback loops.

Importantly, the research does not just generate synthesis *on top* of existing work, but also contributes to methodological innovation itself. Through their ongoing collaboration with different actors in the SURE programme, they are also developing and testing new tools and processes for synthesis, evaluation, and reflection. In this sense, the project is simultaneously a knowledge integrator and a methodological testbed.

Notably, the project aligns itself with what Lang et al. (2012) call a "third epistemic way"—a mode of knowledge production that transcends traditional disciplinary or even interdisciplinary approaches. This transdisciplinary path incorporates diverse forms of knowledge (scientific, local, experiential), focuses on solution-oriented inquiry, and places equal weight on problem framing and co-learning. It is particularly suited to the kinds of sustainability problems that are dynamic, contested, and interconnected.

Knowledge as a Social Practice: Working Across Cultures

One of the key contributions of the SURE F&SR approach is its emphasis on the practice of

knowledge creation—not just as an intellectual process, but as a culturally situated, relational activity. With ten projects operating in different parts of Asia, during the research and development funding phase, synthesis work must account for multiple realities: different governance regimes, language and translation issues, time zones, and even diverging understandings of what counts as evidence.

To navigate this, SURE F&SR incorporates a facilitation component into its research logic. The project team doesn't just observe or analyse the ten SURE projects from a distance—it works alongside them, hosting synergy workshops, offering bilateral consultations, conducting field visits, and running joint reflection exercises. This improves mutual trust and understanding while also generating embedded insight that augments desk-based synthesis. These activities also serve as informal moments of knowledge generation—through conversations, observations, and collaborative design sessions that would not be captured by traditional research instruments. They also reveal the emotional and political dynamics of collaboration: how priorities shift, how misunderstandings are resolved, how institutional constraints are navigated.

Moreover, the team sees facilitation and synthesis not as separate functions but as a dynamic feedback loop that is illustrated in Figure 1 (Borgmann et.al., 2023). Facilitation activities produce insights and observations that feed into synthesis. In turn, synthesis generates hypotheses, findings, and tools that strengthen the facilitation work. This integrated approach has proven valuable in making the research process more responsive and grounded in real project needs. This emphasis on context-sensitive collaboration has also led the team to explore new ways of capturing informal and tacit knowledge—insights that often remain invisible in formal documentation. For example, observations made during field visits or casual exchanges between project partners may reveal cultural expectations, institutional constraints, or emerging practices that would otherwise escape notice. By designing formats that allow such impressions to be shared and reflected upon—such as facilitated peer-to-peer sessions—the SURE F&SR team aims to make space for knowledge that is often underrepresented but highly relevant.

