

USAID ADAPTASI PERUBAHAN IKLIM DAN KETANGGUHAN (APIK) PROJECT

Final Report

November 20th, 2015 – June 30th, 2020

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Photos of the three APIK Landscapes: East Java watershed (left), Southeast Sulawesi coastal areas (center), and Maluku small islands (right)

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COVER STORY

A Place-Based Approach to Building Resilience in Indonesia

For over four years, USAID, through its *Adaptasi Perubahan Iklim dan Ketangguhan* (APIK) project, has been working to support the Government of Indonesia, communities and the private sector to better manage climate and disaster risk. This effort has been delivered using a place-based approach to building resilience in the three provinces; East Java, Southeast Sulawesi, and Maluku, which represent watershed, coastal, and small island landscapes respectively. The place-based approach emphasizes that climate vulnerability is directly linked to each locale's unique landscape, as well as socioeconomic, and institutional characteristics. Therefore, strategies to build resilience to climate and disaster risk also need to take into account these diverse, context specific characteristics. In all three provinces, USAID APIK has completed vulnerability assessments, influenced government budgeting and adaptation planning, and carried out actions from landscape level down to the village level with the approach driven by the specific context in each location.

In East Java, APIK worked along the Brantas watershed to improve community resilience. The vulnerability assessments both at the upstream and downstream level indicated the increasing risk of future flood events that threaten sectors including infrastructure and agriculture. For instance, in Sumbermanjing Wetan Subdistrict, Malang District, APIK collaborated with the local government and community to improve disaster preparedness to flash flooding along the Panguluran river including Sukodono and Sitarjo Village. This was done through setting up a community level disaster preparedness team, facilitating the development of a contingency plan for flash flooding and installation of a community-based flood early warning system (EWS). The information from the EWS can be accessed via mobile phones to provide advance notice to people if flooding is imminent. APIK worked together with the Malang District Disaster Management Agency (BPBD) to install the EWS which was complemented with evacuation and disaster emergency response simulation training. *"After participating in the training on the use and maintenance of EWS, I now understand how to improve flood preparedness through monitoring the EWS systems that can be accessed simply from my mobile phone,"* said Mamiiek Misniati, the village head of Sitarjo who participated in the EWS training. The community and village government realized that coordination plays a major role in ensuring a successful flood early warning system, not only within a single administration but also with other villages from upstream to downstream.

Also, in East Java, APIK supported the state-owned forest enterprise (Perhutani), Forest Management Unit (KPH) in Blitar and communities along the Bogel river to address erosion and sedimentation issues by rehabilitation of the upstream watershed through bamboo planting. Approximately 4,400 bamboo seedlings have been planted along 3,100 m of critical areas in the upstream Bogel riverbank. The bamboo will help reduce the erosion rate so that as a result the sedimentation downstream may be reduced, which in turn will help mitigate the risk of flooding that impacts infrastructure, settlements, and the economy of Sutojayan, Bacem, and Pandanarum villages. The bamboo planting is expected to be expanded further by Perhutani to bring more significant impact.

In Southeast Sulawesi, the vulnerability assessment detailed how warming ocean can disrupt biodiversity and consequently affecting the income of coastal communities such as fisherfolk and seaweed farmers. Sea level rise combined with extreme weather events are a major concern for coastal communities as this increases the risk and severity of coastal erosion. In Rumba-Rumba Village, South Konawe District, APIK has supported 25 seaweed farmers to adapt to the climate impact on seaweed production. The seaweed farmers had experienced a drastic decline in production due to *ice-ice* disease hardening the seaweed's tissues and reducing yields. In collaboration with the village government, the activities in Rumba-Rumba were designed to support farmers to maximize community economic benefits from commercial seaweed production and ensure a stable income. APIK provided rafts, nets, and more importantly, knowledge in good seaweed farming practices through a series of training events. Following the assistance, the seaweed farmers have successfully harvested the seaweed and sold them to the market. On average, they received around IDR 3 million (US \$220) every month by selling 166 kg of

dried seaweeds. Prior to the intervention, they were only able to harvest 100 kg of wet seaweed a month, with a value of around IDR 600,000 (US \$45). One of the seaweed farmers that is also the head of the Disaster Preparedness Group (KSB), Jawas Tullah stated that the training on climate and weather information has helped him a lot. *“As both a seaweed farmer and fisherman, the use of climate and weather information training has helped me decide the right time for planting and when it is safe to go to sea. Now I am better able to predict weather at sea,”* said Jawas.

Another coastal problem identified by the assessment in Southeast Sulawesi is related to mangrove forests. In Awunio Village, over the last three decades, the mangrove areas have declined by almost half due to human activities including massive expansion of fish and shrimp ponds. This threatened coastal communities in the area since the mangrove forests protect them from the impact of extreme weather events, such as high waves and floods. To help re-establish the mangrove forests in this area, APIK together with the local community supported the development of Village Regulation Number 19/2019 on Mangrove Conservation. The village head, Arifin, said that with this regulation, the community has become more aware of protecting and utilizing mangrove properly. *“Not only the community of Awunio, but also neighboring villages are now aware of the benefits of utilizing mangrove as a reforestation responsibility to ensure our safety. This regulation will also support the development of Awunio Village as a coastal ecotourism location in the future by the district government to support local income,”* he added.

In Maluku, the vulnerability assessment indicated that one of the impacts of climate change would be increasing frequency of extreme weather and high waves. Maluku province is predominantly made up of small islands and, as such, is highly dependent on sea transportation for trade and access to services. APIK supported the government to complete the formulation of a Local Climate Mitigation and Adaptation Action Plan (RAD MAPI) at the province, city and district level. This plan also proposes adaptation actions to reduce the risk in sea transportation such as through improved access to weather information. APIK improved the community resilience of fishing communities in small islands by installing climate and weather information (CWI) displays in the three villages of Haruku, Wassu, and Ameth in Lease Islands, Central Maluku District and another one in Durjela village, Aru Islands District. These displays provide a three-day weather forecast as well as storm warnings and are used on a daily basis by fisherfolk and boat drivers to determine whether it is safe to go to sea.

During the windy and wet season, it is sometimes difficult for people in remote islands to access food as the boats don't operate between islands on a regular basis. To help address this, APIK introduced permaculture vegetable production to the remote communities of Haruku and Ameth Village and encouraged people to be more self-reliant by growing food in their own backyards so that they can still access fresh vegetables even in stormy weather when it is not possible to access markets.

These specific examples provide a snapshot of some of the varied resilience building activities in the diverse landscapes where APIK worked. As a result, 42,197 people, including 16,246 women are now more resilient to the climate impacts. The activities were implemented in partnership with local and national government to facilitate replication and scale up. The Indonesian Government has committed to continue supporting this work and so this collaborative effort will help Indonesia be more resilient to climate and weather uncertainties in the future.



(Left) A community member accesses climate and weather information on the mobile phone app linked to the EWS; (Center) The Head of Rumba-Rumba Village KSB, Jawas Tullah shows the harvested seaweed that is ready for sale; (Right) CWI display in Haruku, located at the dock.

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LIST OF ACRONYMS

APIK	Adaptasi Perubahan Iklim dan Ketangguhan <i>Climate Change Adaptation and Resilience</i>
APEKSI	Asosiasi Pemerintah Kota Seluruh Indonesia <i>Association of City Governments</i>
APKASI	Asosiasi Pemerintah Kabupaten Seluruh Indonesia <i>Association of District Governments</i>
Bappeda	Badan Perencanaan Pembangunan Daerah <i>Regional Development Planning Agency</i>
Bappenas	Badan Perencanaan Pembangunan Nasional <i>National Development Planning Agency</i>
BMKG	Badan Meteorologi, Klimatologi, dan Geofisika <i>Meteorology, Climatology, and Geophysics Agency</i>
BNPB	Badan Nasional Penanggulangan Bencana <i>National Disaster Management Agency</i>
BPBD	Badan Penanggulangan Bencana Daerah <i>Local Disaster Management Agency</i>
CCA	Climate Change Adaptation
CFS	Climate Field School
COKM	Communications, Outreach, Knowledge Management
CSR	Corporate Social Responsibility
CWIS	Climate and Weather Information Services
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EWS	Early Warning System
FGD	Focus Group Discussion
FY	Financial Year
GIS	Geographic Information System
GOI	The Government of Indonesia
HIPPAM	<i>Himpunan Penduduk Pemakai Air Minum</i> Community Water User Association
HLR	<i>High Level Results</i>
IRBI	Indeks Risiko Bencana Indonesia <i>Indonesian Disaster Risk Index</i>
IUWASH PLUS	Indonesia Urban Water, Sanitation and Hygiene Penyehatan Lingkungan Untuk Semua
KADIN	<i>Kamar Dagang dan Industri</i> Indonesian Chamber of Commerce and Industry
Kemendesa	Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi <i>Ministry of Villages, Development of Disadvantaged Regions and Transmigration</i>
KKP	Kementerian Kelautan dan Perikanan <i>Ministry of Marine Affairs and Fisheries</i>
KLHK	Kementerian Lingkungan Hidup dan Kehutanan <i>Ministry of Environment and Forestry</i>
KPPPA	Kementerian Pemberdayaan Perempuan dan Perlindungan Anak

	<i>Ministry of Women’s Empowerment and Child Protection</i>
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
NAPs	National Adaptation Plans
NCAR	National Center for Atmospheric Research
NGO	Non-Government Organization
OFDA	Office of US Foreign Disaster Assistance
OPD	<i>Organisasi Perangkat Daerah</i> Local Government Working Unit
OSM	OpenStreetMap
P3GI	Pusat Penelitian Perkebunan Gula Indonesia <i>Indonesian Sugar Research Institute</i>
PDAM	Perusahaan Daerah Air Minum <i>Water Utility Company</i>
PIC	Person in Charge
PIRS	Performance Indicator Reference Sheet
Pokja	Kelompok Kerja <i>Working Group</i>
PPRN	Paguyuban Peternak Rakyat Nasional <i>National Layer Chicken Smallholders Group</i>
PSE	Private Sector Engagement
PY	Project Year
QPR	Quarterly Progress Report
RAN-API	Rencana Aksi Nasional Adaptasi Perubahan Iklim <i>National Action Plan for Climate Change Adaptation</i>
RKP	Rencana Kerja Pemerintah <i>Government Work Plan</i>
RPJMD	Rencana Pembangunan Jangka Menengah Daerah <i>Local Medium-Term Development Plan</i>
SCOPI	Sustainable Coffee Platform of Indonesia
SIDIK	Sistem Informasi Data Indeks Kerentanan <i>Vulnerability Index Data Information System</i>
SMEs	Small and Medium Enterprises
TATTs	Technical Assistance Training Teams
USAID	United States Agency for International Development
USG	United States Government
VA	Vulnerability Assessment

EXECUTIVE SUMMARY

The USAID APIK (*Adaptasi Perubahan Iklim dan Ketangguhan* – Climate Change Adaptation and Resilience) project began in November 2015 with the overarching aim of supporting the Indonesian government, communities and businesses be more resilient to climate and weather-related disasters. The project worked at national level and in the provinces of East Java, Southeast Sulawesi and Maluku.

The quantitative results of the project show that over 42,000 people benefited from resilience building activities implemented by the project in the three provinces and 22,250 people received training in climate and disaster risk. The project was able to integrate climate adaptation and disaster risk reduction into a total of 158 laws, policies and regulations from national to village level and also built the capacity of 174 government institutions to better manage climate and disaster risk. Within the project duration a total of US \$3.7 million was leveraged from government and private sector partners, however, this number is significantly higher when considering the five-year government plans the project has influenced (e.g. US \$3 billion in the national mid-term development plan). In addition, through the work with BMKG 6,130 people now have improved access to climate and weather information.

At the start of the project, APIK facilitated a series of vulnerability assessments (VA's) in each province and landscape. The VA's had two main purposes, the first was to clearly inform decision makers of potential future climate and disaster risks specific to their geographies. The second was to build capacity of local experts within government and research institutions to be able to carry out VA's themselves. With APIK support, the Ministry of Environment and Forestry (KLHK) produced a new ministerial regulation on a standardized approach to climate vulnerability assessments. The local experts supported by APIK are well placed to help implement this regulation.

The APIK project demonstrated that through establishing close collaborative relationships with the Indonesian government, supporting government priorities and timing interventions to align with the government planning cycle it is possible to leverage significant government resources. In all three provinces, the APIK team on the ground worked hand-in-hand with government officials on developing their five-year plans and through a series of workshops and using evidence generated from pilot projects, the government officially recognizes the importance of the issue and has now integrated climate adaptation and disaster resilience into these plans. Examples include Central Maluku District where US \$27 million has been allocated for activities including climate proof infrastructure such as sea walls, mangrove reforestation, early warning systems and improved GIS systems using drone technology. At national level APIK had a team member embedded in the national planning agency, Bappenas with the aim of revising the Indonesian national climate adaptation action plan and ultimately ensuring climate change was integrated into the national mid-term development plan. This work began in 2016 to influence the planning cycle starting in 2020 and involved scientific research, cost and benefit analyses, facilitating inter-ministerial workshops, and participating in international conferences. As a result of this considerable effort from APIK the GOI has allocated approximately US \$3 billion for climate adaptation work in their national plan for 2020 to 2024 in the four sectors of agriculture, water, coastal/marine and health.

Villages in Indonesia receive an annual budget (*dana desa* or village fund) from the Ministry of Villages, Disadvantaged Regions and Transmigration (Kemendesa). The budget varies from village to village but is approximately US \$70,000 to US \$80,000 per year and there are over 80,000 villages in Indonesia. The use of these resources is regulated by policies from Kemendesa. APIK brought KLHK and Kemendesa together to successfully integrate climate and disaster resilience into the Kemendesa policy. As a result, all villages in Indonesia can use this budget to improve their resiliency, through activities such as improved water access, river normalization, reforestation and ground water recharge

wells. These activities were piloted in all the areas APIK works and villages in all three provinces have already allocated resources for resilience action.

Climate and Weather Information Services (CWIS) are essential for any adaptation strategy as it allows people to make informed decisions regarding their livelihoods and safety. APIK carried out an assessment and roadmap of CWIS at the beginning of the project to determine the most strategic way the project could support BMKG (the Indonesian Meteorological Agency) to ensure people could access high quality climate and weather information. Firstly, the project identified access to information as a priority. To help address this the project carried out climate field schools for farmers and fisherfolk to build understanding in how to access and understand weather information, installed automatic rain gauges at community level to increase availability of data, set up early warning systems in areas prone to flooding and also placed digital weather displays in coastal villages to provide real time information on weather conditions. In addition, in consultation with BMKG the project engaged the US-based National Center for Atmospheric Research (NCAR) to provide technical assistance to BMKG to improve their seasonal forecasting and thunderstorm monitoring ability. BMKG has adopted these systems and continues to engage with NCAR to provide remote support.

In all three provinces, APIK supported communities with context specific resilience building action through the Resilience Fund component of the project. This included improved water access, sloping land management, climate smart agriculture, water resource management, reforestation and coastal protection. These initiatives were implemented in partnership with government and private sector and usually co-funded to ensure local buy-in and sustainability. The specific initiatives were designed in partnership with the community and other stakeholders following village level vulnerability assessments with climate and disaster teams set up at village level. The specific activities and the process to implement them varied depending on the local context with the whole process documented and then used to influence government planning at sub-national and national level. APIK applied a gender lens to all activities with the active participation of women strongly encouraged. As a result, there are women climate champions in each location APIK worked, often times leading the climate and disaster teams at community level and always actively involved in the design and implementation of village level projects.

A core approach underpinning APIK's work at provincial level was building landscape level partnerships between cities and districts to address shared climate and weather issues. For example, in East Java land management changes in Batu City at the top of the Brantas watershed leads to increased flooding and landslide risk for Malang District and Malang City, just downstream. APIK was able to facilitate a partnership between the respective disaster management agencies from each of these administrations to work together on this issue for preparedness and response. In Southeast Sulawesi, the Wanggu River which originates in South Konawe District often causes flooding in Kendari City downstream. As a result of APIK engagement an MoU and Action Plan were agreed upon and signed by the District Chief of South Konawe and Mayor of Kendari to work together on this issue.

APIK promoted the concept that resilience is good for business with private sector partners. APIK identified potential partners through a combination of online research and a business perception survey. Once prospective partners were identified, the APIK approach centered on three main activities; a) building awareness of climate and disaster risk to team members of the business; b) identifying specific areas in the value chain of the business at risk from climate change; and c) co-designing and implementing projects that build local resilience whilst also benefiting the business. Thirteen partnerships were established through the project. For example, egg production in Blitar District is being impacted by changes in temperature and more extreme weather events with one of the main issues being the design of traditional chicken sheds impacting the health of the chicken. This affects local livelihoods through reduced income from eggs and also affects chicken feed producers as there is a reduced demand for their product. APIK worked with PT Cargill and the Layer Chicken

Association of Indonesia, to design climate smart chicken housing which regulate temperature better, are more efficient in water use and more hygienic. By the end of the project egg production was already 7% greater from the new chicken shed and other farmers were keen to replicate.

To help ensure the legacy of APIK pilot activities, the Green Climate Fund (GCF) was identified as an ongoing source of funding for climate resilience projects. The GCF in Indonesia is administered by the Fiscal Policy Agency (BKF) of the Ministry of Finance. APIK closely collaborated with them to provide training to regional government and research institutions in each of the three provinces. Following this, the local planning agencies (Bappeda) in each area took the lead on developing a concept note for GCF with APIK support. The concept notes for East Java and Southeast Sulawesi closely mirrored the APIK approach of community vulnerability assessments to identify specific village level projects whereas the concept note for Maluku built on APIK's work on coastal protection through mangrove reforestation. All three concept notes were approved to proceed by the BKF and at a marketplace for GCF projects in early 2020, the projects were matched with GCF accredited entities to move forward to the full proposal stage. A former APIK team member is continuing to engage on this process to shepherd the proposals and ensure they get fully funded.

The communication and knowledge management team in APIK were active throughout the whole project to share best practices, lessons learned and stories from the project widely and help with replication. Throughout the project APIK was covered 392 times by local media and APIK also had 8 stories posted in international media such as climatelinks.org and weadapt.org. The website was also very active with almost 91,000 views plus 361 followers on twitter and over 424,000 twitter accounts reached. The team are continuing to liaise with KLHK on utilizing their website as a home for APIK products in addition to the USAID Development Experience Clearinghouse (DEC).

Throughout APIK implementation the main challenge was the turnover in government personnel. This turnover can happen following local elections and also within election cycles and is quite unpredictable. The impact on the project varied from having to take time to reestablish relationships and build awareness of the project with new individuals, to a shift in priorities for the local government following leadership changes. APIK was able to overcome these challenges through ensuring the project worked with teams in government, and not just specific individuals. In addition, the project worked within government planning systems that continued to be relevant despite leadership changes. Ultimately the main impact on the project was the time and effort required in order to do this.

APIK held closedown events in each province and also at national level to officially hand over products such as guidelines, tools and reports to local stakeholders and also share lessons learned and success stories. The events were very well attended by local government, national government, communities, NGOs, private sector partners, research institutions and the media. In all four closedown events there were testimonies from stakeholders including community members and each government administration publicly committed to continue building climate resilience into the future.

Although APIK was initially designed as a five-year initiative, the project was unfortunately not fully funded and ultimately closed after four and a half years having only received around 80% of the anticipated project budget. Despite the short fall in funding the project was able to successfully influence government planning and budgeting from national to village level, ensuring that climate adaptation and resilience remains an ongoing focus for the Government of Indonesia for the foreseeable future.

RINGKASAN EKSEKUTIF

USAID APIK (Adaptasi Perubahan Iklim dan Ketangguhan) dimulai sebagai proyek pada November 2015 dengan tujuan utama untuk mendukung Pemerintah Indonesia, masyarakat, dan pelaku usaha agar lebih tangguh terhadap bencana terkait iklim dan cuaca. Proyek ini bekerja di tingkat nasional dan provinsi meliputi Jawa Timur, Sulawesi Tenggara, dan Maluku.

Hasil kuantitatif proyek menunjukkan lebih dari 42.000 masyarakat menerima manfaat kegiatan pembangunan ketangguhan yang dilaksanakan di tiga provinsi dan 22.250 orang mendapat pelatihan tentang risiko iklim dan bencana. APIK telah berhasil mengintegrasikan adaptasi iklim dan pengurangan risiko bencana ke 158 kebijakan dan peraturan di tingkat nasional sampai tingkat desa, serta membangun kapasitas 174 institusi pemerintah. Sepanjang proyek, sebanyak 3,7 juta dollar AS telah dialokasikan dari anggaran pemerintah dan mitra swasta, meski demikian angka ini jauh lebih tinggi jika memperhitungkan rencana lima-tahunan pemerintah yang turut dipengaruhi oleh proyek ini (contoh: 3 milyar dollar AS dalam Rencana Pembangunan Jangka Menengah Nasional-RPJMN). Sebagai tambahan, APIK bersama BMKG telah meningkatkan akses 6.130 orang terhadap informasi iklim dan cuaca.

Di awal proyek, APIK memfasilitasi serangkaian kajian kerentanan (*vulnerability assessments-VA*) di masing-masing provinsi dan lanskap. VA tersebut memiliki dua tujuan utama, yang pertama adalah untuk memberi informasi kepada pengambil keputusan tentang risiko iklim dan bencana di masa depan pada wilayah geografis mereka. Tujuan kedua adalah untuk membangun kapasitas para tenaga ahli di tingkat lokal dalam lingkungan pemerintah dan lembaga penelitian agar mampu menyusun VA secara mandiri. Dengan dukungan APIK, Kementerian Lingkungan Hidup dan Kehutanan (KLHK) menghasilkan peraturan menteri baru tentang pendekatan untuk kajian kerentanan iklim. Para tenaga ahli yang telah didukung APIK di tingkat lokal telah siap untuk mengimplementasikan peraturan tersebut.

APIK menunjukkan bahwa melalui kolaborasi yang erat bersama Pemerintah Indonesia, mendukung prioritas pemerintah dan memastikan waktu intervensi yang sejalan dengan siklus perencanaan pemerintah, maka pemanfaatan sumber daya pemerintah secara signifikan menjadi mungkin. Di ketiga provinsi, tim APIK di lapangan bekerja beriringan dengan pemerintah setempat untuk mengembangkan rencana lima-tahunan mereka melalui serangkaian lokakarya dan menggunakan pengalaman yang didapat dari proyek percontohan. Pemerintah menyadari pentingnya isu ketangguhan iklim dan bencana sehingga saat ini isu tersebut terintegrasikan ke dalam rencana pembangunan mereka. Contohnya di Kabupaten Maluku Tengah, dana sebesar 27 juta dollar AS telah dialokasikan untuk kegiatan ketangguhan iklim termasuk di bidang infrastruktur seperti tanggul laut, reforestasi mangrove, sistem peringatan dini, dan peningkatan SIG menggunakan teknologi *drone*. Di tingkat nasional, APIK memiliki personel tim yang melekat pada Badan Perencanaan Pembangunan Nasional (Bappenas) dengan tujuan untuk merevisi rencana aksi nasional adaptasi perubahan iklim (RAN-API) dan memastikan isu perubahan iklim terintegrasi ke dalam RPJMN. Pekerjaan ini dimulai pada 2016 untuk memengaruhi siklus perencanaan baru di 2020 dan menyertakan kajian ilmiah, analisis manfaat dan biaya, memfasilitasi lokakarya antarkementerian, dan berpartisipasi dalam konferensi-konferensi internasional. Hasil dari upaya ini adalah alokasi Pemerintah Indonesia sebesar 3 miliar dollar AS untuk adaptasi iklim di dalam RPJMN 2020-2024 pada empat sektor meliputi pertanian, air, pesisir dan kelautan, serta kesehatan.

Desa di Indonesia menerima anggaran tahunan (dana desa) dari Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi (Kemendesa). Besaran dana berbeda antara satu desa dan lainnya, namun berada di kisaran 70.000 sampai 80.000 dolar AS per tahun dengan lebih dari 80.000 desa di Indonesia. Penggunaan sumber daya ini diatur oleh regulasi Kemendesa. APIK menghubungkan KLHK dan Kemendesa untuk bersama-sama mengintegrasikan ketangguhan iklim dan bencana ke dalam kebijakan Kemendesa. Hasilnya, seluruh desa di Indonesia sekarang boleh menggunakan dana desa untuk meningkatkan ketangguhannya, contohnya peningkatan akses terhadap air, normalisasi sungai,

penanaman pohon, dan pembuatan sumur resapan. Berbagai kegiatan ini telah dilakukan di wilayah kerja APIK dan desa-desa di tiga provinsi telah mengalokasikan sumber dayanya untuk aksi ketangguhan.

Layanan informasi cuaca dan iklim (ICI) sangat penting untuk strategi adaptasi karena dapat membantu masyarakat untuk mengambil keputusan terkait penghidupan dan keselamatan mereka. Di awal, APIK melakukan kajian dan membuat peta jalan (*roadmap*) guna menentukan strategi terbaik untuk mendukung Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) dalam pengembangan layanan ICI. Pertama-tama, APIK memprioritaskan untuk mengidentifikasi akses masyarakat terhadap informasi. Menindaklanjuti isu ini, APIK mengadakan Sekolah Lapang Iklim (SLI) untuk petani dan nelayan guna membangun pemahaman dalam mengakses dan menggunakan informasi cuaca, meletakkan alat penakar hujan otomatis di masyarakat untuk meningkatkan ketersediaan data, mengembangkan sistem peringatan dini di area rawan banjir, dan memasang layar digital informasi cuaca di desa-desa pesisir untuk memberikan info langsung terkait kondisi cuaca. Sebagai tambahan, melalui konsultasi dengan BMKG, APIK menggandeng National Center for Atmospheric Research (NCAR) yang berbasis di AS untuk memberi pendampingan teknis kepada BMKG guna meningkatkan kemampuan peramalan cuaca dan memonitor hujan badai. BMKG telah mengadopsi sistem ini dan mendapat dukungan lanjutan jarak jauh dari NCAR.

Di ketiga provinsi, APIK mendukung aksi ketangguhan masyarakat dengan konteks yang spesifik melalui Dana Ketangguhan (*Resilience Fund*) yang menjadi salah satu komponen proyek. Ini termasuk peningkatan akses terhadap air, pengelolaan lahan miring, pertanian cerdas iklim, manajemen sumber daya air, reforestasi, dan perlindungan pesisir. Inisiatif-inisiatif ini diimplementasikan melalui kolaborasi dengan pemerintah serta sektor swasta dan biasanya dilakukan dengan pendanaan bersama guna mendukung keberlanjutan dan rasa kepemilikan di tingkat lokal. Inisiatif yang ada dirancang bersama dengan masyarakat dan pemangku kepentingan lainnya berdasar kajian kerentanan tingkat desa, ditambah dengan kelompok kerja untuk iklim dan bencana yang dibentuk di desa. Aktivitas yang dilaksanakan bervariasi tergantung dengan konteks lokal dan keseluruhan proses didokumentasikan untuk memengaruhi perencanaan pemerintah di tingkat nasional dan sub-nasional. APIK mengaplikasikan lensa gender ke seluruh aktivitas dan mendorong kuat partisipasi perempuan. Hasilnya, tokoh-tokoh iklim perempuan (*champion*) di setiap lokasi kerja APIK sering kali memimpin kelompok kerja iklim dan bencana di masyarakat dan terlibat aktif dalam perencanaan dan implementasi aksi-aksi di tingkat desa.

Pendekatan inti yang mendasari pekerjaan APIK di provinsi adalah membangun kemitraan tingkat lanskap antara kota dan kabupaten untuk mengatasi masalah iklim dan cuaca bersama. Contohnya di Jawa Timur, perubahan penggunaan lahan di Kota Batu yang berada di hulu Daerah Aliran Sungai (DAS) Brantas mengakibatkan peningkatan risiko banjir dan longsor bagi Kota Malang dan Kabupaten Malang yang berada di wilayah lebih rendah. APIK telah berhasil memfasilitasi kemitraan antara Badan Penanggulangan Bencana Daerah (BPBD) di masing-masing wilayah administratif untuk bekerja sama dalam isu kesiapsiagaan dan respons. Di Sulawesi Tenggara, Sungai Wanggu yang berpangkal di Kabupaten Konawe Selatan kerap menyebabkan banjir di Kota Kendari sebagai hilir sungai. Sebagai hasil dari dampingan APIK, sebuah nota kesepahaman dan rencana aksi telah disepakati oleh Bupati Konawe Selatan dan Wali Kota Kendari untuk bersama-sama menghadapi isu ini.

