# Project description

## Project summary

In year 1 of the Sustainable Communities and Waste (SCaW) Hub, this project will focus on codesigning projects to improve air quality by reducing exposure to poor air quality. The project will contribute to the National Clean Air Agreement and the Department of Agriculture, Water and Environment's (DAWE) priorities: the health and productivity impacts of short-term air pollution, the effectiveness of clean air and heatwave shelters, social research on the understanding and use of air pollution information, local zoning regulations and visualisations of air quality information.  This project will also contribute to the cross-hub climate adaptation research agenda, particularly air quality and climate change interactions for adaptation or mitigation responses. In the Hub's Research Plan 1 (RP1), the Hub is committed to codesign research agendas with DAWE and key end user partners including state environment departments, local governments, non-government organisations (NGOs), Indigenous groups and other NESP hubs. The project will elicit and prioritise research user research needs and synthesize current and emerging research on the use of air pollution information.  We will also conduct a detailed stocktake of existing and emerging sensor networks, as well as work with partners to identify priorities for health impact assessments.

## Project description

While air quality in Australia is generally very good, we continue to see significant health impacts from bushfire smoke, planned burns, traffic, wood-heaters, and local industrial pollution. We understand government departments responsible for air quality, fire and public health urgently need better information for planning and response.  Importantly, this information needs to be made available in a timely fashion and in forms that are usable by all, particularly community members at higher risk because of age, occupation, social disadvantage, or existing medical illness.

To reduce air pollution and its impacts we need to engage with governments, agencies, research partners and communities to ensure that rapidly expanding technology platforms that collect, process and share air quality information are deployed for maximum benefit, in ways that both:

    a.  inform government policy and planning

    b.  empower individuals and communities to take actions that reduce air pollution health impacts.

This project aims to codesign a series of impactful research projects under the 'improved air quality, forecasting and assessment' research theme for our SCaW Hub, in partnership with DAWE and other research users including state environment departments, local government, NGOs, Indigenous groups and other NESP hubs.

To achieve this, we will undertake:

1. A series of facilitated codesign workshops and focus groups, interviews and/or surveys to elicit and prioritise research user research needs with DAWE, state environment and health departments, local government, NGOs, Indigenous groups and other NESP hubs, including:

    a.  a preliminary meeting with DAWE Air Quality Branch to understand DAWE's research priorities and seek feedback on the stakeholder /codesign activity

    b.  virtual meetings with the SCaW Indigenous Advisory Group to explore Indigenous research aspirations in the air quality research area, and to guide the development and implementation of methodologies to ensure research projects and the 7-year strategy meet Indigenous stakeholder needs and promote opportunities to build capacity and employ Indigenous researchers

    c.   a survey of all stakeholders soliciting their views on the relevance to them of research topics and DAWE priorities. The survey will also scope additional project ideas and the willingness of stakeholders to invest and or proactively participate in projects in a given area

    d.   virtual meetings focused on research topics to further understand stakeholder requirements and codesign projects with stakeholders

    e.   virtual meetings with researchers from other IPs to develop collaborative projects that will foster holistic delivery of impact across the Hub

    f.   virtual meetings with Mission leads from other NESP hubs to develop collaborative projects that will deliver Mission goals and promote delivery of impact across the NESP program

    g.   a series of virtual meetings of the IP4 research group, to further develop the 7-year research strategy

    h.   a workshop with DAWE Air Quality Branch to present and seek feedback on the preliminary concept for 7-year research strategy and selected 2022 projects that will be built into RP2.

2. Reviews of the current state of existing knowledge, existing decision-making tools, and existing research projects to inform discussions of research needs. This includes:

    a.   synthesis of current and emerging research on the use and understanding of air pollution information

    b.   identifying priorities for health impact assessments.

All activities in this Research Plan 1 (RP1) leverage extensive consultation and foundational research outputs by Hub air quality researchers at CSIRO, UTAS, UNSW, Monash, Swinburne and the NHMRC Centre for Energy, Air Pollution and Health (CAR), including the AirRater smartphone app, the Clean Air Schools project, the Air Quality Visualisation system (AQVx) and the Smoke Forecasting System (AQFx). These systems have been developed under pre-existing funding programs and bring with them significant background intellectual property (IP). Our program of work will leverage this significant prior investment to deploy these tools for maximum benefit.