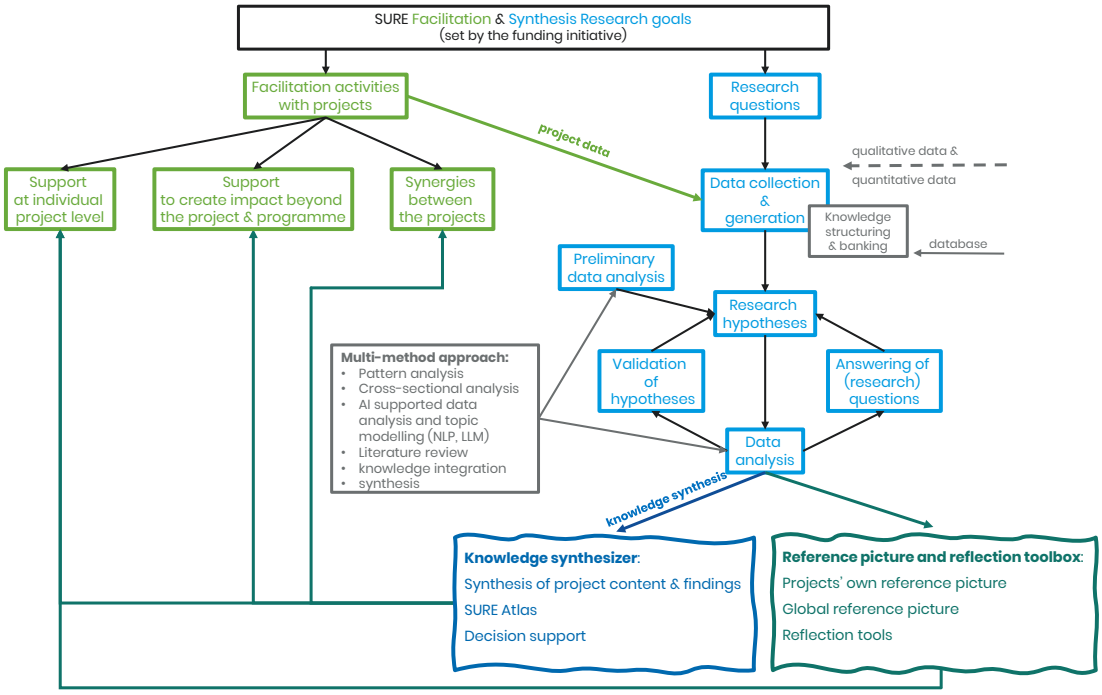


Fig.1. Overview of SURE Facilitation and Synthesis Research Architecture (Source: Borgmann et al., 2023).

From Data to Insight: A Multi-Method Analysis Strategy

The SURE F&SR methodology is intentionally plural. Recognising the complexity of its subject matter, the team applies a mix of qualitative and quantitative methods, supplemented by digital tools, stakeholder engagement, and reflection exercises. Some methods are traditional, such as literature reviews and cross-sectional analysis. Others are more experimental, including AI-supported topic modelling, natural language processing (NLP), and algorithmic analysis or machine learning.

> **It surfaces thematic patterns that could inform future funding calls, or local interventions."**

These methods are applied in a layered and iterative manner. For example, topic modelling may identify a cluster of recurring issues—such as "water governance" or "digital participation"—which are then explored in more depth using workshop materials, interviews, and project documentation. Patterns are validated through thematic analysis, and hypotheses are revisited in light of both structured data and unstructured insight.

Crucially, the team treats synthesis not as a purely cognitive operation, but as a multi-modal practice that benefits from diverse inputs and interpretive registers. Visual material, for instance, plays an important role—not just as illustration, but as evidence. Diagrams, spatial maps, photos, and hand-drawn project sketches often communicate complexity and connections in ways that textual summaries cannot. The team is therefore developing routines for integrating visual data more systematically into the synthesis process, while also experimenting with how such media can support cross-cultural translation and internal learning.

The team's current hypotheses reflect this diversity of input. Among them are propositions such as: there is a pressing need for more robust methods of knowledge consolidation in transdisciplinary sustainability work; existing evaluation frameworks and funding criteria often fail to accommodate culturally specific practices and emergent priorities; cultural sensitivity and translation skills are not ancillary but central to effective international collaboration; identifying cross-cutting issues across projects (e.g. governance, water security, or participatory planning) can help surface synergies that benefit the entire programme; and project design and organisational architecture shape not only outputs but also long-term local impact.

These hypotheses are continuously tested, revised, and validated through the ongoing synthesis logic, which mirrors Peirce's (1878) cycle of abduction, deduction, and induction. It is a learning process as much as a research protocol.

A Toolbox for Synthesised Urban Knowledge

Two key instruments have emerged from this work:

• The **SURE atlas** is a modular digital platform that structures and visualizes research outcomes across the ten projects. Inspired by business intelligence systems, it supports comparative views, custom dashboards, and thematic aggregation, making it easier for stakeholders to locate relevant insights and follow project development.

• The **Reflection Toolbox** is a reflective mapping tool that helps project teams articulate their own assumptions, theories of change, and local impact pathways. It is co-created in workshops and updated over time, offering a basis for internal clarity and reflection.

Together, these tools represent the tangible side of synthesis. They certainly do not replace in-depth analysis or expert judgment—but they enhance both by offering structure, transparency, and usability.