APIK mendorong suatu konsep kepada para mitra swasta bahwa ketangguhan itu baik untuk bisnis mereka. Melalui kombinasi riset daring (*online*) dan survei persepsi bisnis, APIK mengidentifikasi mitra swasta potensial. Setelah mitra-mitra teridentifikasi, pendekatan APIK berpusat pada tiga kegiatan utama: a) membangun kesadaran pelaku usaha terhadap risiko iklim dan bencana; b) mengidentifikasi wilayah spesifik pada rantai nilai yang memiliki risiko terhadap dampak iklim; dan c) bersama merancang dan mengimplementasikan proyek yang membangun ketangguhan lokal dan juga bermanfaat bagi bisnis. Tiga belas kerja sama dengan mitra swasta berhasil dibangun melalui proyek APIK. Contohnya, produksi telur di Kabupaten Blitar yang terdampak oleh perubahan suhu lokal dan kejadian cuaca ekstrem. Masalah ini berkaitan dengan kandang ayam tradisional yang memengaruhi kesehatan ternak dan

berimbang pada mata pencaharian penduduk setempat yang berkurang akibat penurunan produksi telur, serta berdampak bagi produsen pakan ayam karena permintaan terhadap produk pakan ikut menurun. APIK bekerja sama dengan PT Cargill dan Paguyuban Peternak Rakyat Nasional (PPRN) Indonesia untuk merancang kandang ayam cerdas iklim yang mengatur suhu dengan lebih baik, penggunaan air yang lebih efisien, dan lebih higienis. Hasilnya, produksi telur dari ayam petelur di kandang baru percontohan telah meningkat 7% dan para peternak ayam lainnya berminat untuk mereplikasi desain kandang tersebut.

Untuk membantu memastikan peninggalan dari kegiatan APIK, Green Climate Fund (GCF) diidentifikasi sebagai sumber pendanaan berkelanjutan untuk proyek ketangguhan iklim. GCF di Indonesia dikelola oleh Badan Kebijakan Fiskal (BKF) di bawah Kementerian Keuangan. APIK berkolaborasi erat dengan mereka untuk memberikan pelatihan kepada pemerintah daerah dan lembaga penelitian di tiga provinsi. Selanjutnya, Badan Perencanaan Pembangunan Daerah (Bappeda) di masing-masing wilayah memimpin penyusunan naskah konsep untuk GCF dengan dukungan dari APIK. Naskah konsep untuk Jawa Timur dan Sulawesi Tenggara mereplikasi pendekatan APIK terkait kajian kerentanan komunitas guna mengidentifikasi proyek-proyek spesifik di tingkat desa, sedangkan Maluku melanjutkan hasil kerja APIK dalam perlindungan pesisir melalui reforestasi mangrove. Ketiga naskah konsep tersebut telah disetujui oleh BKF untuk diproses lebih lanjut dan saat sesi *marketplace* untuk proyek-proyek GCF di awal 2020, proyek-proyek tersebut dicocokkan dengan entitas terakreditasi GCF untuk maju ke tahap penyusunan proposal lengkap. Mantan personel APIK saat ini melanjutkan keterlibatannya dalam proses ini untuk mengawal dokumen proposal dan memastikan proyek yang ditargetkan mendapat pendanaan.

Tim komunikasi dan manajemen pengetahuan APIK secara aktif terlibat dalam keseluruhan proyek untuk membagikan praktik baik, pembelajaran, dan cerita-cerita dari proyek yang dapat mendorong replikasi. Secara keseluruhan, proyek APIK telah diliput sebanyak 392 kali oleh media massa dan ada sekitar 8 cerita yang dipublikasi di media pembelajaran internasional seperti climatelinks.org dan weadapt.org. Situs APIK juga sangat aktif dan dilihat hampir 91.000 kali oleh pengunjung, serta ada 361 pengikut di Twitter dengan jangkauan lebih ke 424.000 akun selama ini. APIK melanjutkan kerja sama dengan KLHK untuk memanfaatkan situs mereka agar dapat menaungi produk-produk publikasi APIK ke depannya selain adanya Development Experience Clearinghouse (DEC).

Selama implementasi APIK, tantangan utama yang dihadapi adalah pergantian personel di pemerintahan. Hal ini sering terjadi khususnya setelah pemilihan kepala daerah maupun saat siklus pemilihan dan ini cukup sulit diprediksi. Dampaknya cukup bervariasi mulai dari waktu yang diperlukan untuk kembali membangun hubungan dan pengetahuan individu baru terhadap proyek, sampai ke perubahan prioritas pemerintah daerah seiring pergantian kepemimpinan. APIK mampu melewati tantangan-tantangan tersebut dengan memastikan proyek bekerja bersama tim di pemerintahan, tidak hanya dengan individu tertentu, serta masuk ke dalam sistem perencanaan pemerintah yang terus berlanjut meski kepemimpinan berubah. Pada akhirnya dampak utamanya adalah tambahan waktu dan upaya yang diperlukan untuk melakukan ini semua.

APIK mengadakan acara penutupan di tiap provinsi dan juga di tingkat nasional untuk secara resmi menyerahkan produk-produk proyek seperti panduan, perangkat, dan laporan kepada pemangku kepentingan setempat dan juga membagikan pembelajaran dan kisah sukses. Acara-acara penutupan tersebut dihadiri oleh pemerintah, masyarakat, LSM, mitra swasta, lembaga penelitian, dan media. Di keempat acara penutupan tersebut, masyarakat dan perwakilan pemerintah menyampaikan komitmennya untuk terus melanjutkan upaya membangun ketangguhan iklim di masa depan.

Meski APIK awalnya dirancang untuk lima tahun, proyek ini tidak mendapatkan keseluruhan pendanaan secara utuh dan harus berakhir setelah empat setengah tahun dengan hanya menerima 80% dari total anggaran. Walau demikian, APIK telah mencapai hampir seluruh dari target yang ditetapkan dan berhasil memengaruhi perencanaan dan penganggaran pemerintah di tingkat nasional sampai ke tingkat desa agar memastikan adaptasi iklim dan ketangguhan tetap menjadi fokus bagi Pemerintah Indonesia di masa mendatang.



Community in East Java, Southeast Sulawesi, and Maluku deals with climate impacts differently as they live in different landscapes and area characteristics.

SECTION I: INTRODUCTION

REPORT OBJECTIVE

This document represents the APIK Final Report of the implementation period from project year 1 (started in November 20, 2015) to project year 5 (project ended on June 30, 2020). It is submitted in accordance with Section F.5.11 of the APIK Contract which states that the Contractor must provide a final report which must discuss all activities and achievements of the Contract Performance Objectives from the start of the project through to its completion.

PROJECT OVERVIEW

USAID Indonesia's "Adaptasi Perubahan Iklim dan Ketangguhan" (APIK) Project was a five-year initiative supporting the Government of Indonesia to strengthen climate and disaster resilience, working in an integrated manner from the national level down to the regional and community levels. In support of this overall objective, APIK sought to:

- Mainstream climate change adaptation and disaster risk reduction into national and sub-national governance frameworks;
- Build the capacity of local communities and the private sector to address climate change and weather-related natural hazards; and
- Support the use of information for climate and disaster risk management among key stakeholders.

At the national level, APIK provided technical assistance to central government ministries to strengthen their understanding of climate change and the impact of weather-related natural disasters, and to mainstream tools and approaches that facilitate the systematic integration of climate and disaster resilience in their core planning, budgeting, and operations. Given the cross-cutting nature of climate and disaster resilience, APIK worked with multiple government agencies such as the National Development Planning Agency (Bappenas), Ministry of Environment and Forestry (KLHK), the National Disaster Management Agency (BNPB), as well as other technical ministries like Marine Affairs and Fisheries (KKP), Agrarian and Spatial Planning (ATR), Agriculture (Kementan) and Meteorology, Climatology and Geophysics Agency (BMKG).

At the subnational level, APIK sought to build the capacity of local governments to address climate and disaster resilience through their planning and operations, communicate about climate change, and institutionalize resilience building practices in day-to-day activities. Further, the project worked directly with communities on the front lines of climate change and disaster resilience in the targeted districts to implement measures and link those measures to the relevant government processes in a holistic systems approach.

Crosscutting the national and subnational level, APIK further sought to mainstream climate and disaster resilience into the private sector as well as improve the uptake and utilization of climate and weather information (CWI) services. Private sector engagement is critical to addressing shared economic risks and livelihoods, while improved climate and weather information services empower public and private institutions alike to better prepare for and respond to climate and disaster risk. The issue of gender is a crosscutting issue that was mainstreamed into all APIK activities. Women are not only differently vulnerable to climate change, but they are also crucial in implementing adaptation solutions and building resilience. Gender integration in APIK activities was internalized through systematic activities and promoting integration in public policies, programs, and budgets.

APPROACH

The USAID APIK Project applied a technical approach centered on **place-based resilience**, which emphasized that vulnerability to natural disasters and climate change is directly linked to each locale's unique landscape, socioeconomic, and institutional characteristics. Place-based resilience moves beyond generalities to understand the climate story at the local government and community levels, while identifying how the national policy environment influences each community story. APIK built an evidence base from landscape activities, and then used it to influence governance frameworks (national/subnational/private sector) and enhance decision support tools for the people whose livelihoods are stressed by natural hazards and shifting climate patterns.

Exhibit I presents the integrated components of APIK's place-based approach:

Institutional resilience: Under Indonesia's decentralized system, place-based resilience requires that national ministries, as well as subnational governments, mainstream climate and disaster resilience principles into public planning and investments.

Socioeconomic resilience: Place-based resilience also requires that climate and disaster resilience principles be incorporated into business models across different economic sectors, supporting livelihoods and green economic growth. Fostering sustainable incomes is particularly important among the poor, whose resource-based livelihoods often face the greatest exposure to weather stresses and climate shifts.

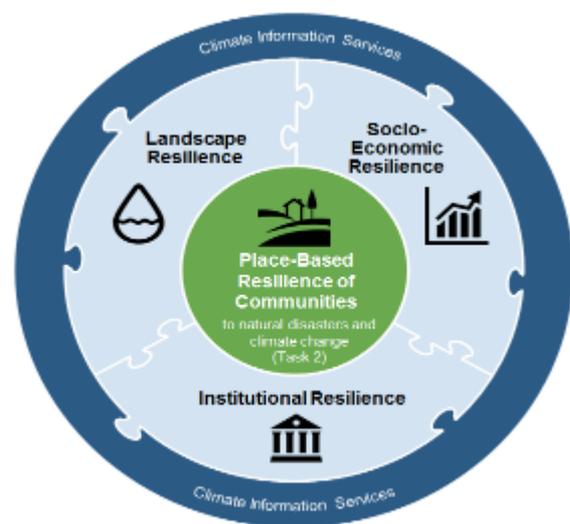
Landscape resilience: The vulnerability of place is interconnected with the ecological, hydrological, and meteorological characteristics of the surrounding landscape. Sound land use decisions that safeguard ecosystem services protecting urban, rural, and island communities from extreme and changing weather are critical, and thus empowering local people to own and make those decisions underpin landscape resilience.

Climate and weather information services (CWIS): Finally, CWIS play an important enabling role in achieving place-based resilience, with the resulting information products informing sound, evidence-based decision making across all tasks and activities. Climate services are not, however, an end in themselves; rather they are a means for people, businesses, and institutions to better understand their *place* and how/if it is changing.

WORKING AREA

APIK subnational activities were focused in three geographic areas – **East Java, Southeast Sulawesi, and Maluku**. The diverse landscapes in each region face different types of climate risks and are representative of the country writ large. In East Java, for example, APIK activities were centered in the population dense Brantas Watershed. In Southeast Sulawesi focused on coastal

Exhibit I: Place-Based Resilience



landscapes, while Maluku represented remote small island landscapes. Exhibit 2 below highlights the APIK working area geographies - detailed landscape maps are included in each section on the report.

Exhibit 2: APIK Geographic Working Areas



TASK STRUCTURE

The *conceptual design* of the APIK project was built around five core tasks. Each of the five tasks was integrated across our *implementation approach*, which was organized by the three levels of intervention (national, subnational, cross-cutting) discussed above. Sections 2-4 of this final report follows our implementation approach structure. Here, we present a summary of the five tasks and 22 sub-tasks that comprised the APIK Project's scope of work. For more detail please see the APIK results framework in Exhibit 17.

TASK 1: INTEGRATE CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION INTO NATIONAL-LEVEL POLICY AND COORDINATION

The underlying hypothesis of Task 1 is that: the integration of climate and disaster risk into national policies, the formation of national forums and networks to disseminate Climate Change Adaptation and Disaster Risk Reduction (CCA/ DRR) knowledge amongst practitioners, and the incorporation of CCA/ DRR lessons learned into planning under the RAN-API will collectively lead to the improved capacity of national public institutions to mitigate against climate and disaster risks, ultimately benefitting the Indonesian people. Task 1 was comprised of the following three sub-tasks:

- **Sub-Task 1.1:** Support national-level implementation of the RAN-API and the integration of CCA and DRR into annual work plans of government ministries;
- **Sub-Task 1.2:** Develop national level tools, guidelines, analyses, and other knowledge products that facilitate mainstreaming of CCA and DRR;
- **Sub-Task 1.3:** Strengthen national CCA/ DRR coordination.

TASK 2: ENHANCE SUBNATIONAL GOVERNMENT AND COMMUNITY RESILIENCE TO CLIMATE CHANGE AND WEATHER-RELATED NATURAL DISASTERS

Task 2 focused on local government and community capacity building, using entry-points such as local government working groups and community-based vulnerability mapping to convene stakeholders and facilitate planning and actions that strengthen landscape, socioeconomic, and institutional resilience. Task 2 consisted of the following sub-tasks:

- **Sub-Task 2.1:** Integrate CCA and DRR into local governance processes;
- **Sub-Task 2.2:** Build local capacity to support vulnerability/ risk assessments;
- **Sub-Task 2.3:** Strengthen landscape-level CCA and DRR mechanisms;
- **Sub-Task 2.4:** Improve provincial and district climate related disaster response capacity; and
- **Sub-Task 2.5:** Implement sustainable community level CCA and DRR measures.

TASK 3: STRENGTHEN TARGETED CLIMATE AND WEATHER INFORMATION SERVICES

Task 3 focused on the collection, packaging, and dissemination of climate and weather information (CWI) services. Better climate and weather information systems are fundamental to fostering place-based resilience across the archipelago, saving lives in the near term (i.e. disaster risk reduction) while supporting better planning and public investment in the medium to long term (i.e. climate change adaptation). The principal sub-tasks of Task 3 were as follows:

- **Sub-Task 3.1:** Conduct CWI stakeholder consultations at all levels and develop roadmap;
- **Sub-Task 3.2:** Build capacity of CWI producers, communicators, and users to develop, disseminate, and apply climate and weather data;
- **Sub-Task 3.3:** Utilize media, communication campaigns, and social marketing to share CWI and raise awareness about climate change impacts.

TASK 4: AWARENESS AND CAPACITY DEVELOPMENT FOR THE PRIVATE SECTOR

Task 4 focused on improving private sector awareness of climate change and weather-related natural disaster risks while strengthening the capacity of private sector partners to integrate CCA/ DRR into business models and plans and carry out sector-specific risk reducing activities. Our strategy emphasized the engagement and mobilization of business associations and business networks around shared risks in key economic sectors, such as the fishing industry in the Maluku Islands or cocoa and rice production in Southeast Sulawesi. Task 4 was comprised of the following sub tasks:

- **Sub-Task 4.1:** Engage and enhance cooperation with relevant business associations;
- **Sub-Task 4.2:** Develop or strengthen forums, tools, and analyses to improve private sector understanding and integration of climate and disaster risks into plans and operations;
- **Sub-Task 4.3:** Engage private sector actors to promote awareness and build resilience among companies and communities in targeted districts/landscapes; and
- **Sub-Task 4.4:** Disseminate information and examples that promote actions by private businesses to strengthen resilience to natural disasters and climate change.

TASK 5: PROJECT COORDINATION AND DOCUMENTATION

Task 5 involved the documentation and dissemination of locally validated climate change adaptation and disaster risk reduction practices to ensure the evidence base generated at APIK landscapes informed national and subnational climate and disaster resilience decision making. Specific sub-tasks under Task 5 were as follows:

- **Sub-Task 5.1:** Develop and disseminate models on the successful integration of local and national strategies for CCA and DRR mainstreaming; and
- **Sub-Task 5.2:** Facilitate broader coordination and collaboration and strengthen the capacity of other USG organizations including USAID projects to mainstream climate and disaster resilience.

FINAL REPORT LAYOUT

In line with APIK's *implementation approach*, Section 2 covers **National** Level interventions, Section 3 details **Subnational** work, Section 4 addresses **Cross-cutting** activities, Section 5 provides a brief snapshot of **Project Management**, Section 6 provides insights on **Most Significant Change**, Section 7 explains about **Challenges Encountered** during the project, and Section 8 provides an overview of **Performance Monitoring** for final results.

Annexes A, E, G, and J detail national and provincial activities including the references to task level results with **Annex F** displays city/district level maps with highlight activities, **Annex B** presents the Presidential Decree 18/2020 on National Mid Term Development Plan 2020-2024, **Annex C** gives guidelines on Business Continuity Plan (BCP), **Annex D** compiles the summary of vulnerability assessments for policy makers documents, **Annex H** provides the Memorandum of Understanding (MoU) between Kendari City, South Konawe District, and Southeast Sulawesi Province Government on Wanggu Watershed management, **Annex I** provides guidelines on Climate Smart Agriculture for corn commodity, **Annex K** sums up private sector engagement activities in a fact sheet, **Annex L** summarizes the Resilience Fund grant activities, **Annex M** recaps project final results in a fact sheet, **Annex N** presents lessons learned in a book format called 'Building Resilience', **Annex O** lists the media coverage throughout the project.



Media discussion involving national actors to improve awareness on climate resilience issue (top picture) and private sector engagement activity to help businesses in dealing with climate change (bottom picture).

SECTION 2: NATIONAL LEVEL RESULTS AND ACHIEVEMENTS

OVERVIEW

In order to implement effective resilience building activities across Indonesia it is important to have the full buy-in and support of national government. Policies and regulations developed at national level provide the legal framework and resources for climate and disaster resilience activities to be included in sub national government planning and budgeting. In addition, a strong partnership with national government is necessary for scaling up of pilot activities from the three provinces in which APIK operated to other areas of the country. For example, once climate resilience is included in government plans and budgets then it becomes a government obligation to use those resources accordingly across Indonesia.

Throughout the project, APIK enjoyed close collaboration and a strong partnership with the Government of Indonesia (GOI), including the National Action Plan for Climate Adaptation (RAN-API) Secretariat under Bappenas and the Ministry of Environment and Forestry (KLHK) to build capacity and enact new policies. With Bappenas, for example, APIK took a lead role in producing the new version of the national climate adaptation action plan. In partnership with KLHK, APIK supported the formulation of the ministerial regulation for an improved and standardized vulnerability assessment process. With the National Disaster Management Agency (BNPB), APIK worked together to improve the Indonesian disaster risk index by including climate factors in the tool, BNPB is continuing to finalize this with the expectation that the tool will be completed during 2020. APIK also partnered with the Meteorological Agency (BMKG) to improve quality and access to climate and weather information systems. In addition, APIK worked with the Ministry of Villages, Disadvantaged Regions, and Transmigration (Kemendesa) to develop guidelines for how village leadership can effectively use the Village Fund for climate resilience activities.

APIK key activities at the national level are highlighted in more detail in the section below. The detailed list of APIK activities carried out at the national level throughout project implementation can be found in **Annex A**.

HIGHLIGHTS

- Led the RAN-API Secretariat of Bappenas in creating a new updated version of the national action plan on climate adaptation.
- Integrated climate and disaster resilience in the 2020-2024 Indonesian mid-term development plan (RPJMN) for the first time through managing the RAN-API, providing scientific assessments and cost benefit analyses as well as drafting the adaptation section for the RPJMN document. As a result of this work, US \$3 billion has been allocated by the GOI to support climate adaptation action over the next five years.
- Strengthened policies at ministerial level, for example: with the Ministry of Villages (Kemendesa) for use of village funds in climate resilience activities; with KLHK on climate vulnerability assessment regulation; and with BNPB on disaster risk index improvement.
- Actively engaged with the private sector and chambers of commerce at the national level to mainstream climate and disaster resilience into business operations.
- Supported BMKG to produce and disseminate climate and weather information and also ensure that it can be accessed and used by local government, businesses and communities.

SUMMARY OF FOCUS AREAS AND ACTIVITIES

While most of the National Level work was anchored by Task 1—Integrate CCA/ DRR into National Policy and Coordination—it also included support for climate and weather information services to national agencies such as BMKG (Task 3) and the engagement of national private sector partners (Task 4). The following section summarizes key activities carried out at the National level.

REVISING THE NATIONAL ACTION PLAN FOR CLIMATE CHANGE ADAPTATION (RAN-API)

One of the aims of APIK was to strengthen the Indonesian National Action Plan for Climate Change Adaptation (RAN-API) to ensure it is relevant and effective for government planning and provides a usable framework for Indonesia to adapt to climate change. In order to reach this goal, it was essential there was synergy and coordination among different stakeholders within government. In 2016 APIK was able to embed a team member in Bappenas to take on the role of Manager for the RAN-API Secretariat and lead the revision and upgrade of this important document. As a result, APIK was able to effectively influence government planning at national level working under the direction of the Director for Environment in Bappenas.



APIK supported Bappenas and led various FGDs and workshops as part RAN-API revision process.

To initiate this work Bappenas requested APIK support to prepare atmospheric and oceanic climate scenario models in four priority sectors (agriculture, water resources, coastal/marine, and health) that will form the basis of the new RAN-API. The climate scenarios make use of climate projections by considering model outputs and combining them with observed climate data. It is important for RAN-API to bridge climate science with the real impact of climate change on the ground to allow for effective adaptation strategies. As part of this work APIK also created a loss and damage report and tool to calculate the financial losses if climate change and disasters were not properly planned for and addressed. It is essential that there is a good system in place to enable government and other stakeholders to effectively monitor and evaluate the impact of climate action through RAN-API to ensure Indonesia is on track to reach national development goals. Ultimately, this tool will be used by relevant ministries for planning and tracking progress of climate adaptation actions. As an initial step in this process, the Government is continuing to develop appropriate monitoring and evaluation indicators that measure resilience, such as economic resilience in the fisheries sector by measuring income distribution, alternative income and potential loss within the sector related to climate change and extreme weather events. APIK helped initiate this process which is now still in progress.

Following completion of the environmental planning for development training module, the RAN-API Secretariat and Bappenas designed a training curriculum to improve planning by building capacity of the planners. The original training modules were focused on supporting the National Greenhouse Gas Emission Reduction Action Plan (RAN-GRK). The modules gave information to planners on how to include climate and disaster factors into their development planning. APIK worked through the RAN-API secretariat to revise the modules so that participants are trained to understand the concept and basic framework of the Green Economy and are able to support activities in line with the Sustainable

Development Goals (SDGs) and Regional Climate Change Adaptation Action Plans (RAD API). These training modules have become an important RAN-API tool in achieving the main objectives of climate change adaptation that consists of (a) Increasing awareness and knowledge of the parties about the importance of using scientific data and information in the RAN-API for development planning and implementation. (b) Reducing vulnerability, risks and impacts of climate change and increasing resilience to climate change in the four priority sectors and (c) Implementing the RAN-API synergistically, especially the implementation of adaptation efforts at national and regional levels.

APIK also supported the RAN-API Secretariat and Bappenas to produce a Coastal Vulnerability Index (CVI), which highlights coastal areas at risk from factors including sea level rise, tidal surges or subsidence. This index supports the Strategic Environmental Review (KLHS) document and process. Bappenas then integrated this into the national mid-term development plan (RPJMN) development process. The CVI is also being used as an input to solve the constraint of coastal development in Indonesia. Indonesian coastal areas face multiple vulnerability issues and threat such as coastal erosion, tidal surges and sea level change. Through this CVI method, the Indonesian government are now able to focus on mitigating these coastal issues in specific areas, for example in Semarang, Central Java where this approach has been trialled by Bappenas. Semarang is outside APIK working areas and so is one example of activities being scaled up and replicated.

The CVI designed by APIK is being rolled out nationally by Bappenas and an early example of replication is in Central Java where Bappenas and the Ministry of Spatial Planning (ATR/BPN) integrated CVI into the Development Corridor Map for the province. The CVI played an important role in highlighting vulnerable areas for the coastline of Central Java and recommended strategies to reduce the risk. While Central Java is not an APIK working area, it is a priority area for Bappenas and RAN-API. The CVI tool was tested here before rolling out to other provinces. This is a good example of APIK methodologies being replicated in other provinces, demonstrating great buy-in from the Indonesian Government in using scientific assessments developed by APIK to influence planning across the country.

To align climate and disaster resilience with Indonesian Government priorities, APIK also conducted budget tagging. This is a mechanism to allow GOI to review existing budget and plans and analyze the resources being used for adaptation actions. Previously there was no mechanism to identify fund allocation for climate change activities within government budgets and this made the monitoring and evaluation for the effectiveness of climate budgeting almost impossible. APIK produced a guideline for climate budget tagging for the Ministry of Finance. With this new budget tagging alignment, the budget allocation and monitoring and evaluation process for the effectiveness of climate related initiatives will be easier to conduct and more accurate. APIK and the Ministry of Finance analyzed the implementation of climate budget tagging to match the climate budget within each ministry with RAN-API priorities. One of the major findings in the budget reconciliation with Ministry of Finance was that ministries only highlight the thematic outputs that fall into the adaptation criteria and are not aligning their climate budgets with RAN-API priorities. The use of budget tagging presents as opportunity to refocus and amend ministerial targets concerning climate and disaster resilience into the upcoming RPJMN.

In PY 5 of APIK implementation, the technical content for RAN-API was finalized. However, the process to secure political buy-in for the plan is ongoing as the GOI is still finalizing the plan for RAN-API to be adopted as Indonesia's National Adaptation Plan or NAP. Within the Conference of Parties (COP) 25, the Indonesian Government, via Bappenas, formally launched the National Adaptation Plan (NAP) which was based entirely on the RAN-API. However, although Bappenas was responsible for RAN-API development, the Ministry of Environment and Forestry are responsible for the NAP and they have not yet formally recognized the RAN-API as the NAP. Bappenas and KLHK continue to discuss this issue. In the meantime, the RAN-API / NAP itself has been integrated with the Indonesian National Mid Term

Development Plan (RPJMN) demonstrating strong Indonesian commitment towards climate adaptation action.

The revised RAN-API identifies priority adaptation programs and details priority geographies for climate change adaptation actions. At the national level, RAN-API will be used as a guideline to provide direction for future government planning in order to be responsive to climate change. At regional level, RAN-API is a reference for local government when preparing their Regional Action Plans, Strategies and budgets to ensure climate change adaptation is incorporated.