We will identify research opportunities that link to research in other parts of the Hub. For example:

- Impact Priority Area 1 (Sustainable people environment interactions) - air quality is an important factor in urban livability, and poor air quality can be exacerbated by high temperatures and atmospheric stability that are characteristics of urban heat islands. In addition, the impact of urban planning on air quality could also be investigated e.g, housing density along arterial roads

- Impact Priority Area 2 (Reduced impact of plastics and other materials) - information on plastics in the atmosphere is currently very limited, however we know that nanoparticles adversely affect human and ecological health

- Impact Priority Area 3 (Hazardous waste, substance and pollutants) - emissions to the atmosphere of hazardous pollutants during management of waste should be assessed for any waste management option developed by the Hub.

We will identify research opportunities that link to the research of the NESP cross-cutting Missions. For example:

- Waste Impact Management Mission - develop evidence to support decision-making and adaptation measures for air quality, pollution and waste management

- Climate Adaptation Mission - model the interaction between waste management methods and greenhouse gas emissions

- Climate Adaptation Mission - examine how a changing climate and emissions reduction measures will impact sources of air pollution and secondary pollutant formation and the value of engaging Indigenous people in climate adaptation activities and economic benefits around employing renewable energy technologies on their lands.

We will also identify research opportunities that link to the research of other NESP hubs. For example, Resilient Landscapes Hub (dust and fire as air quality drivers) and Marine Hub (air quality in coastal cities).

# Informing decision-making and on-ground action

The primary focus of the activities in this research plan is to lay the groundwork to codesign Research Plan 2 (RP2) with DAWE, state environment departments, local government, NGOs, Indigenous groups and other NESP hubs.  However, some of the activities undertaken to inform codesign (e.g. reviews of existing knowledge and tools) will be translated into usable knowledge products (e.g. policy briefs, guidelines) to inform decision-making in 2021.

Specifically, the review of the current state of existing knowledge, existing decision-making tools, and existing research projects synthesis will support Asthma Australia's development of an AirSmart campaign, as well as decisions about the design of air quality information tools such as the AQVx and projects such as Clean Air Schools. The codesign process will identify research user needs and activities that could be informed by these knowledge products.

# Pathway to impact

This section describes how the project will inform decision-making and on-ground action, and the outputs that will be delivered to research users throughout the life of the project.

| Outcomes | | | |
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| The codesign process described in this research plan will be used to identify research needs to create impact through Research Plan 2 (RP2) and beyond. As such, the pathway to impact for Research Plan 1 (RP1) is limited to the codesign process, and not to direct impacts on policy, management, or the environment. | | | |
| **Research-user** | **Engagement and communication** | **Impact on management action** | **Outputs** |
| DAWE – Air Quality Branch<br><br><br>State environment departments<br>State health departments, local government, Asthma Australia and other relevant health peak bodies,<br>NGOs,<br>Indigenous Groups | The needs of research users be identified through the codesign process.<br>They will be involved through codesign workshops, focus groups, interviews and surveys.<br>They will help identify the format of knowledge products to foster their use in policy-making, planning and management.<br>Where appropriate, research plans that involve research users in the co-production of knowledge through the life of the research project will be designed.<br>The codesigned research plan will be developed with extensive consultation and feedback from research users.<br>Research findings generated through RP1 (e.g. synthesis of knowledge and tools) will be communicated in ways that are accessible to research users including reports, policy advice, presentations. The format of these will be determined after consultation with research users and hub knowledge brokers. | The policies, programs and plans that will be impacted will be identified through the codesign process. | The final list of project outputs will be determined through the codesign process. The main output will be Research Plan 2.<br>To support the codesign process, the following output have been identified:<br>Synthesis report on<br>- on current and emerging research on the use of air pollution information<br>- priorities for health impact assessments. |

# Indigenous consultation and engagement

Indigenous communities, businesses, research users, and researchers are vital to a successful Hub. Indigenous research aspirations in the air quality research area will be identified by working closely with the SCaW Indigenous Advisory Group via workshops and regular virtual meetings.

Ongoing conversations with the Hub's Indigenous Advisory Group will guide the development and implementation of methodologies to ensure research projects and the 7-year strategy meet Indigenous stakeholder needs and promote opportunities to build capacity and employ Indigenous researchers. The potential for Indigenous cultural and intellectual property will also be explored through this engagement and incorporated into project design and managed appropriately.