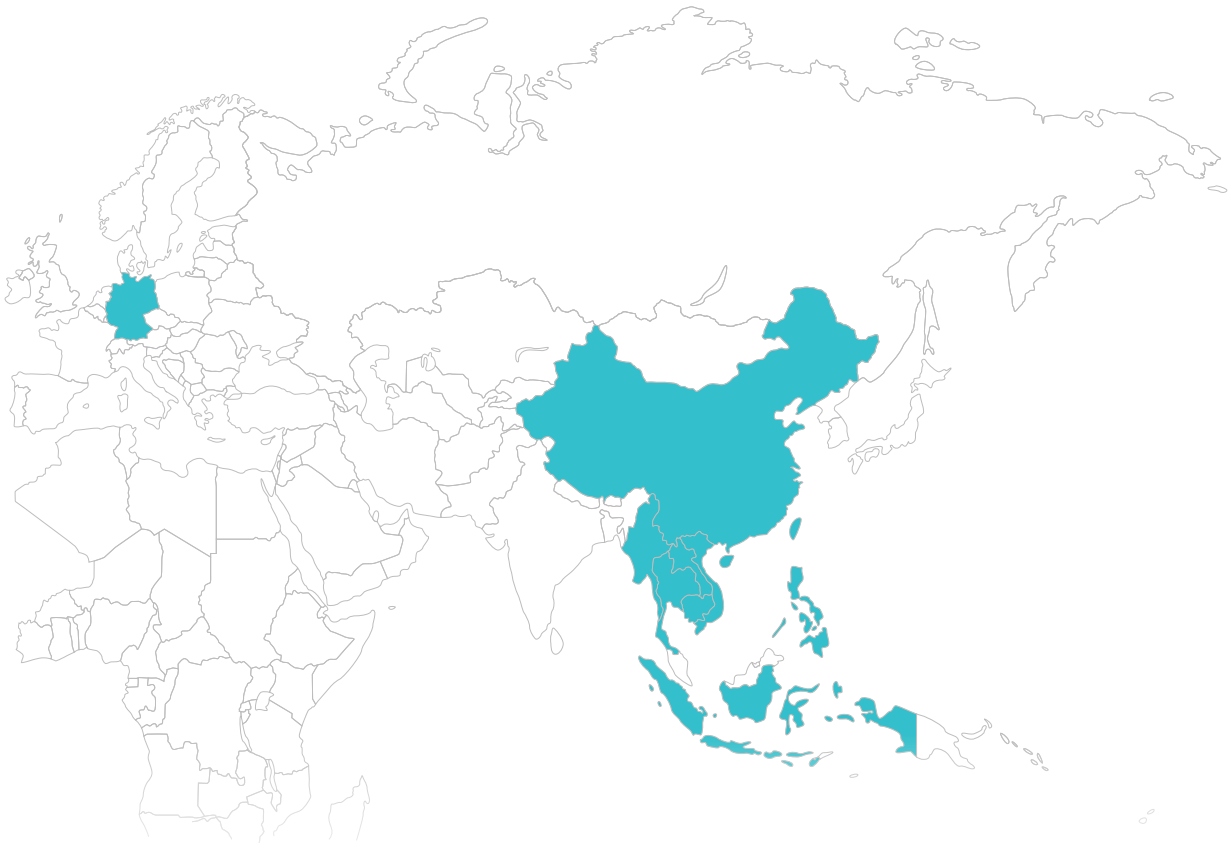
Conclusion: Making Urban Sustainability Knowledge Work

The SURE Facilitation and Synthesis Research Project illustrates that synthesis is not merely a summing-up of results, but a process of sense-making that must be as adaptive and reflexive as the systems it seeks to understand.

In doing so, the project addresses several crucial gaps. It creates a connective tissue between parallel projects. It surfaces thematic patterns that could inform future funding calls, or local interventions. It aims to create tools that democratize access to knowledge while respecting its contextual roots. And lastly, it promotes a form of transdisciplinary research that takes social practice, power relations, and culture seriously.

The tools and methods developed by SURE F&SR aim to do more than support the current programme. They ideally lay groundwork for future collaborative research initiatives facing similar challenges. With appropriate effort and contextualisation, the developed tools could be adapted for other multi-project, multi-country contexts. The conceptual architecture could inform how funding agencies design programme-level evaluation.

As cities continue to grow and change, and as global challenges require collective responses, we will need more research that can integrate across domains, languages, and experiences. We will also need research architectures that are not just rigorous, but inclusive and transformative.



Southeast Asia, China and Germany

Huangyan, China (photo credit: Katharina M. Borgmann).

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«adopt» verb

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1. to take up and begin to use an innovation, idea, or practice, typically based on its perceived advantages, risks, and suitability within a given context.

it's about making space for failure,
reflection and learning along the way

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