INTEGRATING CLIMATE AND DISASTER RESILIENCE IN NATIONAL MID-TERM DEVELOPMENT PLANNING

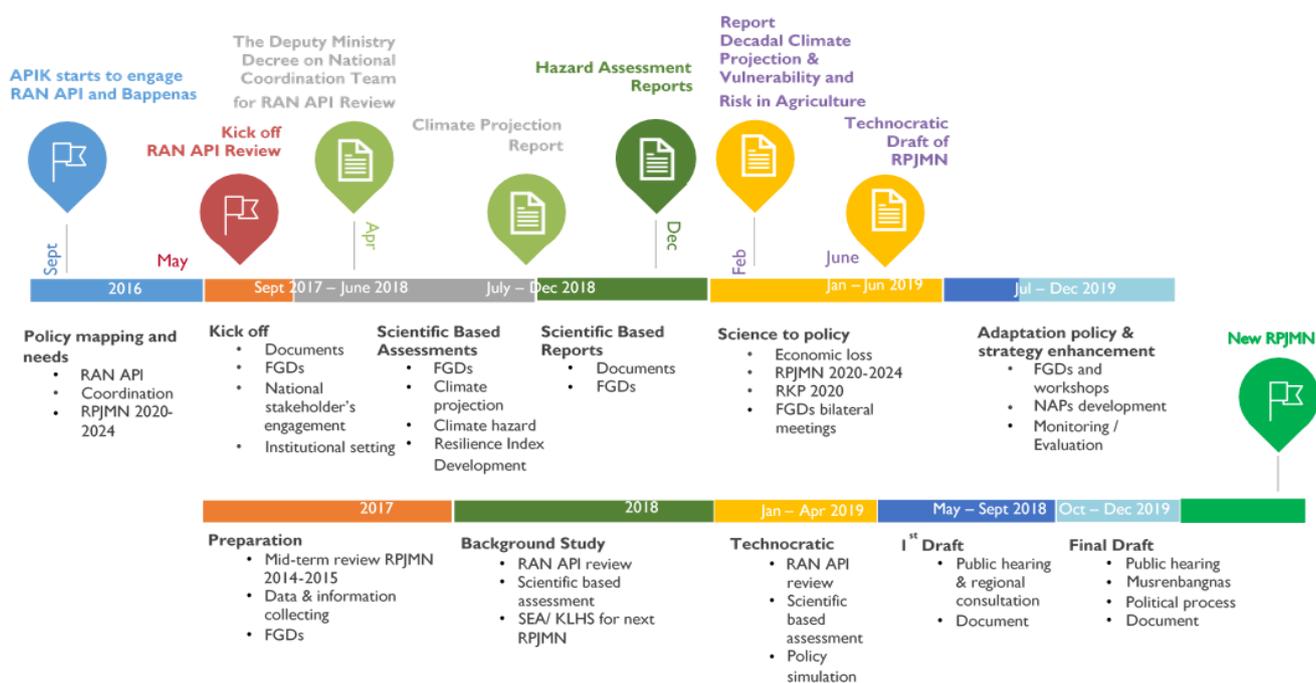
Indonesia develops five-year plans at national and regional level following elections. These plans determine the budget allocation and priority activities for the government for a five-year period. The new national mid-term development plan or RPJMN is for the period from 2020 to 2024, but the process to develop this RPJMN began much earlier. APIK began engaging with the process to ensure climate resilience was integrated into the RPJMN from 2016, initially through the work with the RAN-API secretariat in Bappenas. Exhibit 3 details the engagement process and timeline to produce the new RAN-API and influence the RPJMN.

APIK, together with other development partners, such as the Indonesia Climate Alliance, worked together to ensure a greener RPJMN by enhancing the sustainable development framework. This is in line with Article 3.4 of the UNFCCC which states that climate change policy must be integrated into national development plans. To align with this, the Government of Indonesia must ensure that climate change is mainstreamed into national development planning, both in the long-term, medium-term development plans and also the annual Government Work Plans (RKP).

In October 2016 Indonesia formally declared that climate action, both adaptation and mitigation, would be integrated into its development agenda for the first time in line with the Paris Agreement (GOI regulation UUI6/2016). In parallel with the RAN-API development, another critical component was preparation of the Low Carbon Development Initiative for Indonesia (LCDI) to promote greener economic growth. APIK supported this process through integrating climate resilience into the LCDI. Along with RAN-API the LCDI was an integral component of influencing the RPJMN document. The LCDI includes a wide selection of policy scenarios for each related development sector. The focus area on adaptation and resilience aims to strengthen national and local institutions and community vulnerability to climate impact through (i) Disseminating climate information, developing and improving the design of adaptation strategies, the use of appropriate science and technology, and (ii) Promoting appropriate policies that support the implementation of (adaptation and resilience) activities. APIK through the RAN-API Secretariat also produced a policy brief from the LCDI to finalize the strategy for developing the RPJMN.

Exhibit 3 below details the process for integrating climate adaptation into the RPJMN. The top workflow on the graphic represents the RAN-API revision process and how it is integrated into the RPJMN. This process was managed by APIK through the RAN-API secretariat. The bottom workflow on the diagram is the Government of Indonesia process for producing the new RPJMN. This is included here to show the alignment between the two processes and also highlight the time and level of effort required to influence the RPJMN.

Exhibit 3: APIK engagement with the RPJMN process



As a result of this work, climate change is now an Indonesian Government National Priority for the first time and included as National Priority 6 of the RPJMN which focuses on enhancing development through addressing environment, disaster resilience and climate impact. The RPJMN was formalized by Indonesian Government through Presidential Decree (*Peraturan Presiden*) number 18/2020. This was a huge result for APIK at National level, since this achievement will ensure Indonesian program and budget priorities within the next five years. The specific component of the RPJMN focusing on climate resilience was taken directly from the RAN-API document led by APIK. The Presidential Decree 18/2020 on RPJMN is available in **Annex B**. As a result, approximately **US\$3 Billion** has been allocated for climate resilience in the water, agriculture, coastal/marine and health sectors for the first time.

Following the finalization of National Priority 6 of the RPJMN, APIK, the RAN-API secretariat and Bappenas started to work on the Annual Government Work Plan (*Rencana Kerja Pemerintah - RKP*) for disaster resilience for multiple government stakeholders. Within the RKP, the Indonesian Government will prepare targets for reducing disaster vulnerability at provincial level. The specific agencies include BNPB, BMKG, KLHK, BIG, LAPAN, ESDM and ATR/BPN. The RKP and targets for each agency are currently being finalized. However, Bappenas proposed that each agency undertake activities such as increasing public knowledge and awareness on disaster management, improving technology in reducing disaster impact and integrating good spatial planning and land use management. The RKP also includes strategic steps in reducing the potential loss to the GDP (Gross Domestic Product) such as integrating climate resilience into development planning, increasing resilience based on landscape approaches, adding more early warning systems and building capacity in the regions. Based on Bappenas data, climate adaptation can avoid a national GDP loss by 2024 from the projected GDP of IDR 24.55 thousand trillion down to IDR 24.43 thousand trillion (approximately 0.49%)¹. APIK originally planned to engage substantially in the formulation of the RKP to translate the high-level goals of the RPJMN into real concrete action on the ground. However, due to the APIK project closing earlier than anticipated, the engagement from the project on the RKP was limited.

¹ Executive Summary National Adaptation Plan, Bappenas 2019; page 17

INTEGRATING CLIMATE AND DISASTER RESILIENCE IN THE VILLAGE FUND



APIK facilitated workshops between Kemendesa and KLHK to push the integration of climate and disaster resilience into village fund regulation.

An important focus of APIK was to conduct advocacy at the national level to promote mainstreaming of climate and disaster resilience in villages across the country through policies and supporting tools.

The village law mandates that the village fund from the state budget (APBN) be used to improve welfare and development in villages across the country. The law stipulates that the fund be allocated equitably based on the number of villages, accounting for village characteristics (population, poverty, total area, and geography). These funds,

which are distributed directly to village administrations, are an important potential resource for financing climate change adaptation and disaster resilience activities at the village level. Villages receive the equivalent of around US \$70,000 to US \$80,000 per year. There are over 80,000 villages in Indonesia so influencing how the village funds are used can have a huge impact across the country.

The use of village funds is covered by policies from the Ministry of Villages, Development of Disadvantaged Regions and Transmigration (Kemendesa) and prior to APIK's engagement climate and disaster resilience was not included in these policies. APIK facilitated workshops between Kemendesa, the KLHK Directorate of Regional Mobilization and Resources and the KLHK Directorate of Climate Change Adaptation to help address this issue. Following a series of workshops Kemendesa agreed to prioritize climate and disaster resilience. As a result, climate and disaster resilience activities are now included in the annex of the Ministry of Village Decree No. 16/2018 concerning Priority Allocation of Village Funds and Facilitation Guidelines on Climate Change Control in Villages which will be disseminated by Kemendesa to all villages in Indonesia. In addition, APIK worked with Kemendesa and KLHK to prepare guidelines for village leaders on how to effectively use these resources. The policy and guidelines have now been ratified by Kemendesa. APIK was able to pilot the guidelines in villages within the project areas and raise awareness of village leadership on their ability to use village funds for resilience building activities. In total APIK has been working in 88 villages and all these villages were supported to integrate climate adaptation and disaster management through their village budgets (both *dana desa* and APBDes). As a next step, pilot projects under the auspices of KLHK and Kemendesa are planned to be implemented in villages across Indonesia.

SUPPORTING DEVELOPMENT OF THE VULNERABILITY INDEX DATA INFORMATION SYSTEM (SIDIK)

The Ministry of Environment and Forestry (KLHK) currently uses the Vulnerability Index Data Information System (SIDIK) to provide information on vulnerability and climate risk down to the village level. This system is available online at <http://sidik.menlhk.go.id/>. SIDIK also serves as a reference in determining priority adaptation actions and as a monitoring and evaluation tool.

APIK worked with KLHK to produce a comprehensive framework to implement SIDIK effectively. This framework provided an overview of the purpose of the system and helped make SIDIK a more useful instrument to support the implementation of adaptation measures. APIK produced an academic paper to support SIDIK and help to standardize the vulnerability assessment process.

In 2018 the Ministry of Environment and Forestry formalized the ministerial decree on guidelines for vulnerability, risk, and impact of climate change assessments (Number P.7/ MENLHK/ SETJEN/ KUM.1/ 2/ 2018). These guidelines mandate government agencies to conduct assessments regarding the risks and impact of climate change in their respective areas. The guidelines include information on the techniques needed to develop climate change adaptation strategies at different levels. In addition, the guidelines are designed to be used by other technical ministries to identify vulnerabilities and risks and impacts in specific sectors. APIK provided significant input to the content of this ministerial decree.

SUPPORTING BMKG TO PRODUCE AND DISSEMINATE CLIMATE AND WEATHER DATA

In 2016 APIK started the partnership with BMKG by developing a Climate and Weather Information Services (CWIS) assessment and roadmap. The assessment plus roadmap were produced in a collaborative manner with BMKG and helped identify priority areas for APIK to support throughout the life of the project. The assessment identified gaps in the applicability and use of the current CWIS and the roadmap ensured APIK was aligned with BMKG priorities and helped APIK identify key technical assistance entry-points for the coming four years with a focus on access, use and reliability. For each of APIK's priority provinces (East Java, Southeast Sulawesi, and Maluku) the document describes: (1) priority application areas for technical assistance; (2) a preliminary analysis of specific climate services value chains within each application area, including the respective users and beneficiaries ultimately served; and (3) the Project's proposed portfolio of assistance activities to help strengthen each value chain and close critical information gaps at the regional level. The roadmap also highlighted gaps and opportunities regarding private sector needs for climate and weather information services in each area – for example, the fisheries industry in Maluku received very little weather and climate information, yet, faced growing risks from unpredictability of seasons and more frequent storms endangering fisherfolk at sea. The CWIS roadmap and the Vulnerability Assessment (VA) are closely linked. Findings from the CWIS assessment and roadmap were incorporated into the VA workshops to help inform strategies moving forward.

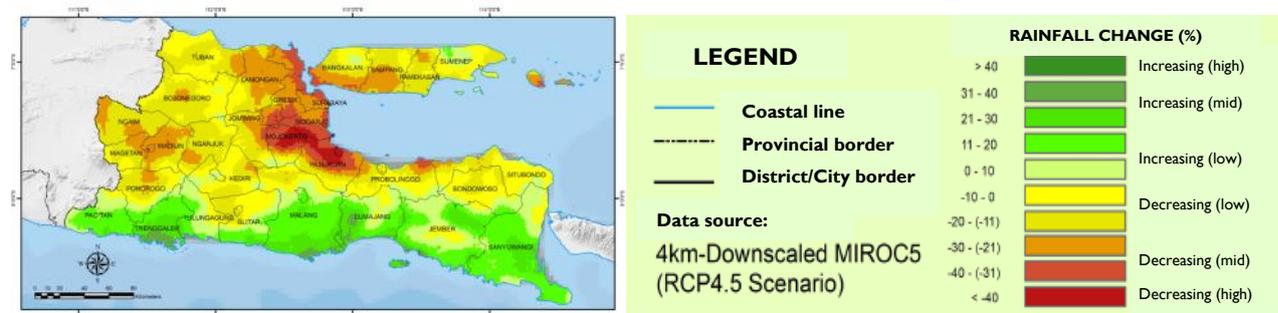
Based on the findings from the CWIS assessment and roadmap, APIK found many BMKG information products are not delivered to local stakeholders in accordance with user needs. For example, a farmer that needs access to monthly seasonal rainfall prediction, at the village/sub-district context must obtain that information from the local government. The climate information (i.e. seasonal prediction) is produced in bulletin form (hardcopy) or in PDF format (softcopy) by BMKG and then disseminated to several government agencies. It is then expected that the local governments will distribute the bulletins to the farmers themselves. During our assessment, however, we found out that this method was not optimal. APIK found that in many BMKG climate stations, staff must still collect rainfall data manually. For example, at the climate station in Malang (Karangploso), the staff manually collect data from approximately 1,000 rainfall posts located all around East Java Province. As this process is relatively manual and takes time to generate the weather prediction, APIK supported the BMKG communication and dissemination strategy by developing Provincial Scale Website templates. These websites are designed to help BMKG offices in the regions improve access to information through customized and focused information relevant to the different contexts. For example, the maps produced by the Climatology Station are presented in more detail down to the village level. The BMKG website (bmgk.co.id) now details more accurate province specific information, see link below:

<https://www.bmgk.go.id/cuaca/prakiraan-cuaca-indonesia.bmgk?Prov=20&NamaProv=Maluku>

APIK also supported BMKG to develop the **OtoKlim System** to automate the data collection and dissemination process so the information on seasonal prediction and analysis can be produced faster and in more detailed spatial resolution (i.e. sub-district and village level). This tool supplies data per district/village to the BMKG Website. The tool automatically provides information by interpolating the

points within the rainfall dataset (historical or predicted/future) into a shape file format. The interpolated data is now used to create rainfall maps at the city/district and village/sub-district level.

Exhibit 4: Rainfall projection map 2032-2040 based on 2006-2014 data in East Java Province for the March-April-May period



In order to build community resilience towards disasters, APIK conducted a competition within the local Indonesian Maker Community to produce and design a prototype of a low-cost, accurate Early Warning System (EWS) for flood mitigation. APIK worked together with the Sub-directorate of Equipment Engineering Climatology and Air Quality from BMKG to set the criteria for the competition and also judge the submissions. The winner of the competition would then be awarded contract to build an integrated EWS for APIK in the regions. There were over 29 submissions to the competition and from these five were selected to receive a small grant [REDACTED] to build the prototype. These prototypes were then tested at the BMKG station in Bogor to determine how reliable and accurate they were. The results were assessed by BMKG so that the winning design could also be adopted and endorsed by them for replication across the country – by the end of the project BPBD East Java had installed early warning systems using this technology and it is hoped this will continue to be replicated by local government in other areas. The EWS consists of several components, primarily the rain gauge and stream level gauge with a mechanism for providing a warning when specific thresholds are reached, and flooding is likely to occur. Following the competition, a winning design was selected from Aplikasi Cerdas Indonesia.

The successful early warning system was initially piloted in the Klorak watershed which is a small river in Mojokerto District which has a history of flash flooding impacting three villages, namely Dilem, Begaganlimo and Kalikatir. APIK worked together with BPBD and BMKG to install Automatic Water Level Recorder (AWLR) and Automatic Rain Gauges (ARG). Data obtained from this system is then transmitted to the data server in Kalikatir Village using LoRa² technology. By the end of the project APIK installed two EWS in East Java (Kalikatir River and Panguluran River). In addition, BPBD in Mojokerto District replicated the system in a river prone to flash flooding in Pacet sub-district.

The work with the Maker Community (<https://www.makedonia.co/>) also included the development of an electronic display system for Climate and Weather Information. The displays are connected to the internet, run real-time maritime and general weather information, and are placed in strategic locations such as village hall or nearby the harbor. By the end of the project, APIK had installed four displays in Maluku (Haruku, Wassu, Ameth, and Durjela) and one in Southeast Sulawesi (Bungin Permai). In Haruku Village there are 494 households (total population 1,979,) and in Wassu there are 332 households (total population 1,061). All these 1,566 households (4,383 people) rely on fishing for their livelihoods and are now accessing weather information from the newly installed displays. The displays are designed to be appropriate for the context in each village. The one in Haruku is using smart TV, while the one in Wassu

² <https://www.link-labs.com/blog/what-is-lora>

is using LED display and supported by solar panel. The village administration was trained in how to maintain these systems and also how to allocate budget from the village fund mechanism in case repair or spare parts are needed.

In order to provide tailored technical support to BMKG, APIK partnered with NCAR (the National Center for Atmospheric Research) from the University of Colorado. NCAR is a US institution devoted to service, research and education in the climate, weather and related sciences. The partnership with NCAR started with a visit to Indonesia in 2018 to assess BMKG systems from a technical perspective and determine what should be the priority actions to carry out in the future. Potential areas initially identified by NCAR included dynamical downscaling of climate information for Maluku province (using the NCAR super computer), improved seasonal forecasting for Maluku and Southeast Sulawesi, data assimilation for East Java BMKG to improve the quality of the service they provide and also updating BMKG capacity through a tailored training program provided by NCAR experts. Following consultation with BMKG it was determined that NCAR should focus on improving the ability of BMKG to provide accurate seasonal forecasting and also better tracking and forecasting for extreme weather events such as thunderstorms.

In November 2018, NCAR specialists visited Indonesia and along with APIK conducted follow up assessments and discussions with BMKG. The discussions were conducted with multiple representatives of BMKG including the Deputies for Climatology and Meteorology, Climate Change Information Center, Climate Variability Analysis Unit, Climate Center Unit, Database, and Public Meteorology Unit of BMKG. The main purpose of this visit was to discuss BMKG data verification needs, to collect specifications of computers available for verification, document the workflow for seasonal forecasting, identify current verification activities, review current BMKG downscaling/bias-correction method and discuss object-based verification options. In addition, the team discussed TITAN (Thunderstorm Identification, Tracking, Analysis and Now Casting) tool installations at BMKG to forecast extreme weather.

To follow up on this work, NCAR returned to Indonesia in August 2019 to facilitate implementation and training of the system to improve seasonal forecasting through statistical verification and hindcasting i.e. Model Evaluation Tools (MET) and Method for Object-Based Diagnostic Evaluation (MODE) as well as the TITAN System. This training was delivered by NCAR experts with approximately 64 participants from various departments in BMKG including; Climate Change Information Center and Climate Service Center, Research and Development Center, Climatology Station Malang and Bogor, Meteorology Station representatives from Surabaya, Kendari, Ambon, Cengkareng, and Bogor, and also university representatives from ITB and IPB. BMKG supported this training by providing examples of radar data from each station (Ambon, Kendari, Surabaya, Cengkareng, and Bogor) with minimum 1-month full time series raw radar imagery data (format depending on radar brand) and example of extreme weather case (e.g. extreme/severe rainfall condition, flood-causing weather condition, strong wind, whirlwind/small tornado). The training was very well received by the participants and NCAR also provided some remote support to BMKG following the visit. As a result, BMKG has now adopted MET / MODE and TITAN to improve their systems.

UPGRADING THE INDONESIAN DISASTER INDEX AND RESILIENCE SCORECARD (IRBI)

The IRBI system managed by the National Disaster Management Agency (BNPB) does not currently consider longer term impacts of climate change on natural disasters. BNPB asked for technical support from APIK to help upgrade the system and integrate climate change into the IRBI modelling. BNPB, APIK, and the RAN-API Secretariat agreed on a methodology, analysis scope, and identification of data needed to strengthen the index focusing on the ability to predict future threats, especially for hydro-meteorological related disasters.

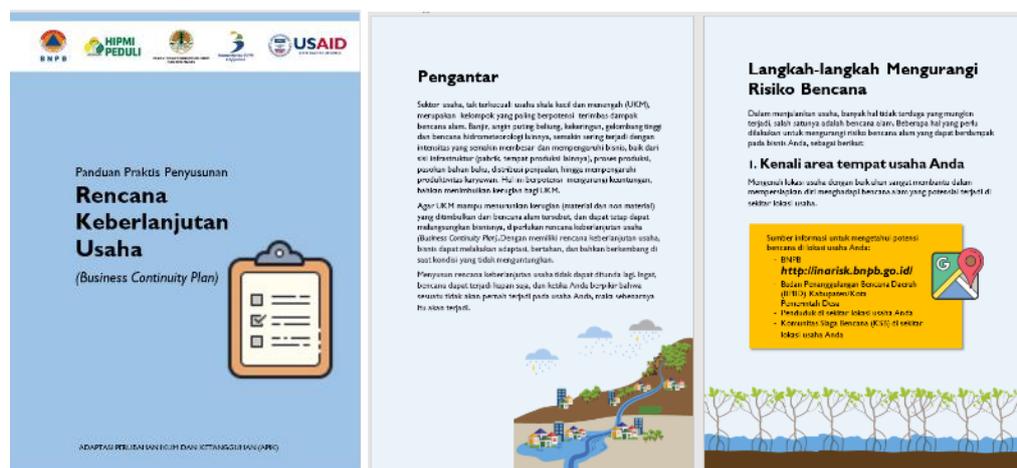
By integrating climate adaptation approaches, BNPB will be able to reduce vulnerability and exposure to hazards and to increase resilience to adverse impacts of climate extremes. Both disaster and climate impact adaptation require collaborative and coordinated actions. The convergence of disaster risk and climate adaptation provides opportunities to strengthen government systems and improve coordination between ministries (particularly KLHK and BNPB). Incorporating climate projections will allow IRBI to consider future threats and hazards in calculating the disaster risk index. This is still a work in progress, however APIK provided as much information as possible to BNPB so that this work could continue even though APIK ended earlier than anticipated.

PRIVATE SECTOR RESILIENCE

The activities with private sector were predominantly at the sub-national level. However, at national level APIK had regular meetings with head offices of national businesses and also developed partnerships with Chambers of Commerce such as HIPMI (Himpunan Pengusaha Muda Indonesia) or the Youth Chambers of Commerce (for business owners under 40 years of age). As a result of this partnership APIK was able to introduce a methodology for integrating climate change and disaster resilience into the business continuity plans for small and medium enterprises across the country. HIPMI in partnership with BNPB have committed to continuing to roll out this tool to their member SMEs.

Businesses face many risks from the short and long-term effects of natural disasters with possible impacts across the entire business value chain, from raw materials through to the end users. Preparation is the best defense against these disasters. As a best practice, all businesses should have a business continuity plan to address crisis situations such as natural disasters. APIK's Business Perception Survey (2017) highlighted that most small and medium enterprises (SMEs) in Indonesia are not aware of the importance of disaster preparedness and lack knowledge on how to formulate business continuity plans. Taking this into account, USAID APIK collaborated with HIPMI to produce a practical guideline for SMEs. The guidelines on business continuity plans is available in **Annex C**.

Exhibit 5: Snapshots of Guidelines on Business Continuity Plans



A workshop to introduce this practical guideline was carried out in February 2020 in Jakarta. Forty-five participants consisting of business owners, the representatives of HIPMI Peduli, BNPB, USAID APIK, USAID Indonesia, NGO's and media joined the workshop. The guidebook highlighting 7 steps on disaster risks reduction and 12 steps on the formulation of a business continuity plan was presented and discussed with participants. There was strong interest in the businesses to adopt resilience into their business continuity plans and HIPMI Peduli will disseminate this guideline to their branches in every province of Indonesia, including through social media. They also plan to conduct a similar workshop in cooperation with BNPB and local BPBDs in the future.



Capacity building for coffee farmers in Malang District (top); Disaster emergency response simulation in Kendari City (middle); Water tank and piping for farmers in Central Maluku District (bottom)

SECTION 3: SUB-NATIONAL LEVEL RESULTS AND ACHIEVEMENTS

The following section summarizes project activities across APIK's three prioritized landscapes. The first part of this section provides an overview of sub-national work across all provinces including highlights and description of the climate resilience strategies and spatial planning advocacy which were carried out in all areas. Please see Table 13 and 14 in the monitoring and evaluation section for results against sub-national indicators.

OVERVIEW

APIK key activities at the sub-national level included building awareness and capacity for communities, businesses and local government on climate and disaster risk. APIK also focused on influencing planning and budgetary processes at province, city, district and village level and implementing pilot projects in partnership with local organizations and businesses to demonstrate approaches to build resilience in each location emphasizing the place-based approach.

HIGHLIGHTS

- The water vulnerability assessment (KKMA) for springs in the Upper Brantas area of East Java was completed in partnership with USAID IUWASH PLUS. Infiltration wells to improve ground water recharge and reduce flooding were constructed in multiple locations in Batu City, Malang District and Malang City.
- Reforestation, including bamboo, fruit trees and mangroves, was carried out in all regions (bamboo specifically in East Java) with 21 hectares of upstream watershed land rehabilitated and 6 hectares of coastal mangroves planted.
- The Vulnerability Assessment (VA) reports were completed for all regions. The local government in all three APIK provinces were actively involved in the VA process and there is strong local ownership of the reports. A total of eight reports were finalized, three provincial level reports and five landscape level reports. Furthermore, APIK also supported the completion of community/village level vulnerability assessments in every village that APIK worked to support the mainstreaming climate adaptation and disaster risk management into village development plans.
- APIK was able to integrate climate and disaster resilience into the mid-term development plans (RPJMD) in the 12 cities and districts and also the three provinces where the project worked. As a result, the government has allocated budget for resilience building in each of these areas.
- Pilot projects implemented by APIK demonstrated to communities and government relevant actionable activities that can be carried out to build place-based resilience. These projects show how real action help solve problems on the ground, e.g. conservation agriculture in Batu City to improve people's livelihood and at the same time help reduce the flooding and erosion issues; mangrove rehabilitation and conservation in South Konawe District to help coastal communities protect themselves from tidal flooding; climate and weather information display in Central Maluku District to strengthen decision making process for fisherfolk and boat drivers on when safe to go to sea.
- APIK worked with province and city/district level government agencies to improve their spatial mapping and data management capacity to enable better development planning and decision making. A more community-based initiative was also conducted through the OpenStreetMap

app which enables community members as well as local government to share information regarding climate impact and disaster issues.

- Various activities were carried out related to groups more typically vulnerable to disasters such as women, children and those with disabilities. Multiple awareness campaigns and trainings were held at schools (including schools for people with disabilities) and universities. In addition, APIK worked directly with women's groups to involve them directly in disaster risk management in their communities.
- APIK facilitated cross-boundary coordination in Maluku, East Java, and Southeast Sulawesi provinces to emphasize importance of the landscape approach. In East Java, the government of Malang District, Malang City, and Batu City have agreed to work together to address common problems across disaster management, environment, public works, and health sectors. In Southeast Sulawesi the government signed an MOU to better manage the Wanggu Watershed in South Konawe District and Kendari City as a result of APIK advocacy. In Maluku the provincial government held a workshop for all cities and districts to come together and plan broader landscape-based approaches based on the island cluster system.
- Regional level work with the private sector has produced strong examples of collaboration resulting in benefits for communities, local government, and the private sector themselves. The climate smart chicken sheds in Blitar, East Java were supported by Cargill Indonesia and serves as a model for chicken farmers to see the benefit of improved shed construction on egg production. The partnership with Bank Sultra, Syngenta, and ACA Insurance has resulted in the increase of Climate Field School (CFS) participants' corn productivity in South Konawe, Southeast Sulawesi. In Maluku, APIK worked with Pertamina to help the community in Morella Village address climate and weather-related challenges through solar dryers and seedling nurseries.

In addition to the region-specific activities highlighted in this section there are a number of initiatives that occurred in all regions. These included; Site Selection, Water Resource Management, Sustainable Landscapes, Vulnerability Assessments, Disaster Resilience Scorecard, Green Climate Fund, and Spatial Data for Disaster Management. These seven activities are detailed below:

REGIONAL ACHIEVEMENTS

SITE SELECTION

The three provinces for APIK implementation were selected during the initial design stage. The aim was to select areas that represent three distinct landscapes common to Indonesia and to devise strategies that work in each of those landscapes which can then be scaled up across Indonesia through partnerships with national government. The selected provinces were East Java (watershed landscape), Southeast Sulawesi (coastal landscapes) and Maluku (small island landscapes). A priority for APIK at the start of the project was to identify the specific cities and districts within those three provinces that would become the target areas for the project.

In order to do this APIK looked at each area through four lenses.

- I. The Landscape Lens which considered the hydrological, meteorological, and land-use characteristics of districts in the province, emphasizing shared environmental risks that are likely to be exacerbated by climate change.

2. The Disaster and Climate Lens using Indonesian Government-endorsed indices to better understand key vulnerabilities across the landscape such as IRBI from BNPB and SIDIK from KLHK.
3. The Socioeconomic Lens. In accordance with USAID’s focus on the poor, this provided additional emphasis on reaching the most vulnerable populations under APIK. The data utilized in APIK’s analysis was obtained from the National Statistics Agency (BPS) as well as the National Program for Poverty Reduction (TNP2K).
4. Institutional Lens to assess local government commitment and demand. The achievement of place-based resilience requires local stakeholders to be active participants (as opposed to passive observers) and, thus, demand-driven programing is a must. This was based on direct consultations with local government representatives to better understand their interests, needs, and development objectives.

APIK actively engaged national and local government in this process before beginning site-specific project implementation, and as a result the 12 cities and districts for APIK implementation were selected as detailed in Table I.

Table I: Final APIK Implementation Areas

PROVINCE	LANDSCAPE	DISTRICT / CITY
East Java	Upper Brantas	1. Batu City
		2. Malang City
		3. Malang District
		4. Blitar District
	Lower Brantas	5. Jombang District
		6. Mojokerto District
		7. Sidoarjo District
Southeast Sulawesi	Coastal and Wanggu Watershed	8. Kendari City
		9. South Konawe District
Maluku	Ambon and Lease Islands	10. Ambon City
		11. Central Maluku District
	Aru Islands	12. Aru Islands District

WATER RESOURCE MANAGEMENT

Water supply and water resource management have been a priority area for APIK since the beginning of the project. When carrying out the initial vulnerability assessments water was frequently mentioned as a top priority for government and communities alike. This is particularly the case in East Java, whereby design APIK worked to address climate and disaster resilience related to water in the Brantas Watershed as a national priority watershed for conservation and rehabilitation. A total of 15 cities and districts and around half the population of the province heavily rely on the watershed for their livelihoods. This watershed is vulnerable to drought in the dry season and flooding in the wet season. Climate projections show that in the future the dry season would be drier and longer in many parts of the province and during the wet season it would have more rainfall yet in a shorter period-thus creating more risk to flooding and landslide.

In East Java, APIK activities to water were mainly focused in Batu City and Malang District. In collaboration with the USAID IUWASH PLUS Project, APIK developed spring vulnerability

assessments (Kajian Kerentanan Mata Air-KKMA)³ specific to the quantity and quality of water at Binangun spring⁴. While the spring is located upstream in Batu City, the water is entirely used by the water utility PDAM of Malang City downstream. APIK worked in both Batu City and Malang City, while IUWASH PLUS worked only in Malang City. Approximately 15% of the raw water needs managed by PDAM Malang City relies on sustainability of Binangun spring. Hence, protection and conservation of the spring is vital. In addition to Binangun spring, APIK and IUWASH PLUS also developed a KKMA for Darmi and Gemulo springs. The KKMA highlighted the risks of climate change and land use change on the long-term sustainability of the springs with longer dry seasons and short but intense wet seasons leading to reduced ground water recharge and increased run off. APIK and IUWASH PLUS used the KKMA as the scientific basis in advocating for both Batu City administration and PDAM Kota Malang to work together collaboratively on spring protection activities. Kota Batu agreed to use the KKMA to strengthen spatial planning in the city, e.g. infiltration wells to recharge ground water as a requirement for getting a building permit while PDAM Kota Malang implements local spring protection around Binangun spring. During a local government agency meeting on July 1, 2019 the Mayor of Batu, Mrs. Dewanti Roempoko, emphasized the importance of spring protection and conservation and the KKMA produced by APIK should be used and referred to as a major component to strengthen city planning.



Participatory process during construction of communal infiltration well in Tlogomas, Malang City.

The KKMA identifies vulnerabilities as well as activities for watershed improvement such as awareness raising on the importance of the watershed, tree planting, and infiltration wells to reduce run-off, increase soil water retention and increase aquifer recharge. APIK piloted specific action to address local flooding and erosion in the upstream of Binangun spring by constructing five infiltration wells as a pilot initiative. The infiltration wells catch the rainfall, thus lower run off and further reducing local flooding and erosion risk. At the same time, the water will then infiltrate and

recharge the aquifer of Binangun spring. With the local community and village staff being involved throughout the process of infiltration well design and construction, they gained a better understanding of catchment area conservation and more concretely that the infiltration wells help reduce local flooding problem. These individuals may become resource persons when the city administration replicates similar intervention in the future.

A similar intervention is also implemented in the urban area of Tlogomas in Malang City where six infiltration wells were constructed. This area typically floods during heavy rain but as a result of the infiltration wells the flooding was greatly reduced which was demonstrated during periods of heavy rainfall in December 2019 and January 2020. In parallel APIK's interventions supported the city's Sustainable Urban Drainage System (SUDS) initiative to improve drainage across the city where Malang City is considering constructing more infiltration wells initially in Tlogomas village and then across other areas of the city.

In Malang District, APIK focused on improving water supply in Arjosari village where many households had to spend hundreds of thousands of rupiahs per week (US \$10-15 per week) to access water from

³ APIK and IUWASH PLUS developed the KKMA jointly by combining and reinforcing both projects' methodologies, e.g. use of down scaled climate projection from APIK side and use of (anthropogenic) quality parameter prepared by IUWASH PLUS.

⁴ APIK and IUWASH PLUS have identified the degradation of Binangun Watershed in Batu City as a threat to water availability particularly in terms of quantity and quality

suppliers with tanker trucks, particularly during the dry season. Water supply is a priority identified in the village's vulnerability assessment and action plan. APIK worked in three hamlets in the village by restoring and improving community-based water supply systems in two hamlets, namely Sumbertimo and Kedungwaru I by installing a new pump, rehabilitating the distribution piping network, installing water storage tanks, and ensuring all the household connections are metered. The community and the village administration funded most of the construction costs by providing IDR 140 million (US \$10,000). Nearly 500 households in the two hamlets can now get more reliable water supply.

In the third hamlet of Mentaraman, APIK supported protection of dug wells used by 90 households by constructing a gabion wall and installing a cover on the wells so that dirt, mud, and leaves could not get into the wells and contaminate the water particularly in the event of local flooding and/or landslide. The wells are located in a narrow steep sided riverbed prone to flooding and landslides, however, this location is the only area in the hamlet that has a shallow water table that can be used by the community to build the wells. Therefore, protection of the wells with gabions and covers is very important to ensure they can be safely used into the future. During village planning, APIK supported the community to address the flood and landslide risks further upstream so that these risks may be more significantly reduced.

Also, in Sumberagung village, Malang District APIK implemented a small grant program to respond to one of the priorities from the village climate action plan that included improvements to a community-based water supply system. Through the grant program, APIK supported 30 households to get clean water from an improved ground water pumping system and piping system. To further improve the service, the village then constructed tanks for rainwater harvesting so that more people can access stored water. Some of the villagers constructed their own water harvesting tanks at their homes when they saw how successful this was. These tanks reduce the need for buying water during the dry season.

To summarize, APIK activities on water supply and water resources management have achieved the following:

- 2,100 people in Arjosari Village (Kedungwaru I and Sumbertimo Hamlets) and Sumberagung Village, Malang District have improved access to clean water through improvements to the community-based water supply systems in the two villages.
- In Mentaraman, Malang District, 361 people (90 households) have their dug wells protected through construction of gabion walls and covers for dug wells so that the wells would not be contaminated or damaged during flooding.
- In Batu City and Malang City, communal infiltration wells that catch rainwater and reduce runoff have been installed reducing the flood risk. In addition, the infiltration wells in Bumiaji, Batu City help recharge the aquifer of Binangun Spring that is used as source of domestic clean water for Malang City.

SUSTAINABLE LANDSCAPES

APIK activities contributed towards sustainable landscape development in all three regions including improved spatial planning, and land use management including reforestation. In East Java, APIK planted bamboo in watersheds in Blitar District and mangroves around commercial fishponds in Sidoarjo District. In Maluku APIK carried out a tree planting campaign with the BPBD and students in sloping areas around Ambon City to reduce the risk of flooding and landslides. In Southeast Sulawesi, APIK worked with coastal communities on mangrove rehabilitation to reduce the risk of tidal surges. In

addition, sustainable landscape activities were integrated into government planning from province down to village level. These activities are detailed further in the regional sections below.

VULNERABILITY ASSESSMENTS

The purpose of the vulnerability assessments was to identify vulnerability and climate risk in each province and landscape. This information then became the basis for the preparation of local government adaptation strategies for climate change and resilience as well as to inform priority activities for APIK in each region. The outputs of the assessments were:

1. List of priority sectors for adaptation and resilience in each province and landscape
2. Mapping of climate vulnerability and risk of the priority sectors
3. List of adaptation options for each priority sector.

The VA's were carried out in a fully participatory manner involving local experts and multiple stakeholders such as national and local government, community leaders, research institutions and businesses. In each of the three provinces and five landscapes assisted by APIK, three workshops were held between January and April 2017, attended by staff from Bappeda, BPBD, DLH, other OPD, as well as by the private sector, universities and local NGOs.

An important aim of the vulnerability assessment process was to build local ownership over the whole assessment with local government “owning” and adopting the reports. In order to do this APIK ensured local government officials led the process with technical support and facilitation from APIK. Carrying out the assessment in this way takes more time and is an intense process but helped ensure a greater likelihood of sustainability and that the results effectively influenced local government planning budgets. The process also developed local capacity, identified local experts and connected the experts with government as potential future resources.

During the first workshop priority sectors were identified by the participants. These sectors are listed in Table 2. Between each workshop a focus group discussion was held for experts to analyze the problems and hazards of the priority sectors. GIS experts then processed the data collected into vulnerability and risk maps. These maps were then confirmed with stakeholders in the area. Through this process APIK also identified some shortcomings in available data at local government level. These data gaps also became a recommendation for local government to address.

There were eight VA reports finalized, one for each province plus five landscape reports: 1) Upper Brantas; 2) Lower Brantas (East Java); 3) Coastal and Wanggu Watershed (Southeast Sulawesi); 4) Ambon and Lease Islands (Maluku); and 5) Aru Islands District (Maluku).

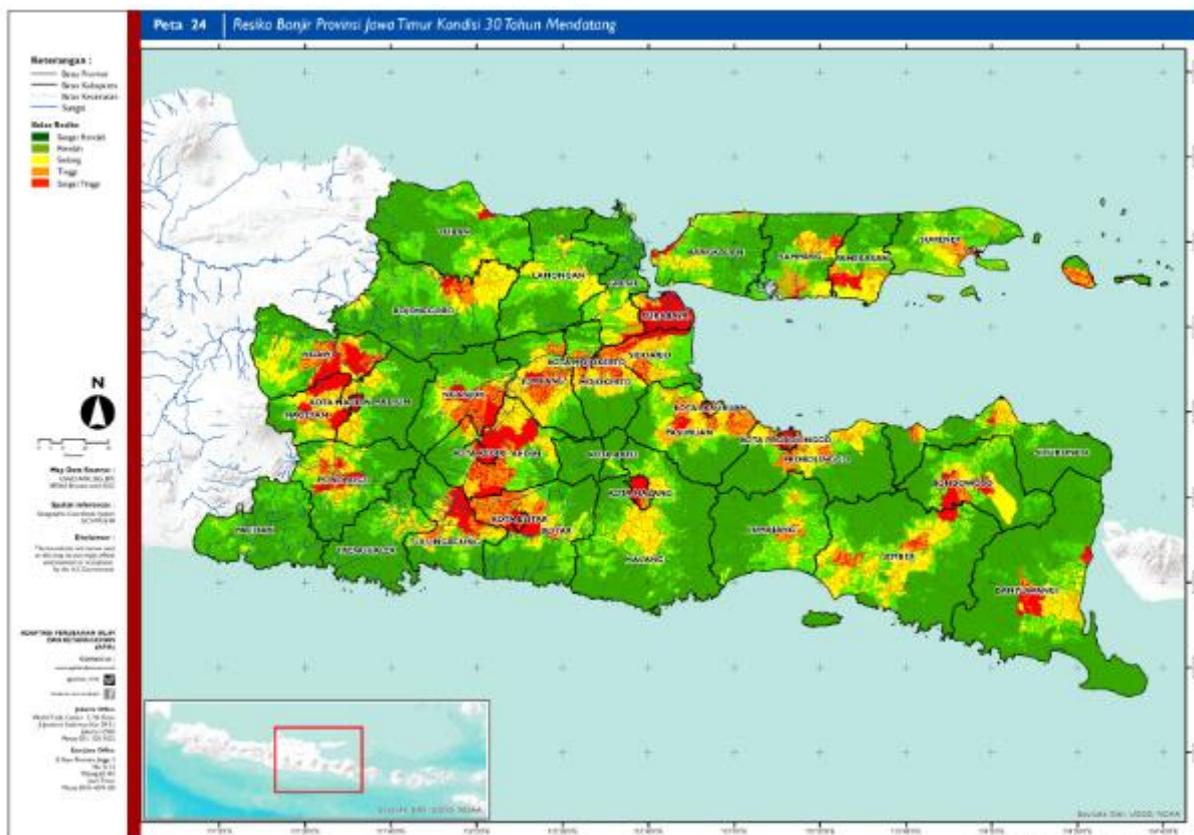
Table 2: The priority sectors which were identified for each province and landscape

LOCATION	VA LANDSCAPE	SECTORS
East Java	East Java Province	1) Fisheries, 2) Rice Agriculture, 3) Livestock, 4) Flood Risk, 5) Landslide Mitigation, 6) Clean Water Access
	Lower Brantas Landscape	1) Horticulture, 2) Livestock, 3) Infrastructure, 4) Plantation Agriculture
	Upper Brantas Landscape	1) Aquaculture, 2) Rice Agriculture, 3) Chicken Farming, 4) Flood Risk, 5) Clean Water Access

LOCATION	VA LANDSCAPE	SECTORS
Southeast Sulawesi	Southeast Sulawesi Province	1) Fisheries, 2) Rice Agriculture, 3) Flood Risk, 4) Landslide Mitigation, 5) Sea Transportation, 6) Forestry, 7) Clean Water Access
	Kendari-South Konawe Landscape	1) Aquaculture, 2) Horticulture, 3) Flood Risk, 4) Landslide Mitigation, 5) Infrastructure, 6) Clean Water Access
Maluku	Maluku Province	1) Fisheries, 2) Horticulture, 3) Flood Risk, 4) Landslide Mitigation, 5) Sea Transportation, 6) Clean Water Access, 7) Tourism
	Ambon- Central Maluku Landscape	1) Fisheries, 2) Flood Risk, 3) Landslide Mitigation, 4) Coastal Erosion.
	Aru Islands	1) Fisheries, 2) Agriculture, 3) Transportation, 4) Water, and 5) Housing

Exhibit 6 provides one example of a map from the VA. This is a flood risk map from East Java province for the period 2030-2040. The map shows which district or sub-district has higher risk to flooding with red color highlighting the highest risk. Each sector was analyzed dynamically, i.e. the current risk condition and the projection 30 years ahead. This map shows that the city of Surabaya and Malang has higher risk than the surrounding area.

Exhibit 6: Example of a Flood Risk Map from East Java Province



The results of the vulnerability assessments have already been used in development planning. For example, the Maluku Provincial Government used the VA results to support the development of the

Road Map of Mitigation and Adaptation to Climate Change. South Konawe district in Southeast Sulawesi used vulnerability and risk maps from APIK for consideration in their spatial plan review. And in East Java the VA results were used to inform the RPJMD at provincial and city and district level.

A set of policy briefs (VA summary for policy makers) was also completed for each of the 12 cities and districts that APIK worked in. Recognizing that the VA reports are lengthy and technical documents, it is understood that they are unlikely to be read in detail by local government leadership. The policy briefs are shorter documents that highlight the main findings, maps, and recommendations to better inform local policy and planning. The summary for policy makers can be seen in **Annex D**. In addition, APIK worked with local government to develop a climate resilience strategy based on the VAs.

The complete VA reports are in Bahasa Indonesia with a short executive summary in English. These reports can be accessed from the APIK website www.apikindonesia.or.id.

DISASTER RESILIENCE SCORECARD

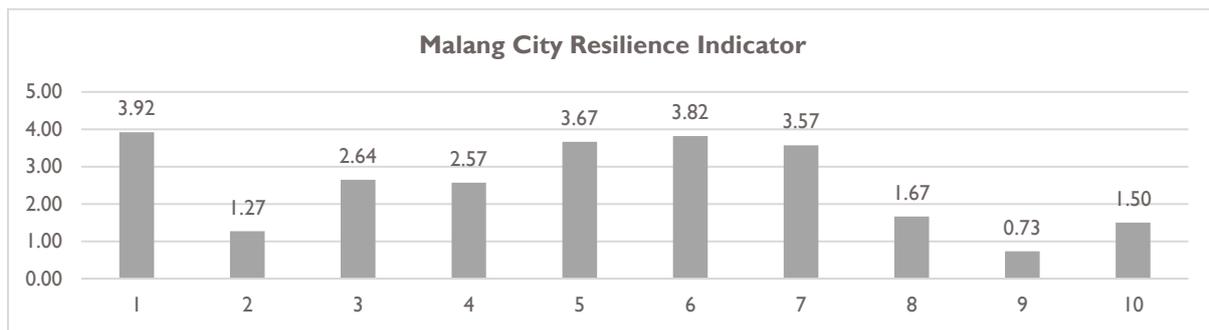
APIK worked with BNPB to revise and operationalize a measurement tool designed to rate local government administrations on their level of resilience, identify gaps in capacity and recommend priority actions to build resilience at institutional level. The tool consists of 71 indicators which are organized into 10 categories (as illustrated in Table 3 below). The tool is implemented as a self-assessment whereby government officials fill out a questionnaire on the 71 indicators. APIK worked with BNPB to align this tool with the United Nations International Strategy for Disaster Reduction (UNISDR) Local Urban Indicators. APIK piloted the tool in the 12 cities and districts across the three APIK provinces supported by the project. APIK trained six local government employees in each area as facilitators and these facilitators then led two workshops in each city or district. An example of the results can be seen in Exhibit 7 below showing that Malang City scored very low in the disaster preparedness category. With these results the city can then quickly identify the gaps and plan and budget accordingly to increase their score. BNPB is rolling out this tool across the country and also encourages cities and districts to repeat the exercise and see if there are improvements.

Table 3: Score Card Categories

CATEGORY (BASIC STEPS-LANGKAH MENDASAR)	
1 Organization structure for disaster resilience	6 Strengthening Institutional Capacity
2 Identify and Understand Current and Future Risk Scenarios (VA)	7 Strengthen people's ability to achieve resilience
3 Strengthen the financial capacity to achieve resilience	8 Infrastructure Resilience
4 Urban Planning to improve DRR	9 Disaster preparedness for a city/district
5 Ecosystem protection	10 Recovery/resilience after shock

The score ranges from 0 - 5, where 0 is the lowest (unprepared/ low resiliency) and 5 is the best (well-prepared/resilient). Each of the 10 indicators on the scorecard represents different areas of urban resilience. The figure below shows an example of the results from Malang City.

Exhibit 7: Resilience Assessment Results of Malang City



The X axis on exhibit 7 shows the resilience score and the Y axis the score card category.

GREEN CLIMATE FUND (GCF)

The Green Climate Fund (GCF) is a good potential source of funding for adaptation action initiatives that have already been identified through the resilience strategy development process. The GCF in Indonesia is administered through the Fiscal Policy Agency (BKF) of the Ministry of Finance and they are mandated to fund adaptation activities. However, prior to APIK there had been no adaptation projects for Indonesia funded through this mechanism. APIK recognized this mechanism as an important legacy for the project and to ensure there was a possible continuation of adaptation projects in the three APIK provinces. During PY4 of the project, APIK had discussions with BKF as the National Designated Authority (DNA) for the GCF in Indonesia. BKF were very keen to work with APIK in order to fulfill the need to develop their adaptation projects. APIK's projects in cities, districts and provinces have already matched the requirements for GCF funding by undertaking a VA, climate resilience strategy, and generating evidence from action implemented in the field.

BKF and APIK jointly held a socialization workshop in East Java specifically to introduce the GCF and identify other potential projects that can be funded through the fund. The provincial government representatives from seven cities/districts in East Java assisted by APIK and university representatives participated in the event. At the initial stages 17 potential projects were identified across the seven cities and districts. From these 17 possible projects one priority project was selected by local government to submit to the GCF. The APIK team replicated this training to government representatives in Southeast Sulawesi and Maluku. In addition, staff from Bappeda Maluku also traveled to West Papua to join a BKF organized event.

As a result of the training and awareness raising, three concept notes were prepared with support from APIK, one each from East Java, Maluku and Southeast Sulawesi. In East Java Province, APIK assisted local government planning agency (Bappeda) to submit a concept note entitled "Community Based Adaptation through Capacity Building of Local Government and Stakeholders in 20 Districts in East Java". [REDACTED] While in Maluku, APIK assisted Provincial government to submit a proposal entitled "Climate Change Mitigation and Adaptation Through Conservation and Restoration of Mangrove Ecosystems in Aru Islands District." [REDACTED]. In Southeast Sulawesi the proposal is to "Build the adaptive capacity and resilience of communities to the risks of climate change." [REDACTED]

As a result of APIK advocacy, all three concept notes were approved by BKF for submission of a full proposal. GCF proposals have to be managed by pre-accredited agencies. At a marketplace for GCF proposals held in Jakarta in early 2020, all three concept notes were matched with accredited entities

for continuing development, the NGO, Kemitraan, will move forward with East Java and Southeast Sulawesi proposals, the International Union for Conservation of Nature (IUCN) plans to move forward with the proposal for Maluku. As such, even though APIK has now ended, these activities will continue to implementation.

EQUIPPING THE GOVERNMENT AND COMMUNITIES WITH SPATIAL DATA FOR DISASTER MANAGEMENT

To be better prepared and effectively respond to disasters it is essential to have good data. Access to reliable, updated and timely data helps ensure the government and first responders can channel resources to a specific location, improve coordination and help ensure that actual needs are being met. APIK supported Indonesian disaster data management by inputting data and information of APIK intervention and results into the OpenStreetMap (OSM) system, an open data mapping system that can be used for real time spatial data management.

Unfortunately, the availability of detailed spatial data on an operational scale e.g. scale 1: 10,000 and 1: 5,000 from government sources is often incomplete or inaccessible. OSM is open source and participatory and is now starting to be used by government agencies as a more reliable source of information than their internal systems.

The OSM platform fully depends on contributions from community to populate the data. A contributor can add roads, buildings, environmental features, issues or hazards in his surrounding or elsewhere. Next, the contributor uploads the data and photos with the information into the OSM. This is then verified by the OSM team. This data is then publicly accessible. In the long run, data compiled by the OSM will be uploaded to National Registry System (SRN) to strengthen Indonesian climate action.

APIK conducted OSM trainings in all three regions where APIK works. For example, APIK conducted basic training for disaster preparedness for 36 students of the University of Pattimura, Ambon. Within the training, APIK shared information relating to disaster management, such as first aid, evacuation routes, and disaster types. During the event, APIK emphasized the importance of having a standard operational procedure during disasters and a contingency plan. APIK also shared information on how to use technology in disaster management such as GIS, Vulnerability Assessments, or using OSM applications to map the disaster-prone areas or the evacuation routes. During the two-day training program, APIK and the students had formed a disaster preparedness group (KSB) for Pattimura University. APIK and the KSB then formed a disaster management action plan that was integrated in the university's program. The plan included activities such as conducting a simulated disaster drill and establishing a rescue center.



OSM training in Kendari City to build government and community capacity in participatory mapping.

APIK also organized a participatory village map training for communities and government staff of Kendari City and South Konawe District. The capacity building equipped the participants from 15 different villages with the knowledge and skills to create digital maps by using OSM. This digital mapping initiative is a strategic move from APIK to support the institutionalization of climate and disaster resilience actions at the village level. As mandated in the Village Law No. 6 Year 2014, each village administration is required to have a village information system, in which maps are a

component. Therefore, this training helped ensure the village records climate and disaster resilience initiatives, such as adaptation actions, historical records, public documents, such as village decree and village planning, and other relevant data. The training equipped community and village officers with the skills to independently input and manage village information in the OSM platform.

In Malang City, APIK conducted a training on OSM. During the training, APIK collected 158 activities on climate adaptation and disaster risk reduction. The data can be accessed from <https://openstreetmap.id/apik-jatim/>. Following the training, BPBD Mojokerto District and Malang City agreed to submit the data to the Communication and Information Agency within their region and use it as the village program database.

I. EAST JAVA

REGIONAL PROFILE

Covering approximately 17 cities and districts, the Brantas is a national government priority watershed for conservation and rehabilitation and APIK's target landscape in East Java Province. About half of East Java's 38 million people live in the basin, which contains a high concentration of critical infrastructure, including eight dams, two major airports, two shipping ports, multiple high-volume highways and rail connections. The Brantas Watershed is therefore a center of significant economic activity for East Java, not to mention to Indonesia as a whole. This elemental watershed is an important contributor to the livelihoods of many people across all sectors, from agriculture to tourism, in one of the most densely populated regions of Java.

APIK works in seven districts and cities across the watershed. This includes Malang District, Malang City, Batu City, and Blitar District located in upper Brantas, also Sidoarjo District, Jombang District, and Mojokerto District in lower Brantas. Given the population pressures and rapid economic growth within the Brantas Watershed, it is not surprising that the landscape is highly vulnerable to environmental hazards. In the upstream areas of Malang District, for example, water security is an increasing challenge, with local wells and springs becoming severely depleted during the dry season. The Brantas Watershed is a significant contributor to Indonesia's net yield of rice and maize. With many households highly dependent upon these crops for their livelihood, it is critical to expand awareness of environmental risk and help farming communities integrate climate and extreme weather risk into their planning.

Notably, in comparison to the Upper Brantas, downscaled climate projections suggest that temperature shifts will be more extreme on the Lower Brantas with the average daily temperature increasing by up to one degree Celsius by the year 2030. Further, the timing of the wet season is also likely to shift to earlier in the year, with the heaviest rainfall occurring from September through November.

OVERVIEW

The following section provides details of the main activities and initiatives that were carried out during project implementation in East Java that covers seven cities/districts in the landscape of Brantas Watershed. A full detailed list of all activities carried out in East Java throughout the project can be found in **Annex E**.

Maps detailing activities in East Java can be found in Exhibit 8, while the maps for Malang City, Batu City, Malang District, Blitar District, Sidoarjo District, Jombang District, and Mojokerto District can be found in **Annex F** including details of the villages where APIK worked. More detail on main activities can be found in the following achievement overview section.

EAST JAVA ACHIEVEMENT OVERVIEW

INTEGRATION OF CLIMATE AND DISASTER RISK REDUCTION IN REGIONAL PLANNING

APIK aimed to influence how local governments build resilience to disasters, especially with regard to their institutional framework and how they engage with communities and other stakeholders. One of the most important entry points for this is city and district budget allocation and improving the capacity to use those budgets appropriately. Mobilizing public finance to undertake multi-hazard risk assessments and adjust planning is an important step to building resilience towards climate change. Ensuring sufficient availability of local government funding is important as it helps facilitate decentralization of disaster

management (rather than waiting for support from national government when a disaster happens), as well as sustainable use of public resources, and better coordination of response mechanisms, thus reducing vulnerability to natural disasters and allowing communities and institutions to bounce back from a disaster more quickly.

In order to increase capacity and resilience, APIK supported Malang District in developing and integrating climate resilience strategies into their district action plan. Inputs from APIK were based on the vulnerability assessment (VA) and the district resilience assessment using revised BNPB 71 indicator and UNISDR indicator tools. The VA helped identify appropriate adaptation options in addressing the risk profiles, while the resilience assessment helped identify areas for resilience improvement. The Malang District action plan focuses on (1) reducing climate and disaster risks, (2) increasing resilience or reducing the district vulnerability, and (3) developing resilience in the tourism sector. APIK supported the district to develop adaptation strategies in the focus areas of infrastructure, environment, agriculture, and the economy – including tourism. More details of adaptation actions and strategies are explained in the sections below.

At the village level, following training from APIK, the administration of Sumberagung Village, Malang District, East Java allocated IDR 9,310,000 (approx. USD 703) for disaster preparedness training and installation of evacuation signs in 25 locations. They also allocated IDR 50,739,000 (approx. USD 3,829) for rainwater harvesting tanks to reduce their vulnerability towards drought. Kepetingan Hamlet, Sawohan Village in Sidoarjo District is prone to tidal waves and coastal erosion as evidenced in the vulnerability assessment. In order to address this issue, the APIK team successfully assisted the village government to obtain funding from the Marine and Fisheries Agency of East Java Province to allocate IDR 75,000,000 (approx. USD 5,660) for mangrove seedlings. The local community group planted these mangroves in June 2019. This budget support from the province has helped the village to protect their coastal ecosystem and be more resilient.

In Mojokerto, the local government agreed to **allocate IDR 72,535,000 (equivalent to US \$5,580)** towards supporting a climate and disaster resilience working group. In Sidoarjo, APIK conducted several focus group discussions supporting the District commitment to enhance their resilience towards disaster through a Decree from the Head of District (Bupati). During the first quarter of Sidoarjo's fiscal year, following consultation with APIK, the District Legislative (D Commission) realized the importance of standard operating procedures (SOP) or guidelines for disaster response. APIK then followed up on this need by engaging Head of District and BPBD to formulate a SOP. In Blitar, The Blitar Environmental Agency (DLH) also allocated **IDR 317,800,000 (equivalent to US \$24,446)** to support a joint program with APIK on ecosystem protection along the Brantas river (fisheries, waste management, and hunting prohibition) to enhance community capacity towards climate impact.

APIK also completed the final draft of the Regional Action Plans for Climate Adaptation (RAD API) for East Java Province and Mojokerto District. In the RAD API for East Java Province, APIK focused on nine sectors that are heavily impacted by climate stresses, namely: agriculture, fisheries, disaster management, tourism, clean water, husbandry, forestry, transportation, and infrastructure. The specific climate stressors were selected based on the historical data on climate and weather-related events within the area. These stressors are sea temperature rise, sea level rise, drought, ENSO pattern changes, cyclone, and extreme rainy season. Based on BNPB data, the economic loss occurring due to climate impact in East Java has increased significantly from IDR 1.44 trillion (approx. USD 87.5 million) in 2007-2012 period to IDR 2.3 trillion (approx. USD 164 million) in 2013-2017 period.

In Mojokerto, based on BMKG data, changes in weather and climate will have a particularly strong impact on several key sectors namely water resources, agriculture, animal husbandry, and health. In the animal

husbandry sector, the weather and climate (prolonged dry season) will affect animal feed supply. With the lack of feed supply, it is very likely production will decrease and/or cost of production will increase as feed prices go up. In the new RAD API for Mojokerto facilitated by APIK, there are several recommended actions for government including: (1) agricultural diversification, (2) farming insurance, (3) farming sector statistical data development, (4) village livestock breeding center, and (5) animal disease control.

LANDSCAPE BASED APPROACH TOWARDS DISASTER RESILIENCE

With support from APIK the three administrations of Malang City, Malang District, and Batu City initiated inter-regional cooperation for Malang Raya (Malang Raya is the collective name given to those three administrations). This cooperation will tackle inter-regional climate and disaster related issues such as waste management, disasters, water resources, and tourism.

The hydro-meteorological disasters impacting these three administrations are usually related. For example, one of the causes of flooding and landslides in Malang City is the deforestation and changing land use upstream in Batu City. To overcome these types of issues trans-boundary landscape level cooperation is essential. This allows regional governments to deal with the potential impacts of climate and disaster impact combined with the demands of increasing disaster resource management based on legal and institutional frameworks and shared benefits and costs. APIK is promoting better communication between all stakeholders, fostering a mutual understanding of risks and also potential benefits of landscape level collaboration and supporting the development of landscape level action plans.

The tourism sector is highly vulnerable to the effects of climate and weather-related disasters. It is also a significant contributor to the local economy. The threats to this sector can be direct or indirect, and can take the form of extreme weather events, increased insurance costs, water supply shortages, rising safety concerns, biodiversity loss and damaged assets. Hydro-meteorological disasters such as flooding and landslides can negatively impact tourism over long periods of time with significant impact on the local economy.



MoU signing between Malang District, Malang City, and Batu City to conduct collaborative efforts in disaster management

The Malang Raya Area is well known for its ability to attract tourists. For example, in 2016, within Malang City alone, the tourism sector contributed to 19% of the city's total revenue, and this revenue is growing rapidly. In 2017 the contribution of the tourism sector increased to 25.5% of the total revenue. APIK also worked with three BPBD's, the tourism office, and BMKG to develop and disseminate climate and weather information to reduce hydro-meteorological disaster risk in the tourism sector.

Following several FGD's facilitated by APIK the three administrations in Malang Raya signed an MoU on Disaster Management across the landscape on September 26, 2018 at an event in Malang City. Within the MoU, the three BPBD's from the three areas agree to conduct joint efforts on disaster preparedness and response. Following the MoU signing, APIK facilitated a workshop for the three BPBD's (Malang District, Malang City and Batu City) on early warning information systems (EWS). Early Warning Systems are a vital component in reducing the disaster impact and helping prevent asset and economic loss caused by disasters. More than 40 people from multiple stakeholders including BPBD, BMKG, and Brawijaya University participated in the FGD. Within the

workshop, APIK assisted the BPBD's to coordinate with other government agencies and prepare a flood mitigation plan for Malang Raya. On May 2nd, 2019, APIK with BPBD and the Malang Tourism Agency facilitated a capacity building activity for tourism operators, which focused on disaster risk assessment training in Batu City, East Java. The training was designed to increase the ability of tourism operators to develop a Standard Operating Procedure for Disaster Risk Assessments and to apply it in the environment of each tourism site as a plan for action and disaster preparedness. During this event, BPBD representatives from each area in Malang Raya also explained to the public how the BPBD's coordinate with each other when disasters strike.

BUILDING COMMUNITY DISASTER RESILIENCE



Left: EWS in Panguluan River, Malang District; Right: EWS in Klorak River, Mojokerto District

In building resilience to address climate change and disasters risk at community level it is important to first build awareness of current and future risks. APIK supported a series of activities at community level. In Sitarjo Village, Malang District, APIK worked with local government to improve community resilience by building an Early Warning System (EWS) to provide warnings for flash flooding. The EWS system was designed following the completion of the contingency plan document for this area jointly developed by APIK and Malang District BPBD and the Climate Change Adaptation Working Group. APIK facilitated installation of early

warning sensors at several points along the Panguluan river. The sensors installed include a rainfall sensor in Sukodono Village and river water level gauge sensor in Kedungbanteng Village. Information display is installed downstream in Sitarjo Village. These sensors provide early warning information about the threat of flooding risk so that the community will be better prepared. In July 2019, APIK conducted the training on the use and maintenance of the EWS. APIK also successfully advocated for the provision of Village Funds for the EWS operation and maintenance. This is to ensure the sustainability of the EWS in the community.

In Mojokerto, APIK established an inter-village disaster preparedness group, *Kelompok Siaga Bencana*, (KSB) for the three villages of Kalikatur, Dilem, and Beganganlumo as these villages frequently suffer from flooding. APIK provided training for the KSB and helped build better disaster preparedness for the floods that occur most years. Once the KSB was established APIK further collaborated with them to install EWS in five locations alongside Klorak River that runs through the villages. The installation process began in April 2018, using devices developed by Aplikasi Cerdas Indonesia (ACI) who won the EWS innovation competition held by APIK in 2017.

In each of the three villages USAID APIK, ACI and BPBD installed Automatic Water Level Recorders (AWLR) and Automatic Rain Gauges (ARG). The ARG measures rainfall and the AWLR measures stream water level. Sensors on the ARG and AWLR record data which is then analysed automatically through a server installed in the village office in Kalikatur Village and will trigger a siren to warn people when the analysis shows that water level has reached specific threshold and a flood is likely. With EWS, community members and authorities have time to make better decisions and take appropriate measures to respond to flooding. Based on this experience ACI are now able to directly work with local government on installing these systems in other locations, however, to date this has only happened in Pacet subdistrict of Mojokerto District, East Java.

APIK further promoted the system's replicability by using: (1) Long Range (Lo-Ra) technology instead of cellular connectivity that is more appropriate for remote areas with limited signal; and (2) Open source technology that is free, accessible, and easily replicable. The Lo-Ra technology enables connectivity in remote areas with a weak signal. The data can be accessed by the Disaster Preparedness Team in the villages as well as the village administrations. In addition, this data is sent to BPBD for processing and further disseminated through SMS gateway system. The data from the EWS can be seen from the Kalikatur Dashboard at the following link: <https://monitoringku.com/kalikatur/>. While this system is designed for flooding and flash flooding events, the alarm system and training provided to the KSB will also help them be better prepared for other hazards. The KSB was also provided with walkie-talkie radios to communicate between the villages and also were supported to develop a SOP for flooding and carry out flooding simulations. In February 2020 the Klorak river again flooded but thanks to the EWS and the KSB, the village was much better prepared to deal with this hazard.

RESILIENT SCHOOLS

Students and youth play a key role in tackling climate change and so were a priority group for APIK to work with. APIK empowered youth through building their knowledge and awareness towards climate change at school. Schools are important components of a community that can become centers and agents of change for disaster risk reduction and climate adaptation. There are four fundamental aspects of making schools safe from disaster: (1) knowledge, attitude, and action; (2) policy; (3) preparedness planning; and (4) resource mobilization.



School camp in Jombang District to improve youth and student awareness and willingness in taking resilience building action

In celebration of the Earth Day 2018, APIK and the Jombang Environment Agency conducted a youth camp entitled "School Campaign for Climate Change Adaptation Awareness & Disaster Risk Reduction" in Jombang. The youth camp aimed to enhance the capacity and reduce the vulnerability of students. The activity also aimed to raise youth and student involvement in environmental education as well in implementing disaster risk management through community action. The idea was to make the camp a fun learning and experience-sharing event in DRR training, aimed at building resilience among children. The students undertook training on what to do

when disaster occurs. They also received basic first aid training for disaster victims. More than 100 students participated in the event, which took place on April 21-22, 2018.

In Malang, BPBD are committed to ensuring that children have practical knowledge of disaster risk management to ensure communities are truly resilient and to minimize the loss and damage caused by disasters. In order to increase students' capacity and resilience, APIK supported BPBD Malang District on the program Pena Sekolah (Pengenalan Bencana di Sekolah), a BPBD program in increasing knowledge and awareness for disaster reduction in schools. On 13-14 February 2019, APIK and BPBD conducted a fun-learning event in SDN (elementary school) 2 Pujon and SDN 2 Kalisongo, in Malang District. More than 200 students participated and within the event APIK and BPBD shared the knowledge with students and teachers on how to respond if a disaster occurred. APIK also supported the schools to prepare evacuation routes and a contingency plan.

IMPROVING GIS CAPACITY OF LOCAL GOVERNMENT AGENCIES

Following consultations with local government it was clear there was a need to improve capacity in using spatial data for more accurate land use planning, disaster preparedness and to support better decision making (e.g. city level spatial planning). The availability of spatial data is also an issue with most of the spatial data in local government being largely inaccurate and incomplete and not able to support good planning and decision-making. In addition, much of the data is not in an editable format so they have to rely on external spatial data providers. At the same time, the number of government staff who are familiar and capable of using spatial data is limited.

APIK carried out GIS training for BPBD in Sidoarjo, Jombang, Mojokerto and Blitar, and also worked to help increase spatial data availability. Upon completion of the training, the participants established an informal group of GIS experts so that they can share spatial data as well as support one another in spatial data production.

In 2019, Malang District Disaster Management Agency BPBD established the Information Center (PUSDALOPS) & Disaster Management Rapid Reaction Team (TRC-PB) as an effort to build preparedness and rapid and appropriate response to disasters. The newly formed PUSDALOPS and TRC-PB needed technical assistance to improve staff knowledge and skills, especially in data collection and management. To help address this, APIK held a training on July 8-10, 2019 on the Open Data Kit Collect (ODK Collect) application as a tool for disaster reporting. Through ODK Collect BPBD can collect disaster data using a smartphone device making it much simpler and quicker to collect information and provide important data in near real time to support disaster response in a timely manner. APIK also introduced and provided training on ODK Collect to the Jombang District Environment Agency to support well monitoring e.g. water quality and water level checking in Bandardowo Village, Jombang., ODK Collect enables evaluation of complex logic such as geo-locations, images, audio clips, video clips and barcodes, as well as numerical data needed for the mapping process.



GIS training in relation to pest control and crop production was delivered to East Java Agriculture Agency staffs, took place in Batu City.

APIK held a training on climate projection to improve basic planning for the Food Crop and Horticulture Plant Protection Office (BPTPH) of the East Java Agriculture Agency. This training focused on addressing the increasing number of pests impacting crop production as a result of climate change. The training was provided to 41 representatives from the Agricultural Agency. Data on pest outbreaks and the linkage with weather conditions is important in understanding pest lifecycles and distribution that will be used as the baseline for production plans based on climate variability. APIK also worked with a technical

specialist from the agricultural agency to support training on processing pest data into spatial data for plant and production protection. The participants then conducted a simulation in measuring precipitation and predicting when the dry season would begin. APIK worked with BMKG in the training by presenting climate change and extreme climate pattern in East Java and facilitating discussion on climate information for plant protection and mapping.

Following the success of drone and GIS mapping activities, APIK carried out capacity building in unmanned aerial vehicle (UAV or drone) mapping throughout APIK areas. In Blitar, APIK conducted UAV mapping in Bogel River from January 7-10, 2019 to map the critical forest area as well as the land

use in Perhutani (state-owned forest) area. This map is then used by APIK and Perhutani in determining the exact location for bamboo planting for slope stabilization and reducing erosion in the upstream Bogel River area. The UAV helped highlight that the area in upstream Bogel River is quite heavily damaged due to land clearing and land use change. By conducting bamboo plantation, the landslide risk in the upstream area will be reduced.

CLIMATE SMART AGRICULTURE



Climate field school for sugarcane farmers in Wonokerto Village, Malang District.

In East Java, APIK promoted climate smart agriculture practices as a part of reducing land degradation, conserving water and improving livelihoods for several agriculture commodities including sugarcane, and chayote gourd. APIK initiated a climate field school (CFS) to improve sugarcane production in Malang District. These practices also promoted eco-friendly soil treatment to increase the soil productivity rate.

Sugarcane is the primary source of income for many farmers in the southern part of Malang District but increasingly farmers are seeing reduction in yield and

quality of sugar as a result of climate change and weather-related disasters. A Sugarcane Climate Field School (CFS) was implemented in Wonokerto Village, Bantur Sub-district, Malang District from October 2017 to September 2018.

During the sugar cane CFS, farmers learned how to control weeds and pests, observe the environment around the fields, measure air temperature, and analyze soil conditions. For 10 months, farmers learned together onsite and immediately practiced what they had learned in the demonstration plot. In addition, the CFS also encouraged farmers to produce quality sugarcane seeds. In addition, the farmers learned how to practice sharecropping with sugar cane and peanuts thus increasing their incomes as well as improving soil fertility as a result of the nitrogen fixing ability of peanuts. The increased soil fertility also helped the sugar cane mature more rapidly. During the peanut harvesting season, farmers obtained around 500 kg of peanuts per each 0.5-hectare plot of land. This was the first time these farmers had practiced intercropping and they were very pleased with the result and extra income from the peanuts.

The farmers in the CFS plan to use the sugar cane for seed production and, following an inspection by the Center for Sugar Cane Research (*Pusat Penelitian Perkebunan Gula Indonesia - P3GI*), they received a seeds and business license certificate from UPT Balai Sertifikasi Benih Perkebunan and UPT Pelayanan Perizinan Terpadu East Java Province to prove that the seeds meet the necessary quality standard and can be legally sold. By receiving this certificate (Izin Usaha Produksi Benih Tanaman Perkebunan Number: P2T/025//18/04/01/VII/2018), the seeds can be sold to neighboring farmers to address seed quality issues in drought prone areas. Based on sugar rendement test from P3GI, the sugar content of the cane produced in the CFS is 14.85%. This represents an increase of more than 1% over previous rendement levels which were typically 13.77%. As a result, the sugarcane in the CFS locations has a good sale value. In addition, the typical yield of sugarcane in this area is 90 tons per hectare but from the demonstration plot in the CFS the farmers were able to harvest the equivalent of 120 tons per hectare. When combining the increase in production with increased percentage of sugar this represents a significant boost in income for the farmers. As a result, from the CFS demonstration plot 60 tons of cane seeds are being sold out to neighboring farmers within and outside the village. Several neighboring villages such as Srigonco have already committed to buy seeds from the Sugarcane CFS in Wonokerto Village.

In Batu City, where the majority of agricultural land is situated on steep slopes, the risk of landslides is high. Most of the people who live in Batu are farmers who rely on vegetable and fruit crops as their main source of income. APIK introduced the use of trellis for Chayote in order to reduce land degradation caused by rainwater runoff. The Chayote catches much of the rain before it hits the ground and so reduces the chances of landslides and flooding. There is also a significant economic impact as the Chayote

can be harvested every few days and in one harvesting period, a plot of land of approximately 600 square meter can produce up to 160 kilograms of Chayote. With the market price at around IDR 1,500-2,000 per kilogram this is a significant source of income. Due to its success the neighboring farmers have started to replicate this method.

COASTAL RESILIENCE AND LIVELIHOODS



Fishfarmers in Segoro Tambak Village, Sidoarjo District planted mangrove as part of silvofishery method

In Sidoarjo District, APIK collaborated with the local community working group (Pokja) to develop a local vulnerability assessment in Segoro Tambak Village. Segoro Tambak is prone to tidal flooding and high wind especially during the rainy season. During the dry season, Segoro Tambak is also prone to drought. People in this village are mostly fish and shrimp pond farmers who are highly affected by these disasters. For instance, fishponds are normally separated from each other, and the river or the sea, by earth banks that can easily be destroyed by flooding and oftentimes leading to the fish being swept away with a complete loss of revenue for the farmer. Following

the assessment, APIK in partnership with the community introduced a silvofishery system in Segoro Tambak. The silvofishery system enables farmer to cultivate fish and shrimps in addition to conserving mangrove trees that protect the fishponds from erosion, flooding and also give protection from tidal surges.

In March 2018, following the assessment, APIK and the Pokja started to implement silvofishery in two pilot ponds (0.5 ha each). The Pokja and APIK planted approximately 7,000 mangrove seedlings and 200 api-api (*avicennia germinas*) seedlings along the dirt barriers between the fishponds. With the mangroves growing and as a result, the barriers between fishponds strengthened, the two pilot fishponds are now more resistant to erosion.

PRIVATE SECTOR ENGAGEMENT

APIK and Yayasan Sahabat Multi Bintang (YSMB) signed a Memorandum of Understanding (MoU) on developing conservation-based tourism in Claket, Padusan, and Pacet Villages in Pacet sub-district, Mojokerto District on December 6, 2018. YSMB is the Foundation of PT Multi Bintang (PT. MBI), a large Indonesian beverage company. Located on the slopes of Welirang Mountain, the three villages are an important water catchment area for Mojokerto downstream. However, these villages also suffer from flash flooding and landslides. The three villages are directly upstream of a PT. MBI factory.

Based on the APIK Vulnerability Assessment, Pacet is highly prone to disasters, especially flooding and landslides. These disasters have occurred more frequently as a result of heavier rainfall and more unpredictable extreme weather events. To make things worse, there is significant environmental degradation and land use change upstream – primarily from forest to agriculture. Despite the high vulnerability to disaster, the Pacet area is a tourism destination for activities including trekking and white-water rafting. APIK and YSMB agreed to conduct activities to increase community and village resilience toward disaster risk including, for example, sloping land management, tree planting, and infiltration wells.

Following the MoU signing APIK worked with YSMB to develop the adaptation plan process by conducting village level Risk Assessment and FGD on climate impact in the Claket-Padusan-Pacet-Kemiri

Landscape. APIK, YSMB and the village community agreed on the action plan for bamboo planting to stabilize sloping land and increase ground water recharge as well as a community based clean water supply system. The results of the risk assessment were then disseminated to various stakeholders to get support for the implementation of adaptation action. The slope stabilization work through bamboo planting began in January 2020.

In 2018, APIK established a partnership with Cargill Indonesia which resulted in a commitment to strengthen the resilience of poultry farmers in Blitar district. As one of the biggest egg production centers in Indonesia, Blitar District in East Java supplies 70% of the eggs for East Java and contributes to 30% of national egg supply. In 2018, the population of layer chickens in Blitar District was 15,365,100 chickens with total egg production of 155,802 tons. Most of the chicken farms are located within Srengat, Ponggok, Kademangan, Wonodadi, Kanigoro, and Udanawu Sub-districts.

However, the egg production is threatened by the impact of climate change and natural disasters. For example, extreme temperature or frequent heavy rains lead to a declined egg production, a reduction in the egg quality, and also increase the risk of chicken and egg disease (e.g. Egg Drop Syndrome). The fact that most of the chicken farms in Blitar District are located in areas prone to hydro-meteorological disasters (such as flood, landslide, and drought), increases the vulnerability of chicken farming businesses.

The traditional style of chicken sheds is very susceptible to even small temperature or rainfall changes, i.e. they get hot quickly and also rain blows in during storms. In this partnership, Cargill provided support through improved chicken housing. Cargill built a demonstration chicken shed that complies with relevant international standards and will help maintain egg production despite rainfall and temperature changes. In addition, the new chicken shed will improve feeding and drinking water systems leading to greater economic efficiencies as well as reducing water usage in this drought prone area. On August 29th, 2018, APIK, PT. Cargill and the Community Based Poultry Farmer Association (Paguyuban Peternak Rakyat Nasional -PPRN) signed the collaboration agreement. Project activities began in November 2018 by conducting a technical team meeting and starting work on the chicken shed design.

APIK and Cargill had started the collaboration with a joint visit to identify the location and get ideas on proper design for the layer chicken sheds with support from the UN Food and Agriculture Organization (FAO). The climate smart chicken sheds were completed by the end of October 2019. In addition of the shed, PPRN added a community building for meeting and carrying out training. These facilities are developed as a Learning Center that can be used by farmers to improve their capacity on farming management, as well as a laboratory for the company (Cargill) to test their new products to support the layer chicken's productivity. The launch of this facility was conducted in November 2019 with representatives from local government, many farmers from neighboring villages and the US Consul General from Surabaya also joining the event. Integrated training modules that combine good chicken farming practices, climate information and adaptation actions, layer poultry farming management, as well as entrepreneurship were developed by APIK in collaboration with Cargill, FAO-ECTAD, and USAID-JAPRI. The modules are used for Training for Trainers (ToT) to the champions of layer chicken farmers in Blitar (members of PPRN).



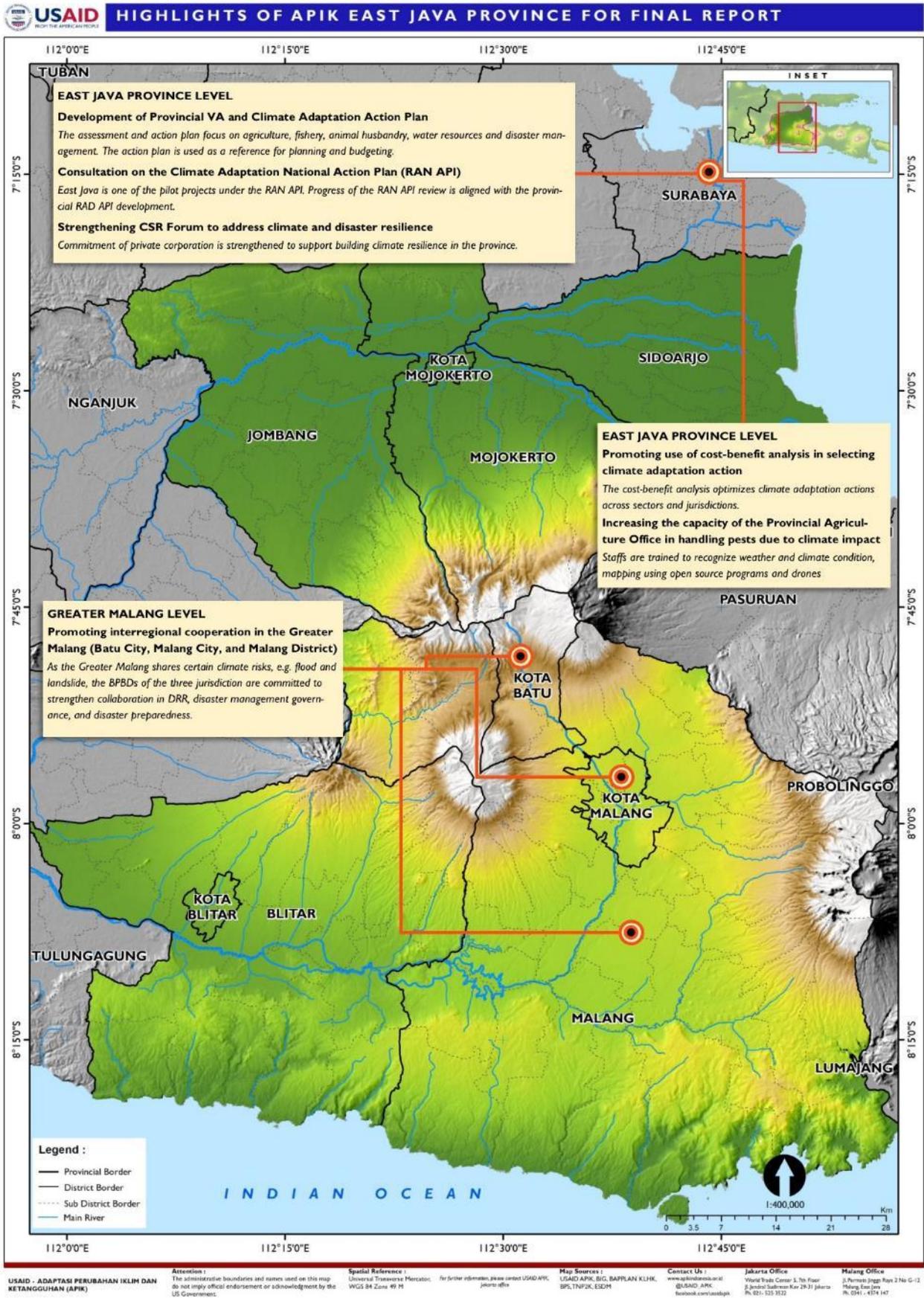
Climate smart chicken shed was built in Blitar District as a result of collaboration between Cargill and PPRN with facilitation from APIK

The establishment of a climate smart chicken shed in Ngrejo Village shows real business and community adaptation action towards climate impact. The innovation helped to secure better livelihoods for at least 1,000 smallholder chicken farmers. The pilot climate smart chicken shed carries a number of innovations and benefits to local farmers. For example, the introduction of a new feeding system designed in such a way to allow the farmer to feed all the chickens in the shed at one time saves more time and energy and is much more efficient. It also reduces the potential for food to spill and be wasted. The shed is also equipped with a drip mechanism, so

water only comes out if pecked by the chicken. This model ensures the provision of drinking water for the chicken is more efficient hence reducing the pressure on the environment. The design also means it is much simpler to collect eggs. Overall, the new shed design also maintains fresh air circulation. Better air circulation also triggers more optimal egg production and ensure chicken health.

Two months after the launch, the egg production in the new climate smart chicken shed had increased by 7.7%. In a traditional shed, the egg production is around 52kg per 1,000 chickens. Meanwhile in the climate smart shed, it is around 56 kg per 1,000 chickens. From the 2,000 chickens in the new shed, 90% of them are already producing eggs. The mortality rate should also be reduced due to the temperature of the shed that is more comfortable for the chicken. In addition, the eggshells are cleaner as the new shed is more hygienic and the employees are more comfortable in their work.

Exhibit 8: Map Detailing Activities in East Java Province



2. SOUTHEAST SULAWESI

REGIONAL PROFILE

Southeast Sulawesi has a long coastline, as well as dense (but rapidly degrading) tropical forests in the center of the province. One of the main industries in the province is nickel mining, which is unfortunately leading to an increase in erosion and sedimentation in the rivers. Hydro-meteorological disasters are common in this region with frequent issues from flooding, landslides, coastal erosion, and extreme weather events. Floods and landslides are the most frequent and perilous disasters. These conditions are exacerbated by poor environmental management, including upstream deforestation for plantations / agriculture, and mining which contributes to increased risk of landslide and flooding after intense rainstorms.

The APIK Project worked in Kendari City and South Konawe District. Kendari is the main city with a population of 370,728 people (BPS, 2017). South Konawe District has the second highest population with 304,214 people (BPS, 2017). Kendari is located around the edges of Kendari Bay and is in the downstream of the Wanggu watershed. South Konawe District is situated in the southern part of the province, and the headwaters of the Wanggu River originate from this district. Both the coastal and watershed landscapes of Southeast Sulawesi have important influences on the region's economic development, and thus the sustainable management of these landscapes in the face of climate and extreme weather risk is vital to engendering economic prosperity.

Increasingly erratic weather patterns in Southeast Sulawesi are having significant impacts on local economies and livelihoods. Protracted droughts have particularly affected irrigated agriculture and reduced food production for livestock. Many farmers now only manage to get one crop harvest per year instead of two. Local fishermen and seaweed producers are also affected by recent climate trends such as warming sea temperatures (and coastal pollution), which are pushing fish to deeper waters, reducing the size and quality of annual fish catches, and causing seaweed producers to shift to a hardier variety that brings a lower market price. These pressures are forcing fisherfolk to use sophisticated gear and seaweed producers to expand the area in production that affected their cost of production.

OVERVIEW

The following section provides details of the main activities that were carried out during project implementation in Southeast Sulawesi in Kendari City and South Konawe District. A full detailed list of all activities carried out throughout the project can be found in **Annex G**.

Maps detailing activities in Southeast Sulawesi Province can be found in Exhibit 10, while the maps for Kendari City and South Konawe District can be found in **Annex F** including details of the villages where APIK is working. More detail on main activities can be found in the following activity overview section.

SOUTHEAST SULAWESI ACHIEVEMENT OVERVIEW

INTEGRATION OF CLIMATE AND DISASTER RESILIENCE IN REGIONAL PLANNING

At the outset of the APIK project in Southeast Sulawesi APIK carried out a number of workshops and training sessions for government officials and other stakeholders on the importance of incorporating climate and disaster resilience into government strategies and planning. The main principle being that the impact of climate change and natural disasters is very likely to undermine existing development strategies

and outcomes with challenges to the resilience of livelihoods and ecosystems. Development planning that integrates strategies to address climate and disaster impact can play an important role in addressing the potential issues. Following the awareness raising there was strong buy-in from local government to ensure climate and disaster resilience was a part of their planning strategies and so APIK and Southeast Sulawesi Government were able to work together closely on this for the duration of the project. Notably, APIK in Southeast Sulawesi has successfully integrated climate impact and disaster risk management into regional plans at provincial, city, district, and village level.

South Konawe District

The APIK project started activities in South Konawe in 2016 right when the local government administration was starting to prepare their new five-year development plan (RPJMD) from 2016 to 2020. This was very fortuitous timing as it allowed us to immediately influence government activities in this district. APIK started by ensuring the newly elected Head of District realized the importance of reducing climate and disaster risk into their development plan's mission and vision. This was achieved through working with government to identify risks facing the region such as landslides, flooding, temperature change, coastal erosion and more frequent extreme weather events. The local government recognized that climate and weather-related disasters were happening more frequently and so were keen to do something about this issue. As a result, South Konawe's RPJMD now includes strategies and solutions to build resilience to disaster and climate impact as one of their 5 years' development target – specific activities include coastal protection schemes, improved land management, climate smart agriculture, and training / awareness raising. The South Konawe Government allocated IDR 112,000,000 (equivalent to US \$8,615) from Bappeda's budget for the establishment of the climate and disaster resilience working group on building resilience, while the marine and fishery agency in South Konawe has allocated IDR 1.084.913.000 (approx. USD 81,880) for mangrove planting in South Konawe coastal area. In addition, the institutional resilience scorecard assessment was also implemented in South Konawe District and as a result, they now have a plan of action to increase their score as part of the strategy to achieve their goal of sustainable economic development within the district.

Village Level

APIK continued the work in South Konawe by translating the District RPJMD so that it was relevant for the village level and opening a new opportunity to utilize village funds for reducing climate and disaster impact activities. APIK then worked with the District Government to issue a Head of District Regulation on Village Fund Allocation (**PerBup Konawe Selatan 6/2018**) that enabled climate and disaster resilience activities to be officially funded.

The processes of accessing district funds and village funds are completely different. Village administrations have a greater degree of autonomy over how their funds are used and so that provided an opportunity for APIK to work closely with village officials and communities to channel these funds for climate and disaster resilience activities. The village budget can be allocated towards initiatives such as climate resilient infrastructure, sustainable agro-industry, or supporting conditions for increasing local resilience toward disaster risk. Village governments are the front line in dealing with these issues and the potential impact. However, in most cases, the Village Fund has not typically been spent on these types of things – largely because of a lack of awareness and capacity in village leadership. APIK worked with villages to include activities such as climate smart infrastructure design, in areas such as water resources planning, coastal protection or strategies for reducing natural disaster risks, to plan appropriately and save losses and money in the future.

Table 4: Summary of Village Funds Allocated for Climate and Disaster Resilience Actions in South Konawe District, 2018

VILLAGES	Batu Jaya, Rumba-Rumba, Awunio, Lamokula, Wawatu, Tanjung Tiram, Puasan, Bungin Permai
CLIMATE BUDGET ALLOCATION FOR 8 VILLAGES (2018)	IDR 1,070,179,800 (approx. USD 80,768) Note: annual village budget stands at around USD 70,000
ACTIVITIES	<ul style="list-style-type: none"> a. Village development includes prevention of coastal erosion, environmental conservation, development of disaster evacuation roads, construction of evacuation buildings, post-disaster management, construction of natural disaster management facilities and infrastructure. b. Village community empowerment, including strengthening the capacity of rural communities in dealing with disasters, among others: provision of information on disasters (Early Warning System), community preparedness training in dealing with disasters, training of volunteer for handling natural disasters. c. Adaptation and mitigation efforts including; tree nurseries, reforestation, watershed conservation and other environmental conservation activities.

Kendari City



APIK facilitated series of meetings to integrate climate and disaster resilience into Kendari City RPMD.

APIK also worked to influence the Kendari City 2017-2022 Mid-Term Development Plan (RPJMD). APIK started this process using the City Resilience Score Card Index as the entry point. APIK was able to ensure the city government included the City Resilience Index as one of the key performance indicators in the Kendari City RPJMD 2017-2022. As a result, Kendari City Government plans to regularly carry out a resilience assessment as a key development indicator for the city. APIK also supported the Kendari City government in the preparation of climate adaptation action plan (RAD-API) which provides more detail on specific action

that will take place over the next five years such as mangrove reforestation and flood mitigation schemes. This shows a great buy-in for climate and disaster resilience activities by the City Government. As an example, the Kendari City BPBD had allocated IDR 150,000,000 (approx. USD 11,321) for resilience scorecard and adaptation action plan development.

Provincial Level

At provincial level, APIK initiated the process through a public policy review of seven existing provincial regulations⁵. APIK then worked with the local government to integrate climate and disaster resilience into these regulations.

⁵ 1) Local Regulation No. 13 Year 2015 on Sustainable Food Agriculture Land Protection; 2) Local Regulation No. 14 Year 2013 on Environment Management and Protection; 3) Local Regulation No. 2 Year 2014 on Southeast Sulawesi Spatial Plan 2014-2034; 4) Local Regulation No. 6 Year 2014 on Nipa-nipa Forest Park Conservation Area Management; 5) Local Regulation No. 1 Year 2015 on Watershed Management of Southeast Sulawesi

In addition, as a result of APIK efforts, the Provincial Government Legislative Body (DPRD) urged the provincial government to have a local regulation for climate change adaptation (*Perda Adaptasi Perubahan Iklim*) to anticipate disasters caused by climate change. Thus, it will be an important reference for the community in anticipating and building climate resilience. On January 21st, 2019 APIK's advocacy on the Perda finally paid off when the Southeast Sulawesi Governor, Ali Mazi, signed and legalized the provincial regulation (Perda) on climate adaptation (**Perda API 11/2019**). In his remarks, Ali Mazi hoped that the local regulation will not only become the legal jurisdiction but also help the government in implementing resilience building initiatives from the provincial level until the village level. Southeast Sulawesi is the first province in Indonesia to release a formal local regulation that specifically addresses climate adaptation.

In terms of development planning, APIK's efforts was successful in integrating climate adaptation and disaster management into the 2018-2023 Southeast Sulawesi Province mid-term development plan (RPJMD). The provincial government and related stakeholders are convinced about the importance of building regional resilience to climate change and disaster. New specific targets related to climate and disaster resilience in the 2018-2023 Southeast Sulawesi RPJMD highlight this. For example, the Southeast Sulawesi RPJMD Goal 8 (Combating Climate Change and its effects) emphasized the formulation of new Key Performance Indicators (IKU) related to disaster resilience and increasing the Regional Resilience Index to Disasters. Within the RPJMD, the provincial government has allocated IDR 57,090,708,800 (approx. USD 4,308,733) for programs related to climate and disaster resilience specifically for disaster risk reduction and climate change impact program in Southeast Sulawesi.

TRANSBOUNDARY LANDSCAPE COLLOABORATION IN THE WANGGU WATERSHED

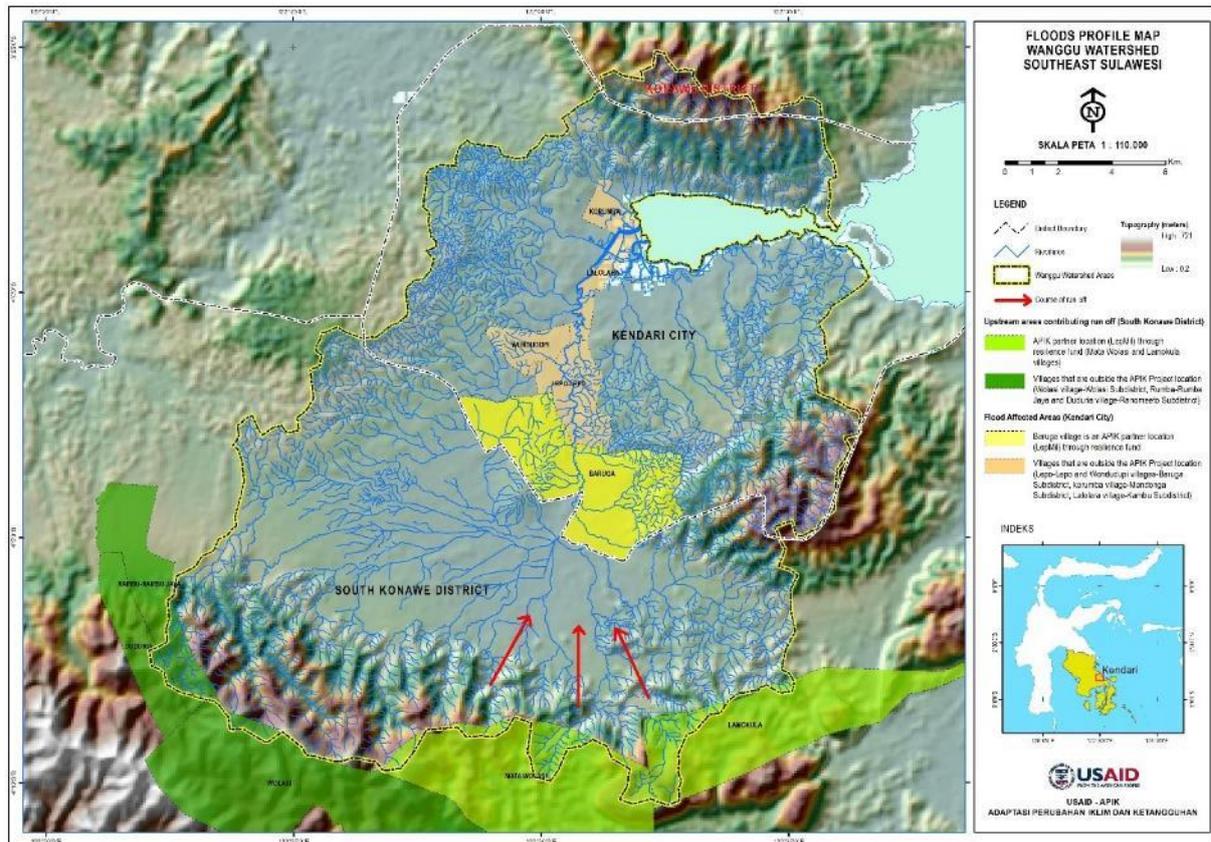
One of the central components to the resilience building strategy employed by APIK was the landscape approach. The landscape approach recognizes that broader strategies to build climate and disaster resilience need to involve all stakeholders in a geographical landscape including multiple administrations – for example, neighboring cities and districts. To promote this strategy APIK identified issues that require the collaboration of Kendari City and South Konawe Governments. Kendari City suffers from frequent flooding and one of the main causes of this issue is from the Wangu river which originates in South Konawe. Poor land management in the upstream Wanggu River (in South Konawe) due to deforestation and land use change to mining increases sedimentation and the flow of the river which then impacts the downstream area, in this case Kendari City. In addition, the land use change in Kendari City coastal area from agriculture, fish farming and mangrove forest to housing and beach reclamation exacerbates this issue, increasing run off in the urban area makes it even more challenging for water from the Wanggu river to get to the sea leading to more floods especially when there is a high tide. A map of the Wanggu Watershed can be found in Exhibit 9.

Following the vulnerability assessment completion in PY 3, APIK worked with local government to develop a resilience strategy to address this issue. Climate projections for the period of 2030-2040 show that there is a chance of an increase in rainfall in Kendari City and South Konawe District within a range of around 10-30% especially during March to May. The Wanggu River is very prone to flood, and if there is no improvement in land management then flooding will strike Kendari City more frequently. It should also be noted that South Konawe also suffers from flooding. After a series of workshops were conducted all the relevant government parties from Kendari, City, South Konawe District, and Southeast Sulawesi Province agreed to develop and legalize an adaptation action plan for the Wanggu watershed. This was formalized through an MoU between Provincial, Kendari City and South Konawe District Governments. The MoU was finalized in October 2019 with the relevant legal approvals. As the MoU is between different government administrations, the local house of representatives was engaged in this process

Province; 6) Local Regulation No. 9 Year 2016 on Disaster Management; and 7) Local Regulation No. 12 Year 2016 on Production Forest and Protected Forest Management.

before it was formalized. With the MoU (**Kesepakatan Bersama No. 360/4065 and No. 614/139/2019**) legalization, now the three local government parties have the legal mechanism to work together to tackle the flood problem. The MoU also included detail on specific activities and roles and responsibilities. The MoU also included detail on specific activities and roles and responsibilities, available in **Annex H**.

Exhibit 9: Map of Flood Profile in Wanggu Watershed



Strategies developed within the MoU include river normalization, rehabilitation of degraded land, and improved waste management. Following the MoU, the Government of Kendari City and South Konawe District have held several consultation meetings to discuss the spatial plan (RTRW) in each region, to increase spatial synergy in both regions. The Regional Disaster Management Agency (BPBD) in Kendari City and the South Konawe District have also committed to work together to deal with flood mitigation and response.

In Kendari City, as part of its efforts in disaster mitigation and reducing the flood hazard in Wanggu river, APiK supported the BPBD to revise the Flood Contingency Plan for 2018-2019. The revised plan includes a clear SOP and division of responsibilities between agencies in the Kendari City to manage flood disaster event. In addition, the plan provides details on why the flooding is occurring more frequently, so the government can also put in place strategies to minimize the risk in the future. During an emergency, quick action is required; however, this depends on availability of plans prior to disaster event so that everyone is aware of and understands what to do. If appropriate actions are not taken or if the response is delayed, then lives, resources, houses, and livelihoods could be needlessly lost.

REPLICATING APIK'S APPROACH TO INCREASE COMMUNITY RESILIENCE THROUGH GOVERNMENT PROGRAMS

APIK supported the Southeast Sulawesi Government to formulate a strategy and give guidance on integrating climate resilience and disaster risk management into the KPPN (National Priority Village Area) Tinanggea Masterplan. The KPPN program is an initiative of the national government to encourage good development practices at the village level and an effort to accelerate the development of rural areas. In South Konawe overall, there are 13 villages and one Tinanggea sub-district (Lapoa, Asingi, Bungin Permai, Telutu Jaya, Torokeku, Roraya, Lonowulu, Tatangge, Wundumbolo, Panggosi, Bomba-bomba, Akuni, Lasuai villages, and an urban village Kelurahan Tinanggea) that are integrated in the KPPN Tinanggea area.

APIK successfully integrated aspects of the adaptation action plan and activities into the KPPN master plan, including mangrove protection, silvofishery, vulnerability assessments, climate field schools for seaweed and rice, and EWS installation. These activities will be executed and funded by the government, demonstrating strong buy-in from the local government for APIK's approaches and activities. One of KPPN strategies is to maximize the use of Village Funds, so the funds channelled to the villages can be effective and well targeted. In order to reach the goal, villages within KPPN area coordinate closely on planning and financing programs. APIK's work to encourage villages to use village funds for community resilience programs was used as an example of a best practice for other villages to replicate.

Prior to its engagement with APIK, the South Konawe District Government had already established priority sectors based on the potential natural resources in villages to boost economic growth in the area. Those sectors include paddy rice, coconut, shrimp, seaweed, and crab. APIK worked with the district government to formulate the rural area development plans (RPKP), providing input on how to integrate climate adaptation programs into their plans and strengthen the KPPN capacity for reducing risks due to climate impact and disaster events.

APIK's efforts to integrate climate and disaster resilience into the district regulations for Village Fund Allocation in South Konawe District were replicated in two additional KPTBs (Disaster Resilience Village Areas): West Ranomeeto and Sabualoka Sub-Districts. To assist with the ongoing and future planning efforts of local governments, APIK provided technical support to build the capacity of local governments in flood mitigation and management, focusing on specific areas of interest, including protecting agricultural commodities that are vulnerable to climate change and extreme weather impacts.

BUILDING COMMUNITY RESILIENCE TOWARDS NATURAL DISASTERS



Community in Awunio Village received capacity building in disaster preparedness and response

Building community resilience requires the involvement of multiple stakeholders including community members, government offices, research institutions, and local civil society groups. When disasters strike, governments and aid organizations are not always in a position to help communities immediately. Therefore, it is important to build community capacity in disaster preparedness and response so at least the community will be able to understand what to do during disasters until the first responders arrive. Increasing community knowledge on disaster prone areas within their neighborhood is a vital part of ensuring that people will be able to

mitigate and reduce the risk of climate and weather-related disasters.

A first step to building community resilience is establishing local disaster preparedness teams. These teams are the focal point for disaster management in the community and so it is important they are able to understand and develop basic disaster management systems, including evacuation routes, disaster simulations, and communication systems to alert the broader community if disaster is likely to occur. APIK established disaster preparedness teams in every village where APIK worked and trained them in disaster mitigation approaches and best practices.

In order to reduce the risk of floods in Kampung Salo in Kendari City, APIK conducted a rapid assessment with the local disaster preparedness team. The assessment found that Kampung Salo is prone to flooding due to its location in a narrow valley at the foot of Nipa-Nipa Mountain in Kendari City. Many parts of this area have more than 25-degree slopes. The flooding is getting worse as a result of poor forest management upstream with land being cleared for housing and agriculture plus more extreme weather events (e.g. heavier rainfall). In addition, the downstream area of Kampung Salo is located near the shoreline and when there is a high tide in combination with heavy rain, the flooding is even worse in this area. In 2017, a major flood struck the area affecting 2,216 people and causing significant loss of assets and infrastructure.

In addition, the flooding in Kampung Salo is exacerbated by poor river management and in particular, the large amount of solid waste that impedes the flow of water. The village is located between the national oil and gas company (PT Pertamina) depot for Southeast Sulawesi and the Kendari City gasoline stations. Since reducing flooding is vital to both the community and Pertamina, APIK partnered with both to support solid waste management in Kampung Salo. PT. Pertamina agreed to support the improvement of waste management in Kampung Salo through a waste bank program. The waste bank where community members can deposit their trash is a means of generating income for the community while reducing the amount of trash that ends up in the river and surrounding environment. The waste bank is managed by the disaster preparedness team. The local government environment agency (DLH) of Kendari City were engaged in this process as the waste bank management serves as an example for replication by DLH in other areas in the city. PT. Citra Utama Mandiri, a leading company that specializes in waste management and has been promoting the use of an Android-based application for managing other waste banks in Indonesia, also took part in the initiative. PT. Citra Utama Mandiri provided capacity building to the disaster preparedness team with funding support from PT. Pertamina.

Schools play an important role in disaster risk reduction. In addition to education, schools often provide shelter during a disaster. In this context, APIK implemented education programs on disaster risk reduction (DRR). With the impact of climate change the need for effective disaster resilience education is greater now than ever before. APIK conducted a disaster simulation in Kendari City primary schools (*Sekolah Dasar*-SD) 6 and 8 in collaboration with BPBD. Similarly, APIK provided training for students and teachers in SD 03 Kolono, South Konawe. APIK also conducted a disaster and evacuation drill event in Kendari City on 16 October 2019. The event took place in SD 32 and SD 44 Kendari. The facilitators for this drill were the schoolteachers that had previously been trained along with BPBD staff. During the drill, 42 facilitators from 42 schools around Kendari City actively participated. The drill also involved students and teachers from the 42 schools. In total 2,520 people participated in the event. As a result, the participating schools have now established standard operating procedures for flooding.

APIK also supported the local BPBDs to hold disaster simulation events in Kendari City and South Konawe District that successfully involved a wide range of different stakeholders in the community, including students, government staff, healthcare staff, community groups, disaster forum members, volunteers, mass media, and others. In Kendari, the disaster evacuation simulation was held in Lepo-Lepo Village with participation from 322 people. Meanwhile, in South Konawe, it was held in Lamokula Village where 302 people joined the event. Through this event, both villages had the chance to test their

early warning systems and SOP in the event of a flood. The participants took part in disaster event simulations, where they were instructed to go to the emergency assembly point and evacuate to the evacuation shelter once the flood warning was announced by a disaster preparedness team member through sirens and the loudspeaker from the mosque. Local community members were eager to participate in this event, indicating a high degree of awareness about the risks posed by climate change and disasters and a desire to enhance their ability to prepare for disasters.

Through the experience of disaster simulations, the communities are better equipped to act as first responders during a disaster event. The Chief Executive of BPBD from South Konawe, Adiwersyah Toar, expressed his appreciation of APIK's support. He mentioned that Lamokula Village had been frequently hit by floods in recent years, which makes it urgent for the BPBD to take the opportunity to coordinate with APIK to improve community capacity in dealing with disasters, such as floods and landslides.

CLIMATE SMART AGRICULTURE



Top: Climate field school for rice farmers in Baruga Village, Kendari City; Bottom: Climate field school for corn farmers in Punggaluku, South Konawe District

Southeast Sulawesi farmers are one of the most vulnerable groups affected by hydro-meteorological disasters such as drought and flooding. These disasters affect farm productivity and directly impact livelihoods and welfare. Crop failure is a frequent occurrence due to long and severe droughts as well as unexpected storms and flooding. Farmers are also seeing more widespread and damaging pest attacks.

In order to build farmers' resilience towards climate and disaster impacts, APIK worked together with BMKG to conduct Climate Field School (CFS). The initial Climate Field School in Southeast Sulawesi was focused on rice farming and took place in Baruga Village, Kendari City. Farmers participating in the CFS had the opportunity to immediately put the training material into practice through hands-on pilot activities. Participants experimented with different planting techniques, including integrated pest management and using different plant varieties.

Through the CFS, farmers also learned how to identify the types of seeds that are most appropriate for the climate in their area. As a result of the CFS, they understand how to access climate and weather information and interpret environmental conditions such as rainfall, humidity and temperature to predict the likelihood of plant disease outbreaks such as rice blast fungus (*Magnaporthe grisea*) that may disrupt the growth of their crops and could even cause harvest failure.

As part of the CFS process, APIK also worked with the BMKG to build their capacity to quickly and effectively provide accurate climate and weather information to farmers. Recommendations included developing better practices and procedures for the dissemination of climate and weather information such as exploring more appropriate delivery channels for the information, for example via radio or text messaging (SMS), and also recommending they develop applied messages for farmers with practical information on when to plant and when to harvest rather than just a typical weather map for the farmers to interpret. Through the CFS and its work with BMKG, APIK helped to improve farmers' resilience through good agriculture practices and understanding climate and weather patterns to increase their

productivity. Farmers found that this knowledge really helped them improve their farming methods. These farmers then started to share the knowledge that they gained with farmers in neighboring areas.

Following the success of the CFS for rice farmers in Kendari City, APIK conducted a second CFS for corn farmers in Punggaluku Village, South Konawe District. There is significant potential for corn production in South Konawe District. There is a high demand for corn in Indonesia and the Ministry of Agriculture is promoting domestic corn production to reduce imports. Currently, corn productivity in Southeast Sulawesi is 2.84 tons/hectare, which is far below the national average yield at 4.1 ton/ hectare. The causes for this low productivity include poor quality seed and ineffective implementation of good agricultural practices. Moreover, the crop is impacted by climate and disaster risks and a lack of information regarding appropriate times to plant and harvest. While climate and weather information is available, the majority of the farmers are unable to access and fully understand how to use it for their daily agriculture activities.

For corn farmers, access to working capital is essential and they often try to take loans prior to planting, to be paid back post-harvest. However, due to harvest failure, many farmers have been unable to pay back their loans in the past, so banks were unwilling to lend to farmers as it was considered too risky. To address this issue, APIK engaged with businesses to support the CFS implementation. APIK partnered with Bank Sultra, a public state-owned bank in Southeast Sulawesi that has a mandate to improve the local economy, including the agriculture sector. Bank Sultra expressed their desire to distribute credits to farmers but they had not yet found a successful model because of the risks. Additionally, Bank Sultra lacked the knowledge and tools that they needed to assess credit risk for farmers while taking into account climate and disaster risks.

APIK facilitated a partnership between Bank Sultra, PT ACA Insurance, and Syngenta Indonesia, with the aim of providing loan protection, weather-based crop insurance for farmers, better access to good varieties of corn, a training for farmers in good agricultural practices that take into account disaster risk, and training for bank employees on climate and disaster risk. APIK, Bank Sultra, ACA Insurance, and Syngenta signed a letter of intent to collaborate for the Climate Smart Agriculture pilot project for corn in South Konawe District. The aim was for ACA to provide crop insurance products to support government programs and minimize farmers' loss through a holistic risk management concept. The insurance will increase the farmers' ability to bounce back if a disaster occurs. Syngenta, one of the pioneer companies on innovative agricultural technology, provided technical assistance in good agricultural practices as well as improved seed for the pilot. As a result of this CFS, the corn production of farmers in the area doubled from around 3 tons/hectare to approximately 7 tons/hectare and by the end of the project the best practices taught in the CFS had been replicated by 85 farmers with approximately 170 hectares under cultivation using the new approach. For more details on climate smart agriculture for corn, see **Annex I**.

Another important commodity for Southeast Sulawesi Province is cacao. Cacao production is prone to changes in the climate. Increases in temperature combined with reduced or erratic rainfall can lead to increases in pests and diseases, impact the overall health of the cacao tree and create issues for post-harvest handling of the cacao thus decreasing output and income for the farmers. Typically, cacao is harvested during the wet season, which brings its own challenges as heavier than expected rains lead to crop destruction as well as leading to challenges for storing and drying the cacao to ensure it is a suitable quality to sell to the factory. In addition, climate change combined with poor land management techniques also lead to reduced soil fertility which is further reducing the yields and quality of cocoa.

On November 13, 2018, APIK and PT. Kalla Kakao Industri (PT. KKI) signed a cooperation agreement to build resilience of cacao farmers in South Konawe through Climate Smart Cacao Farming with pilot

activities located in Puurema Subur Village, Lalembu Sub-district, South Konawe District. Together with PT. KKI, APIK would improve farmers' access to weather and climate information, raise awareness on weather and climate risks, support new appropriate technologies to reduce the impact of climate change, and improve crop management to boost cacao production.

Within this CFS, APIK, BMKG and PT KKI created a joint CFS module. The Training of Trainers event was attended by twenty-seven participants including representatives from PT KKI and government extension agents in Puurema Subur, Puunangga, Kapuwila, Teteinea Jaya Village. Participants gained new skills and knowledge in climate smart cacao agriculture practices including how to access and understand BMKG weather forecasts, improved cacao tree management techniques to mitigate the risks from pests and diseases and improved post-harvest handling techniques. APIK also collaborated with BMKG Ranomeeto and Kendari Maritime Climate Station to support this event by enhancing farmer's knowledge in climate and weather.

COASTAL RESILIENCE



Seaweed farmers in Rumba-Rumba Village received support from APIK through series of trainings to improve their farming practice under climate impacts

Seaweed production is one of the main commodities for people living in coastal areas in Southeast Sulawesi. APIK supported 25 farmers from five seaweed farmer groups that were struggling because of an inability to adapt to the changing climate and weather cycle, which affected the cultivation and growing process.

In Rumba-Rumba, the seaweed farmers had a drastic decline in their yields due to *ice-ice* disease, which causes a whitening and hardening of the seaweed's tissues. *Ice-ice* outbreaks most often occur when there is an increase in the sea temperature. In collaboration with the village government, APIK

activities in Rumba-Rumba supported farmers to maximize community economy benefits from commercial seaweed production. Seaweed production has been declining in Rumba-Rumba not only due to *ice-ice* disease but also as a result of the clearing of seaweed wetland habitats for other fisheries products and infrastructure such as docks and boat routes that had threatened the seaweed farmers. APIK worked with the community to help restore the seaweed production and to be able to ensure a stable income for seaweed farmers. APIK provided rafts, nets, and more importantly, knowledge in good seaweed farming practices. Together with the Pokja API-PRB in Rumba-Rumba (Community Working Group in Climate Change Adaptation and Disaster Risk Reduction) APIK conducted a series of training events, both in seaweed production and in strengthening the Pokja institution itself. According to the seaweed farmers, the knowledge on climate and weather helps them to understand the right time to plant, hence reducing the seaweed's vulnerability to *ice-ice* disease.

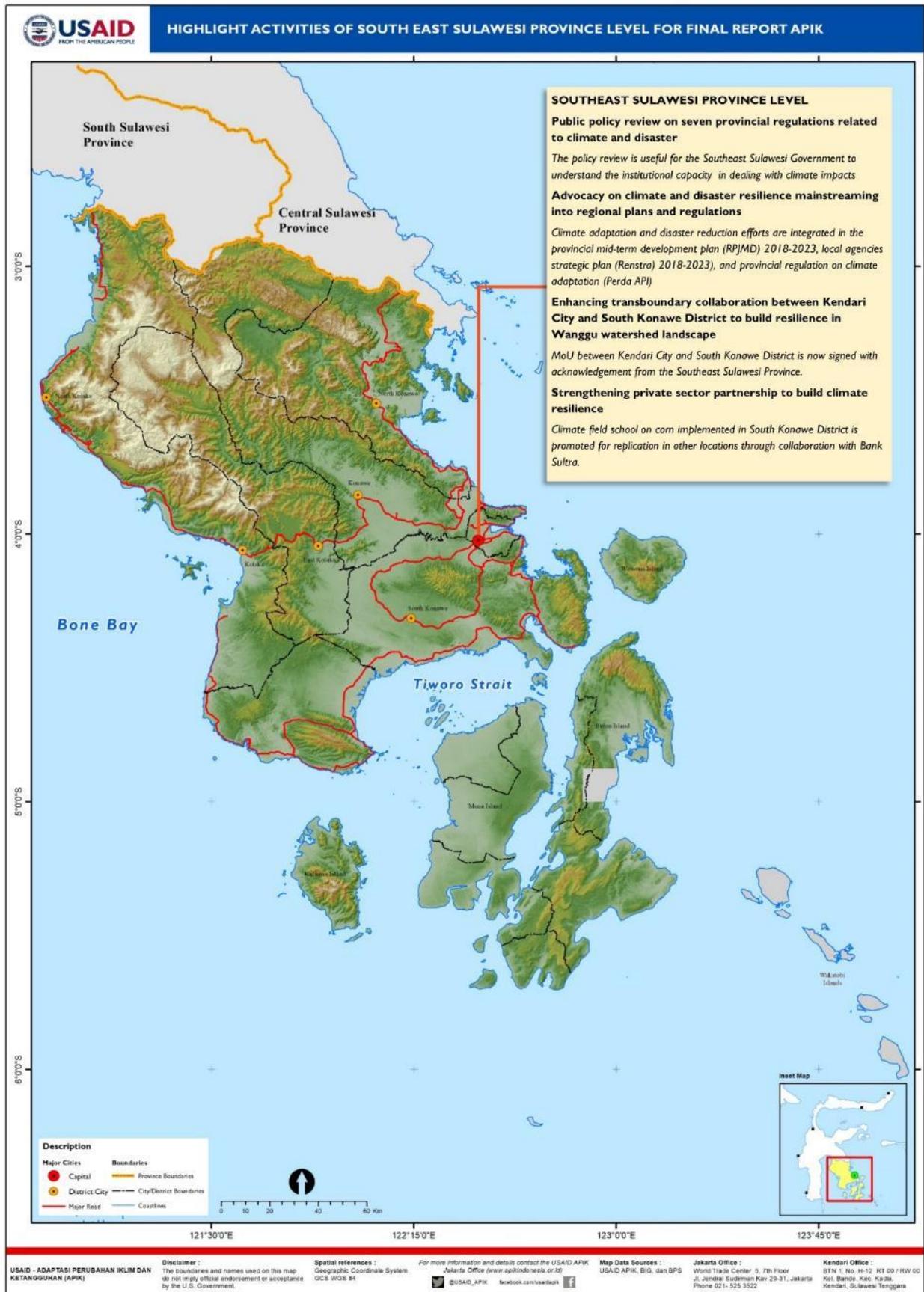
Through a participatory approach, the Pokja developed seaweed production activities through the village funds mechanism. As a result, Rumba-Rumba village government allocated its village funds for the seed purchase. Between May and June 2019, there were three households of seaweed farmers that successfully harvested the seaweed and sold them to the market. On average, they received around IDR 3 million (approx. USD 226) every month by selling 166 kg of dried seaweed. Prior to APIK intervention they were only able to harvest 100 kg of wet seaweed a month with lower quality and so of less value in the market. These types of adaptation action that directly impact the local economy are typically the most sustainable as people feel the immediate benefit and recognize the importance of continuing to

adapt. As a result of better management techniques and being able to sell the crop for a higher price the farmers are better able to withstand sudden shocks such as an outbreak of *ice-ice* affecting production.

In 2017, APIK worked with Lembaga Penelitian dan Pengembangan Masyarakat Universitas Halu Oleo (LPPM-UHO) to increase fisheries sector resilience in Southeast Sulawesi. Based on the initial baseline research conducted in 2017, LPPM-UHO installed bio-reef technology in four villages: Puasana, Lalowaru, Tanjung Tiram, and Wawatu. The bio-reef technology was designed locally by LPPM-UHO and consists of coconut shells fixed to a rod. APIK supported them as a pilot initiative to place these coconut shells in strategic locations offshore to help regenerate destroyed coral reefs. The reefs had been largely destroyed by bomb fishing in the past.

Bio-reef technology is designed primarily for the purpose of regenerating coral and providing habitat for marine wildlife with the solid substrate providing a good medium for corals to grow. In February 2017, APIK and LPPM UHO completed the bio-reef installation. The success rate of the installations was 90%. The remaining 10% did not grow because they were too close to a freshwater source. LPPM-UHO was able to recover those bio-reef and replant them near the successful sites. Already in this short amount of time (three to four months after bio-reef installations), the villages have seen more fish including 10-20 species that were not seen in that area before. The prime aim of this initiative was to reduce coastal erosion, however, APIK also worked with the surrounding villages on sustainable fishing as more reef fish will be attracted to the bio-reef area.

Exhibit 10: Map Detailing Activities in Southeast Sulawesi Province



3. MALUKU

REGIONAL PROFILE

APIK's activities in Maluku focused on building resilience for small island landscapes. Maluku is dominated by small islands as can be seen in the map in Exhibit 11. In Maluku, APIK works in three areas: Ambon City, Central Maluku District (specifically the Lease Islands), and Aru District. Ambon and the Lease Islands are grouped into Island Cluster VII (in the *Gugus Pulau*-Island Cluster structure of Maluku Province⁶), comprising the administrative Ambon City and Central Maluku District (Sub-Districts Leihitu Barat, Leihitu, Salahutu, Haruku, Saparua, Saparua Timur, and Nusalaut). The island cluster VII has higher economic and population growth relative to other clusters given that Ambon City serves as an economic hub for transportation, financial services, education, trade, and industry in the province. Capture fisheries provide some of Island Cluster VII's most important commodities, contributing 136,000 tons of fish annually and 304 hectares of seaweed. Locations having the largest fish catch include Kecamatan Saparua (Saparua Island), Sirimau (Ambon City), Salahutu and Leihitu (Central Maluku District located in Ambon Island).

The Aru Island District represents Island Cluster IX. The economy in Aru is dominated by fisheries, particularly from the Arafura Sea-WPP (*Wilayah Pengelolaan Perikanan*-Fisheries Management Area) 718 that yields approximately two million tons of fish per year. Aru Islands District is prone to tidal flooding due to its flat and low land and vulnerable to water borne disease given its poor water and sanitation infrastructure. Coastal erosion, intense storm waves, and coral and sand mining are common in Wamar and other islands in the district. Seawater intrusion into shallow ground water wells for household use is also a major problem.

Climate change in Maluku Province is threatening livelihoods and leading to shifts in labor movement patterns—from fishing to farming (and the reverse), as well as from rural work to urban employment. In terms of disaster risk, the remote location of Maluku presents a major challenge for natural disaster preparedness and response. Hydro-meteorological hazards such as landslides, flooding and tidal surges can be more destructive because it takes first responders a long time to reach the remote island locations. Some places are still lacking facilities such as high schools or health clinics and people need to use boats to travel to neighboring islands to obtain the services that they cannot receive on their islands. For that reason, it is very important that Maluku considers climate impacts in their development planning.

OVERVIEW

The following section provides details of the main activities that were carried out throughout the duration of the project in Maluku. A detailed list of all activities carried out during the project can be found in **Annex J**.

Maps detailing activities in Maluku Province can be seen in Exhibit 11, while maps for Ambon City and the Lease Islands as well as the Aru Islands District can be found in **Annex F**.

⁶ Island clusters are determined by local government and designed to support local development planning and each cluster includes islands with some interdependency. Island cluster I (Buru); II (West Seram); III (North Seram); IV (East Seram); V (South Seram); VI (Banda); VII (Ambon and Lease); VIII (Kei); IX (Aru); X (Tanimbar); XI (Babar); XII (Terselatan)

MALUKU ACHIEVEMENT OVERVIEW

BUILDING LOCAL RESILIENCE THROUGH CLIMATE ADAPTATION PLANNING

In partnership with the Directorate General of Climate Change, KLHK, APIK supported Maluku Province to develop a roadmap for climate adaptation and mitigation and sustainable development. Many agencies such as BPBD, PMI (Red Cross), Health Agency, Transportation Agency, etc. had in place their own plans and regulations on climate and disaster management, which in many cases have been developed without any coordination. This roadmap served to promote coordination and communication between various actors to engender a more effective allocation of resources and a more strategic and effective approach to resilience building activities and programs.

In the initial discussion held by APIK and KLHK in June 2017, the KLHK's Director General for Climate Change, Dr. Nur Masripatin stated the importance of multi-stakeholder communication and coordination and enhancing people's capacity in facing climate impacts. Following this meeting, Maluku's Governor issued a Governors Decree No. 97.a/2017 to establish a team to formulate the roadmap which also included APIK representatives as team members. During the process, APIK also collaborated with the Indonesian Forestry and Climate Change Experts Network (APIKI Network) for Maluku and North Maluku Region. APIK facilitated 15 meetings of the constituent members and provided technical support in terms of consultation to KLHK who led the document drafting. The roadmap identified the strategic gaps and opportunities between government agencies regarding effective strategies in dealing with climate change. The aim is to reduce overlapping in planning and budgeting within each agency. In addition, the roadmap provides guidelines in developing a clear adaptation and mitigation strategy for the province.

The whole process took about six months until finally the Climate Mitigation and Adaptation Roadmap (*locally known as Roadmap MAPI*) was launched in January 2018 by the Minister of Environment and Forestry (KLHK) during the Climate Festival event in Jakarta and then subsequently also launched by the Governor of Maluku in Ambon City in February 2018. It makes Maluku as the first province in Indonesia that owned a Roadmap MAPI as part of the implementation of Indonesian Determined National Contribution. The provincial government committed to effectively implement the roadmap moving forwards.

Following the launch of the Roadmap MAPI, APIK assisted the local government in formulating adaptation strategies and action plans. These are the basis for mainstreaming climate resilience into development planning. Addressing climate change requires a comprehensive multi-sector approach, so the strategies and action plans promote strong inter-agency collaboration. In Maluku, APIK assisted local government at the provincial and city/district level in formulating adaptation strategies and actions in line with each area's specific context. The adaptation strategies outline the vision, types of activities and the expected outcomes. The accompanying action plan sets out what needs to be done to convert the chosen adaptation option into specific actions. These strategies and action plans are then incorporated in the planning and budgeting documents.



As part of the process to formulate these new plans and strategies APIK ensured that the development was led by local government officials with technical support from APIK. In this way there is strong local ownership. This takes more time and is an intense process but leads to greater sustainability and better likelihood of effectively leveraging local government budgets. The process develops local capacity, identifies local experts, and connects the experts with government as potential future resources.

Following the formulation of the Roadmap MAPI, APIK focused on mainstreaming climate adaptation into local development plans and budgeting through various workshops and technical assistance. As a result, Ambon City government allocated approximately IDR 2,380,000,000 (approx. USD 179,622) in their 2018 budget. The most impressive result is seen in Central Maluku District where the climate resilience strategies were integrated into their regional midterm development plan (RPJMD). Initially, the vulnerability assessment (VA) facilitated by APIK helped in identifying appropriate adaptation options in addressing the risk profiles, while the resilience scorecard assessment, also facilitated by APIK, helped identify areas for resilience building. The RPJMD of Central Maluku District has been finalized in PY4 and in total the district allocated IDR 361,338,982,772 (approx. US \$27,270,865) for climate adaptation and disaster management activities for the 2017-2022 period. This compares to their previous RPJMD which did not include any climate adaptation funding. The new RPJMD of Central Maluku demonstrates that when climate and disaster resilience has been successfully integrated in the development planning as well as increased awareness of local government to build local resilience then significant resources can be leveraged.

Across the province for the 2019 fiscal year, APIK has supported local government agencies, including Maluku Province, Central Maluku District, Aru Islands District, and Ambon City to allocate IDR 23,446,866,478 (approx. US \$1,769,575) in total for building climate and disaster resilience activities. For example, the Central Maluku Public Work and Settlements Agency has allocated IDR 2,453,449,000 (approx. US \$185,186) for a sea wall in Ameth and wave breaker in Siri-Sori Islam since these areas have experienced frequent coastal erosion. Ambon City Local Development Planning Agency (Bappelitbangda) has allocated funds to create a local action plan for climate mitigation and adaptation and water supply capacity survey. While Aru Islands District allocated IDR 5,551,923,728 (approx. US \$419,013) for water supply and resources programs as a direct response to APIK findings in the Vulnerability Assessment and district resilience indicators.



Climate risks and impacts were identified at the community level to discover inputs for village development plan.

Meanwhile at the village level, APIK facilitated a participatory process to support community members in identifying climate and disaster risks followed by the development of village resilience action plans. APIK facilitated establishment of village working groups as a platform for collaborative efforts to respond to the threat of climate change. With the assistance of APIK, the community in 12 villages (Allang, Ameth, Haruku, Hative Besar, Ihamahu, Leahari, Morella, Negeri Lima, Passo, Sirisori Islam, Soya, Wassu) have carried out their own risk assessment and action plans. For example, in Haruku, they prioritized mangrove planting to address coastal erosion issues in their development plan and budget, while Ihamahu prioritized a water retention basin to deal with drought risk.

LANDSCAPE BASED RESILIENCE THROUGH TRANSBOUNDARY COOPERATION

Maluku consists of groups of small islands with different issues and contexts. In total, there are 1,340 islands in Maluku Province, divided into 9 districts and 2 cities. The vulnerability assessment carried out by APIK showed how climate disasters originate and impact people, ecosystem, and economy in small islands landscape of Maluku. Linkages between different islands in the province affect how the local economy works and how people live their everyday life, especially in terms of access to essential services. Increasing frequency of extreme weather events can significantly impact travel activities between islands. It can prevent people accessing markets or getting to doctors or hospitals. In the longer run, sea level rise also threatens people who live in low-lying areas.

These transboundary challenges also affect disaster management. For example, some villages of Central Maluku District are located in Ambon Island. Flood and landslide that occur in those villages are often handled ineffectively by the Central Maluku District because their government center is far away in Masohi, Seram Island. In fact, since these villages are in Ambon Island, they are nearer to Ambon City, a different government administration unit. On the other side, when floods and landslides occurred in the villages of Central Maluku in Ambon Island, Ambon City received the impact too. One of the water sources for the local government-owned water utility (PDAM) includes springs located in Central Maluku District and landslides can disrupt water access in Ambon City. In addition, the supply of agricultural products that come from Central Maluku District for Ambon City is often impacted. To help address these issues, APIK collaborated with the TATTs program (a USAID OFDA program for building the capacity of provincial disaster management institutions to improve local DRM policies and practices) to support Maluku Province BPBD in facilitating a review and update of the 2012 version of contingency plans for floods and landslides in Ambon City and Central Maluku District. The scenarios primarily refer to the climate risk and vulnerability assessment facilitated by APIK. APIK was involved in the revised contingency plans preparation.

For broader transboundary issues, APIK worked with Bappeda of Maluku Province to strengthen transboundary cooperation to tackle common issues experienced by multiple cities and districts. In an initial workshop, APIK, Bappeda of Maluku Province, and city and district Bappeda representatives from across the whole province discussed the common issues between neighboring areas. A follow up workshop identified main issues between regions to be inserted in the Strategic Environmental Assessment (known as KLHS) for the Provincial RPJMD. The newly developed RPJMD includes strategies to overcome the impact of hydrometeorological disasters within the Island Cluster system, such as strong winds, tidal waves, heavy rain, storms, floods, landslides and droughts which cause significant human and economic losses.

These discussions have helped local governments, for example Ambon City and Central Maluku District, to collaboratively focus on addressing issues of solid waste management, disaster management, and water resource management. Buru District, South Buru District, and Southeast Maluku District agreed to develop a joint strategy for marine transportation, food security, and water resource management. By acknowledging the identified transboundary issues, Maluku Province Government used these inputs in their development planning to reduce potential losses due to climate change in small islands landscape and strengthening city and district collaboration. APIK encouraged the provincial government to support the cities and districts to form and legalize potential transboundary agreements between them. With clear sharing of resources and responsibilities, transboundary cooperation offers opportunities to solve problems, including conflicts, and capitalize on wider benefits to the local economy and service provision. Through the island cluster system, the local government has bought in to this approach and is committed to move forward with the landscape approach into the future,

INCLUSIVE DISASTER PREPAREDNESS FOR YOUTH

APIK worked together with BPBD of Maluku Province to improve disaster preparedness for school students. Based on discussions with local stakeholders, it was determined that schools are an effective place to spread information in community. In addition, building awareness and understanding of youth on climate and disaster issues is very strategic where back home they will further share what they have learned with their family members.



To engage youth on climate adaptation, APIK and the Maluku Provincial Disaster Risk Reduction Forum held a “Governor Teaching” event for 800 students in Ambon City which was attended by the Maluku Governor in person. APIK also collaborated with BPBD and held a disaster preparedness simulation involving five junior high schools (SMPN 1, 7, 8, 11, and 13) in Ambon City. School Disaster Management Unit was also launched as part of a strategy to institutionalize disaster preparedness and safety in schools. Moreover, APIK supported Maluku Province BPBD for the 2019 Disaster Awareness Day attended by the head of BNPB,

Donny Monardo. In this event school students planted trees as a symbolic act of protecting nature in order to reduce disaster risk. APIK also held disaster management training for students of Junior High School SMP 14 in Hatu in Ambon Island, while in Siri Sori Islam Village of Saparua Island, APIK supported the Islamic Boarding School (MTS) 04 to develop a participatory disaster risk assessment. These activities helped the students and teachers to have a better understanding on what to do during disasters and how to reduce the risk which in turn will strengthen school capacity in disaster preparedness. Examples of improved preparedness include operationalizing SOPs for disaster preparedness with clear individual responsibilities, raise awareness on the types of risks within a specific area and setting up a disaster preparedness team.

With the aim of improving students’ awareness and knowledge in flood disaster management, APIK and BPBD Maluku collaboratively developed and produced communication materials. The communication products consist of handbooks, leaflets, and posters that provide information on what actions can be done to reduce flood risk, also during and after disaster. These materials were disseminated to 20 high schools, 16 elementary schools, and 4 special need schools (locally known as *Sekolah Luar Biasa-SLB*). Children, even more those with special needs, are among the most vulnerable to disasters. They require assistance during emergency because it is often difficult for them to cope with the situation on their own. The development of evacuation plans in schools, or in communities, must consider their particular needs to ensure it is inclusive.

At the university level, APIK delivered basic training on disaster preparedness for students in the University of Pattimura, Ambon. APIK emphasized the importance of having a standard operational procedure for disaster preparedness and response as well as a contingency plan. The university students received information on vulnerability assessment, technology use in disaster management, including GIS and OpenStreetMap application to map disaster prone areas and evacuation routes.

As a result of APIK efforts, BPBD plans to continue to reinforce the foundation that has been built in the schools and universities. The established network between the education institutions and BPBD is expected to lead to improved disaster management and response.

COORDINATING WITH GOVERNMENT TO REPLICATE THE APIK APPROACH

Maluku Province government launched a program called ‘*Dewi Bulan*’ (an acronym for *Desa Wisata Bahari Berkelanjutan* or Sustainable Marine Tourism Village) in November 2018. The program aims to help marine/coastal villages become sustainable through eco-tourism. The program will not only focus on increasing economic income and resilience for the people, but also serves as a way to preserve nature and the ecosystem. One of the criteria for a village to be included in a *Dewi Bulan* Program is having a climate adaptation and disaster management program. Following the *Dewi Bulan* launching, APIK in collaboration with Maluku Province Bappeda delivered a training for staff of Hukurila Village, Ambon City on participatory vulnerability assessment and disaster risk assessment. APIK presented examples of the project activities not only in Maluku but also in other regions. The Head of Hukurila Village was keen to replicate some of the activities demonstrated by APIK, particularly on waste management and sustainable environment protection through village regulations. APIK and Hukurila Village agreed to develop vulnerability assessment and produce adaptation options. The agreement between APIK and Hukurila Village shows good buy-in and good practices from the government for program replication in climate and disaster resilience issue. This also highlights that APIK has become a key partner for the provincial Bappeda when it comes to climate and disaster resilience program development.

Throughout the project, APIK supported important government events at all levels in Maluku. For example, Ambon City Government and APIK conducted a joint activity on the Ambon Bay Coastal Clean-Up Campaign that aimed to protect the bay from plastic waste and reduce the threat of floods in coastal areas. During the campaign, students and communities rallied together collecting and cleaning the trash littering the Ambon bay. At the village level, APIK supported the community group in Soya Village and organized tree planting activity in a landslide prone area within the village. Both the community group and APIK intended to stabilize the sloping terrain and at the same time protect water resources. These events are designed to raise awareness and give concrete examples, so people have more consideration, understanding, and experience in protecting the environment.

APIK in Maluku had an excellent partnership with local government and team members were frequently asked to support government initiatives. For example, the APIK Maluku Governance Specialist was asked to join a delegation of Maluku government to Jakarta to support the finalization of the Environmental Strategic Plan (KLHS) and all costs for the trip were covered by the Maluku government. In addition, the regional manager of APIK in Maluku was invited by the National Disaster Management Agency (BNPB) as a resource person to participate in a workshop on Resilience Scorecard review held in Balikpapan with all costs covered by BNPB. These recognitions show great buy-in from the government and appreciation of the technical support provided by APIK as well as acknowledgement of the project capacity to support government priorities in the region.

UTILIZING LOCAL WISDOM AND CUSTOMARY LAW FOR IMPROVED RESILIENCE

People in Maluku still widely use local wisdom based on natural indicators called *Nanaku*. This practice has been applied in the community for generations. Farmers and fisherfolk use *nanaku* to determine farming and fishing patterns rather than using weather forecasting from BMKG. When a *Salawaku* tree blooms with flowers, a farmer will interpret it as a sign that planting season is coming. When the tide is high than normal, it is a sign for fisherfolk that fish are moving closer to the shoreline. However, with climate change, relying on traditional ways to forecast weather becomes harder. Still, *nanaku* is very important as it preserves cultural and traditional values in the community and these values encourage the community to protect the environment. APIK worked with the community to help upgrade the practice of *nanaku* with science-based information in climate and weather prediction.

To improve weather prediction capacity in the community, APIK identified and recorded the different types of *nanaku* related to seasonal forecasting in six villages (Leihari, Passo, Soya, Hative Besar, Allang, and Negeri Lima). *Nanaku* is not traditionally written down so these records are important. APIK discussed with BMKG office on ways to integrate modern climate weather information into these traditional practices. APIK also consulted with experts and officials from the agriculture, forestry, and fishery sectors on the validity of the *nanaku* and to understand the scientific explanation behind the local wisdom practices. These explanations help people to understand which *nanaku* practices are still relevant and those that are no longer reliable with current situation. The *nanaku* system is now fully documented and aligned with BMKG in Maluku and farmers and fisherfolk received training on how to access BMKG information and now have better knowledge in combining the relevant traditional signs of nature with scientific information.

Still related to local wisdom, there is a customary law related to natural resource management for traditional people of Maluku. This customary law is known as *sasi* and it serves as a tool to regulate management of natural resource so they can be more sustainable. For example, *sasi* dictates when and how often it is allowed for communities to harvest nutmeg, also when the traditional fishing season starts for certain kinds of fish. As a customary law, *sasi* does not have a legal foundation and some people have started to neglect it. From various discussions with local community including customary leaders in the six villages mentioned above, APIK helped in improving and getting *sasi* recognized as a formal village regulation. With this, *sasi* becomes not only applied to traditional/customary people but also people in general. This village regulation helps *sasi* to become a stronger tool in ensuring a sustainable ecosystem for the benefit of local people.

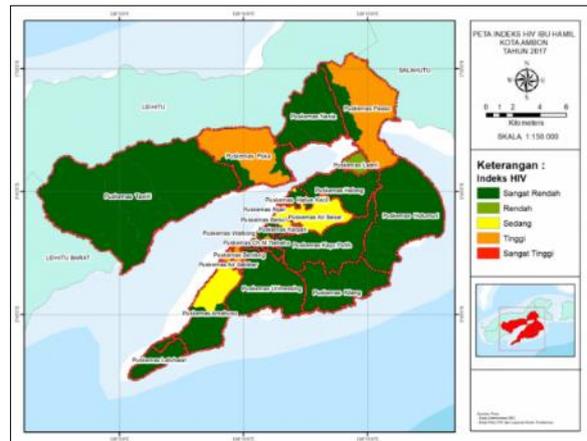
IMPROVING LOCAL CAPACITY IN GIS, SPATIAL MAPPING, AND DATA COLLECTION

APIK identified that there was a need to improve Maluku Government capacity in utilizing spatial data for development. At the same time, APIK learned that the availability of spatial data in local government is very limited and not sufficient to support good planning and decision-making. In addition, a lot of data are not in an editable format. The local government heavily relies on external spatial data providers because a number of government staff who are familiar and capable of managing spatial data is limited as well.

Responding to this issue, APIK led a series of Geographic Information System (GIS) trainings for government agencies in Ambon City, Central Maluku District, and Aru Islands District. Upon completion of the training in Ambon City, the participants agreed to set up an informal GIS forum. This forum consists of people from different government agencies such as development planning, health, disaster management, fisheries, and forestry agencies, and they meet to discuss and share knowledge related to the GIS experience in their offices and support one another in data sharing.

After multiple agencies in Ambon City had participated in the initial GIS training organized by APIK, the city health agency asked APIK to deliver GIS training for their staff so that they can map the malaria transmission area. The training has helped the Ambon health agency to visualize their data into map formats and they said it is easier to present information rather than only relying on texts and tables. In Central Maluku District, the Disaster Management Agency (BPBD) budgeted for and purchased a drone to support mapping activities after they had participated in the training and saw the value of the technology. Central Maluku BPBD has mapped many of their sub-districts after APIK provided technical assistance on the drone usage.

In Aru Islands, APIK conducted two GIS trainings in disaster vulnerability mapping and geo-statistic data processing. APIK also gave support for the agriculture and fisheries agencies in Aru to conduct natural resources mapping around the area and identified the vulnerability and disaster risk for those two agencies. This series of training are fully funded by the local government, while APIK simply provided technical expertise by sending its Maluku GIS Specialist to deliver the training. APIK approaches to using GIS and geospatial data have proven interesting and useful for local governments. By developing geospatial programs, local governments are now able to support and improve government functions in disseminating climate and disaster risks information.



One of the maps produced by Ambon City Health Agency after training

APIK also supported the community in producing maps needed for the community-level disaster risk assessment. The initial map produced in the assessment using participatory process was only a simple sketch. In order to convert the map into digital version that is more comprehensive and accurate, APIK provided GIS mapping training for community groups in Haruku, Wassu, Ihamahu, Siri-Sori Islam, and Ameth. The participants learned to perform digitization so they become familiar to work with spatial data and moreover can update their village map by relying on internal resources. The map in the village is now able to show border areas, disaster prone areas, and natural resource locations useful for adaptation efforts in water sources, agricultural land, potential tourism, and other areas.



Disaster prone locations in Haruku are mapped and the information is accessible for local community

APIK also introduced the use of *OpenStreetMap* to village representatives and government agencies as a supporting tool in mapping, especially at the village level. The availability of a village map can support the acceleration of development in the village. Through the village map, visual information on the spatial/territory of a village can be used as a means of coordination, monitoring, and evaluation of village and rural area development. The village map also includes the information on adaptation actions and enables to integrate it into the village information platform *Sistem Informasi Desa* (Village Information System). Through the mapping, the integration of climate and disaster resilience into the village development process can occur systematically and be institutionalized. The climate resilience mapping platform for Maluku is available on <https://openstreetmap.id/apik-maluku/>

By optimizing the use of more reliable spatial data in development planning, government officials have more information to help them in decision making and planning. It also improves government functions in disseminating information to the public. GIS helped them in determining areas with inadequate public services and infrastructure and provides basic solutions on urban planning related with climate impacts.

In addition to improving local capacity in data collection and processing, APIK conducted *KoBoCollect* training for Central Maluku BPBD. *KoBoCollect* is an android-based system used for primary data collection. With the application, government officials can enter data from interviews or other primary

data sources, both online and offline without using printed forms. With this application, BPBD staff are able to update the disaster data more efficiently during emergency response.

STRENGTHENING COMMUNITY RESILIENCE

Based on the climate disaster risks assessment and resilience action plan developed at village level, APIK and the community identified climate adaptation actions that can be implemented to strengthen community resilience. The implementation, at the same time, became an opportunity to showcase what climate adaptation looks like for local government and communities.

Solar dryer installation is a good example of how APIK initiatives secured the nutmeg and clove production that is a source of living for many people in Maluku. Higher and more unpredictable precipitation impacts the nutmeg and cloves drying process. Drying is a key factor in these commodities production because nutmeg and cloves with less water content will have higher price in the market and less susceptible to fungal diseases. In general, farmers in villages of Maluku spread the nutmeg and cloves outside under direct sunlight on cement, floors, rooftops, or mats for drying. With extreme weather, this traditional drying process becomes interrupted. APIK's support in providing solar dryer started in Morella Village as a result of a private sector partnership with PT Pertamina TBBM Wayame. An MoU was signed between PT Pertamina and the Morella Village government with APIK as a counter signatory in an advisory role. PT Pertamina agreed to support Morella through their corporate social responsibility (CSR) program to help the village address climate and weather-related challenges. From this partnership, 20 solar dryers and a nursery for seedlings and saplings of both nutmeg, clove, and fruit trees were provided to Morella Village. The Morella farmers also received grafting training to help improve production. Based on the feedback from people in Morella and the benefit of the solar dryers, APIK then installed 40 solar dryers in Allang, Negeri Lima, and Hative Besar Village as these villages also faced similar challenges based on the climate and disaster risk assessment. Solar dryers make the drying process quicker and more hygienic. It improves the crop's quality and henceforth ensure good selling price.

In Haruku and Ameth Village, Central Maluku District, APIK introduced permaculture to the local community. In the case of Haruku and Ameth, a training on permaculture was conducted that focused on improved horticulture techniques in household gardens so that they can grow vegetables and create a more sustainable living. During the wet season it is hard for these communities to access vegetables as mostly they come from Ambon Island by speed boat and often for days at a time the boats are not able to travel because of stormy weather. By growing food in their own backyard, people in Haruku and Ameth create a safety net for them when sea transportation is inaccessible. When Maluku was hit by a 6.5 magnitude earthquake in September 2019, Haruku was severely impacted with 393 houses damaged and around 3,712 people evacuated to the hills above the village. The communities that implemented permaculture stated that they gained benefit by having a supply of vegetables from their backyard because boat drivers that usually travel for food and logistic supplies chose to stay on land for a few days for fear of a tsunami.



Located in Saparua Island, Central Maluku District, Siri-Sori Islam Village has limited water resources and this lack of water which was worsening over time with a longer dry season causing drought, was causing many farmers to give up agriculture and switch to daily labor. In order to help people in Siri-Sori Islam

Village when facing prolonged drought, APIK worked with farmers to help improve water access so they can restart growing vegetables. APIK provided the community with a communal water tank and installed a water pump to pump water from the nearest spring in the valley up to the tank from where it is gravity fed to the farmers fields. This system is benefitting 15 farmers who have now started planting and growing vegetables on their land again. The buy-in from the community is a good indicator of sustainability and this initiative is addressing real needs of them.

CLIMATE AND WEATHER INFORMATION SYSTEM (CWIS) DISPLAY FOR SMALL ISLANDS



The economy of Maluku relies heavily on small scale fisheries. Most fisherfolk use small boats and travel far out to sea to catch fish, however, with climate change causing shifting seasons and invalidating traditional means of weather forecasting plus more extreme weather events there is now more risk for these fisherfolk of getting caught in a big storm while at sea in a small boat.

Although climate and weather information from the Meteorological, Climatological, and Geophysical Agency (BMKG) is available and disseminated through various channels, information such as maritime forecasts are still not widely accessed or understood by fisherfolk who are the end users that need this information the most. Trying to bridge this gap, USAID APIK collaborated with BMKG to organize Climate Field Schools (CFS) for coastal communities. The CFS aimed to increase capacity and access to climate and weather information (CWI) with a focus on maritime weather forecasting. The CFS for fisherfolk was developed by BMKG and has been carried out in various locations across the country since 2012. The original concept was then adapted by APIK in partnership with BMKG, with additional curricula on basic knowledge about climate change. During the CFS, resource persons from BMKG and APIK shared knowledge about types of weather forecast, how to read maritime weather forecast components such as wave height, wind speed, wind direction, and strength of oceanic currents. Participants also learned about the types of weather products available from BMKG and how to access them. Moreover, participants also practiced how to teach others about weather information and make the information easy to understand.

To help improve safety for fisherfolk and also people that frequently travel from island to island APIK worked with BMKG to install electronic climate and weather information displays in Haruku, Wassu, and Ameth Village, Central Maluku District. The displays are connected to the internet, run real-time maritime and general weather information, and are designed to be appropriate for each village context. The display in Haruku uses a smart TV and is placed in the harbor, the one in Ameth also uses smart TV but it is located in front of the village office. Since Wassu often experiences problem in electricity supply, the display in Wassu is using LED display supported by solar panel and installed in front of the village office. The displays provide a weather forecast for three days and also emit warnings if there is a storm approaching. The information displayed includes rainfall, storm prediction, wave height, and wind direction. The displays also provide a warning in the event of an earthquake and potential tsunami. The displays are directly linked to the BMKG server as the source of weather information.

With the displays installed, fisherfolk and boat drivers are able to make informed decisions when to go to sea. The information is also useful for farmers because they know the best time to plant or to dry their clove and nutmeg harvest. APIK also provided training to the village disaster preparedness teams on how to troubleshoot and maintain the CWI device and how to read the information in the display.

To ensure the display operational and maintenance, the village government has also defined roles and responsibilities and allocated resources from the village fund for the ongoing maintenance of the system.

BUILDING RESILIENCE IN ARU ISLANDS DISTRICT



Following the completed VA, APIK led field survey to identify water resource in Durjella Village, Aru Islands District.

Aru islands are in a remote location very far from Ambon and unfortunately, as a result, have received very little support from the provincial government or development organizations. Given the challenges and expense accessing Aru Islands, APIK just carried out a few initial priority actions and focused on building local capacity on building resilience.

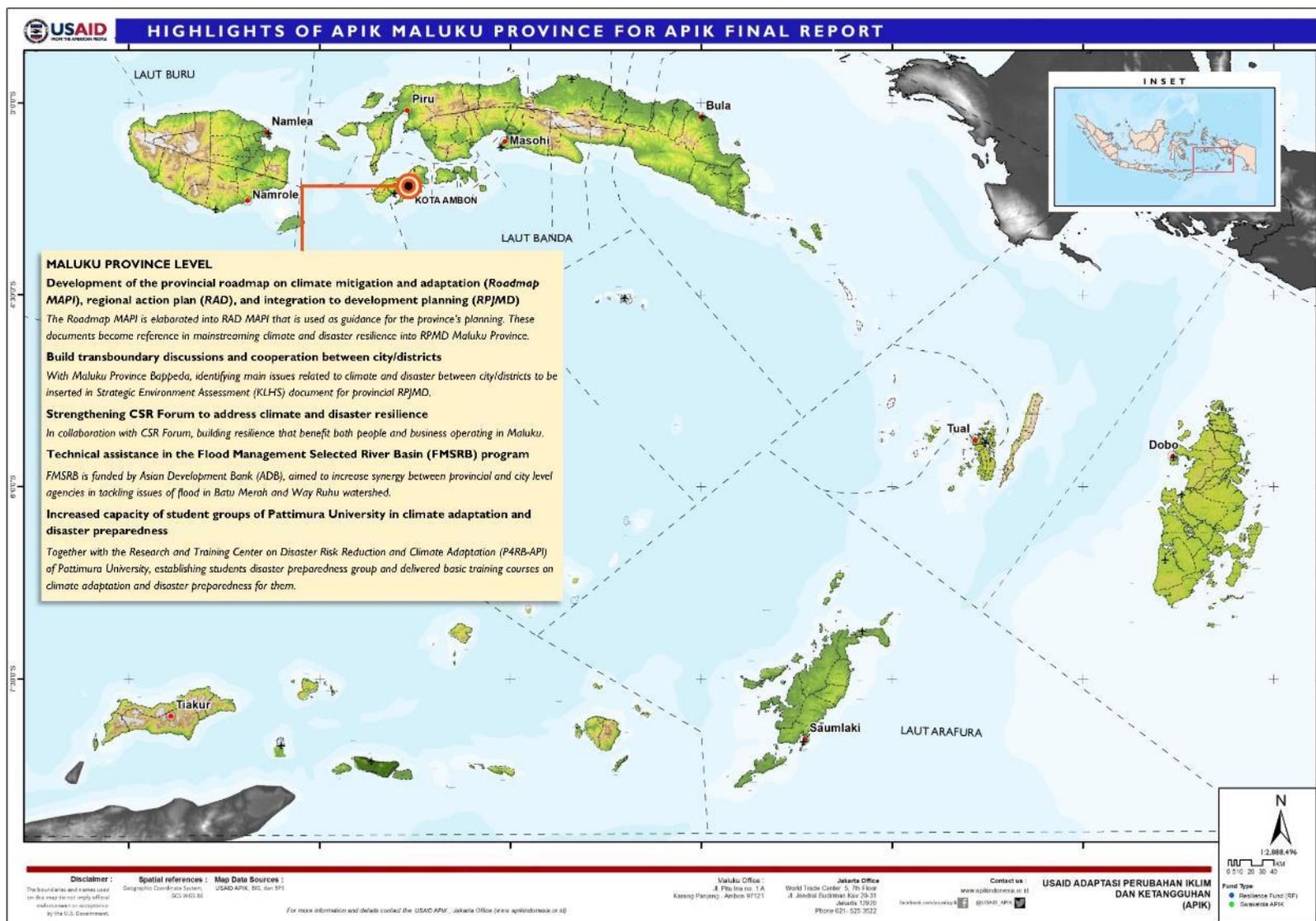
The islands are predominantly flat and swampy with limited freshwater and very few rocks. The lack of rocks means villagers harvest coral and sand for building materials. This leads to increased coastal erosion as the protection afforded by the coral reef is drastically reduced, particularly in Wamar Island, where the district's capital, Dobo, is located. There is also a problem with saltwater intrusion into drinking water sources as a result of the coastal erosion. The people of Aru islands are seeing these issues get much worse over time and the Bupati (District Head) of Aru was keen for APIK to work with the district government to address potential climate and weather-related disasters and build community resilience.

The first step was completing the vulnerability assessment (VA) for Aru Islands District. This is the first time the District had a VA. Like in other APIK working areas, the VA in Aru was done through a participatory process involving local government and other stakeholders. In addition, Ibu Ian from Maluku Province BPBD was one of the main facilitators of the VA. The VA indicated that the district is particularly vulnerable to climate risk in six main sectors namely: fisheries, agriculture, marine transportation, water, infrastructure, and settlement. The VA detailed recommendations and adaptation actions for the local government which have now been included in the local government development plans and budgets.

After conducting a series of training sessions on climate and weather literacy in Aru Islands, APIK installed an automatic rain gauge (ARG) as the local government wanted to start collecting better climate and weather information to improve decision making. The ARG becomes the first device in Aru that can support the government in collecting rainfall data. This responds to the water management issue in Aru which experiences localized flooding during wet season and water shortage during dry season. In relation to water issue, APIK conducted survey in Durjela Village, Wamar Island as the village has suffered from an aging and overburdened water supply system that mainly depends on ground water resource with average 7-8-meter deep that is highly prone to seawater intrusion. The result of this survey became inputs to Durjela's planning and budgeting document so that they can better protect their water source and the water catchment area.

As a follow up of the VA, APIK also installed a climate weather information display in Durjela Village to improve marine safety. The CWI display is placed in the village hall so everyone can access it. Village officials and community members received training, so they understand how to read the information as well as handle simple technical glitches and maintain the device. Real time weather information as well as three-day forecast provided by BMKG can help fisherfolk and farmers in their livelihood activities. APIK also provided the community with solar dryers to help them with drying seaweed which is one of the main income sources other than fishing and small-scale farming.

Exhibit II: Map Detailing Activities in Maluku Province





MoU signing between Pertamina, community group in Morella Village, Central Maluku, and APIK (top); Female farmer group in Batu City helped community to improve food security (middle); Gallery exhibition during APIK closing event in Jakarta (bottom)

SECTION 4: CROSS-CUTTING

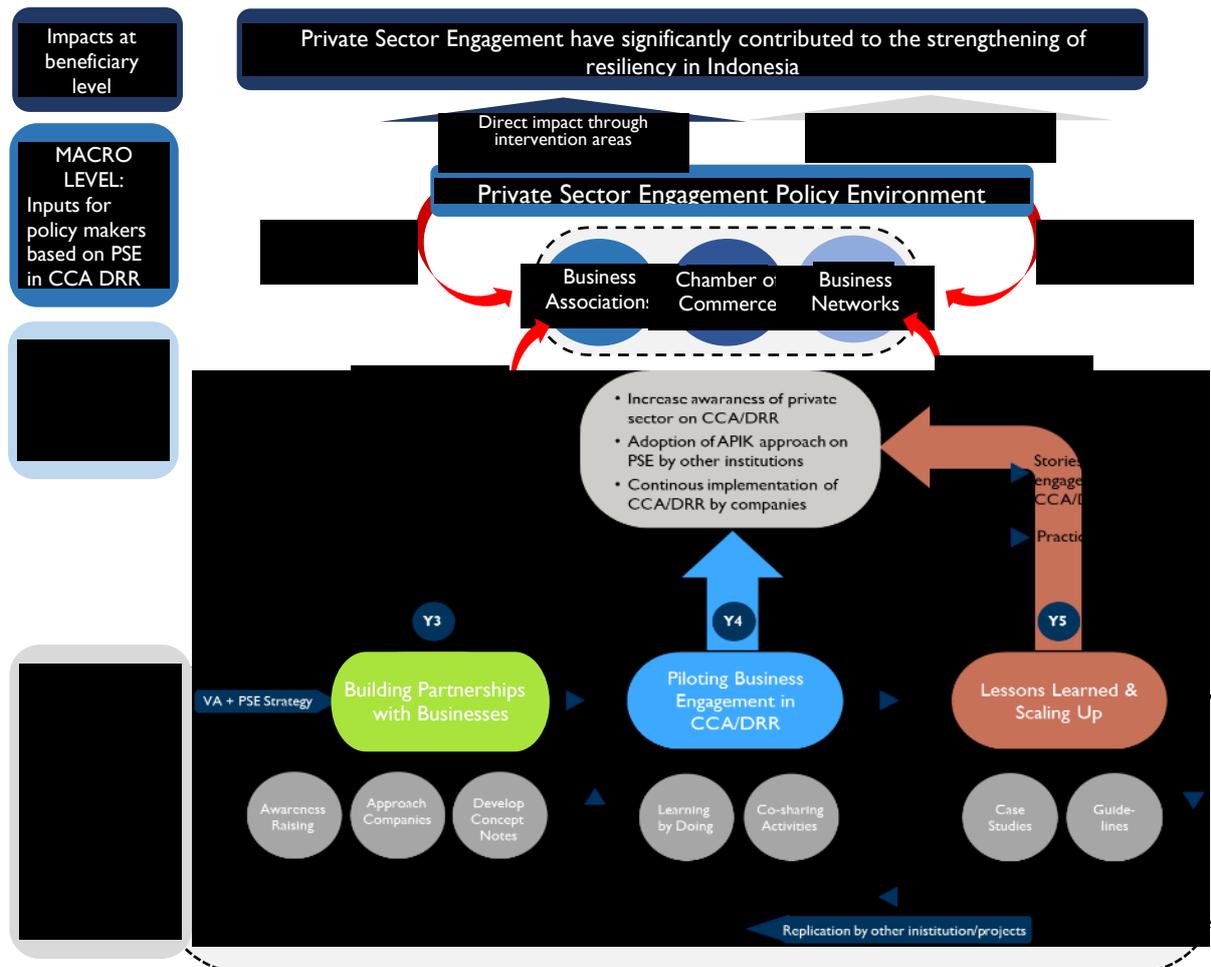
SUMMARY

In this section, we present the crosscutting initiatives that supported the implementation of technical tasks and activities at national and subnational levels. The report is organized under the following focus areas: private sector engagement, resilience fund, gender mainstreaming, and communication-knowledge management.

PRIVATE SECTOR ENGAGEMENT

One of the core strategies of APIK was to engage the private sector in order to identify areas to work together on community resilience whilst also improving the long-term viability of the business in the context of climate change and natural disasters. Climate change and natural disasters can impact the sustainability of businesses with regards to their supply chains, access to markets, workforce and also damage to physical assets. The concept of shared value partnerships for resilience is to identify win-win situations where community resilience is enhanced and also there is a long-term benefit to the business. In addition, through sharing knowledge and best practices, successful private sector engagement for climate adaptation will ideally catalyze greater investment in climate-resilient actions by other businesses in multiple sectors. Exhibit 12 below details the methodology used by APIK for engaging with businesses.

Exhibit 12: Private Sector Engagement (PSE) approach in APIK Project



Source: USAID APIK

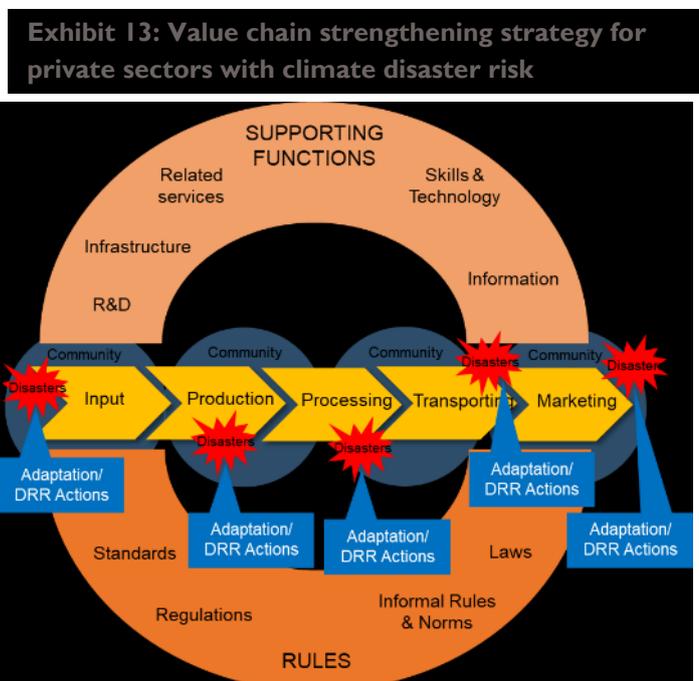
APIK employed the following approaches to working with the private sector in Indonesia:

1. **Strengthening capacity and awareness** of businesses regarding climate and disaster risk, including potential economic impact and future risks.
2. Working with the business to **analyze their value chain** and identify areas where there could be a current or future risk as a result of climate change or natural disasters.
3. **Co-design initiatives** with the business and community to address the risks identified in step 2 above. These initiatives would then be implemented as pilot models and the impact on the resilience of the community as well as the business assessed.
4. **Publicize and share information** on successful partnerships to encourage more businesses to engage in resilience building activities.

The APIK PSE approach provided examples of local adaptation actions and evidence from the field to be used as inputs for policy making and strengthening of businesses in Indonesia. The learnings from the work with vulnerable sectors/sub-sectors both for companies and decision makers contribute to an **enabling environment for private sector engagement with** the aim of facilitating more strategic investments from businesses for **Climate and Disaster Resilience** in Indonesia (please see Exhibit 12).

APIK pushed for a paradigm shift within businesses, to transform social and environmental investment strategies from corporate social responsibility (CSR) (which tend to be short term projects implemented from more of a philanthropic perspective) to corporate shared values (CSV) which are generally funded from core business budgets and have a direct impact on business sustainability. With CSV, APIK advocates for business partners to allocate their resources (knowledge, technology, skills) to support resilience building in the community that are impacted by their business operations or involved within their supply chain.

As an engagement strategy, APIK conducted mapping and identification of the main business activities within the value chain that are vulnerable to climate and disaster risk. To provide the scientific basis for the engagement APIK used the vulnerability assessments and climate and weather projections produced through the project. The data and information from these assessment documents helped APIK make the case to businesses and support them in helping make their business operations more resilient. APIK then produced a concept note together with the businesses as a basis of the partnership. Following the partnership, APIK then engaged the private sectors in implementing the climate adaptation pilot activities.



BUSINESS PERCEPTION SURVEY

APIK conducted a Business Perception Survey of 15 companies (10 in Jakarta, 5 at sub-national level) to get a fundamental understanding of the private sector perception with regard to climate change and

weather-related disasters. The survey was conducted at the end of PY 2 in order to assess awareness and knowledge of climate and disaster impact within their business operations. APIK used this as a baseline to develop the strategy for private sector engagement.

At the end of the project APIK conducted an end line survey of the 15 businesses that were part of the business perception survey to measure the change in their awareness with regards to the impact of climate change and weather-related disasters to their businesses. The summary of survey findings can be seen in the table below:

Table 5: Summary of Business Perception Survey Findings

<i>Knowledge about climate change</i>	Based on the survey, all respondents (15) demonstrated an increase in awareness regarding climate impact and natural disasters.
<i>Awareness on the impact of climate change to the businesses</i>	The companies surveyed stated that they are now aware of the impact of climate change on their businesses. Based on the survey the most common climate impact on their business (12 out of 15 companies) was an increase in temperature.
<i>Company readiness to adapt to climate risks</i>	Eleven out of the 15 respondents that were involved in APIK’s activities (workshops, meetings, trainings) informed the project that their company is now more ready to adapt to climate risks (37.5% increase from baseline). And 10 out of 15 respondents stated that their company have already, or are planning to, develop a climate adaptation strategy.
<i>Adaptation and/or mitigation actions implemented by companies</i>	There is a significant increase in the number of companies (40%) who are investing in ecosystem, watershed, and other natural sources as part of their mitigation and adaptation plan to climate change. The end line also showed that 9 out of 15 companies are already preparing their business continuity plan and are integrating climate and disaster impact in the plan.

This survey confirmed that of the 15 businesses **there is a gradual change in the awareness of the private sector** with regards to the climate change and its impact to their businesses. **Creating awareness, promoting enabling policies and facilitating access to climate and weather information is still an important agenda beyond the APIK Project.** Business networks/associations could be agents of change to scaling up the experiences and lessons learned from private engagement in APIK.

APIK PARTNERSHIPS WITH BUSINESSES

During the project period, APIK engaged with 13 businesses from several sectors (i.e. agriculture, water, poultry, finance & insurance). While the initial investment from these businesses was limited, the financial impact on the local economy through for example, improved productivity and improved access to markets, is expected to be around US\$ 9,337,723 over the coming five years. The partnerships with businesses reached 8,716 people in communities who have directly benefited from the project activities. A factsheet with recap of PSE activities and results can be found in **Annex K**.

Table 6: APIK Private Sector Engagement Summary

NO	COMPANY	CLIMATE ADAPTATION ACTION	COLLABORATION	RESULTS
1	Bank Sultra, PT 	Piloting climate smart corn agriculture. Locations: South Konawe District, Southeast Sulawesi Province	<ul style="list-style-type: none"> Climate field school Guidance on climate smart corn agriculture 	<ul style="list-style-type: none"> Increased corn productivity Replication of good agriculture practices by other corn farmers in South Konawe
2	ACA Insurance, PT 	Beneficiaries: Farmer group in Laeya Sub-district, South Konawe Value of partnership: US\$ 4,6 million		
3	Syngenta Indonesia, PT 			
4	Cargill Indonesia, PT 	Strengthening egg layer chicken farmer's capacity in dealing with climate impacts through piloting of climate smart chicken shed.	<ul style="list-style-type: none"> Development of climate smart chicken shed Provision of learning center Module on poultry farm management 	<ul style="list-style-type: none"> Increased egg production and quality Decreased chicken death rate Efficiency of cost (feed, water, labor) Improved comfort and health for labor at work
5	Paguyuban Peternak Rakyat Nasional (PPRN) Blitar 	Location: Blitar District, East Java Province Beneficiaries: PPRN members and layer chicken farmer in Blitar District Value of partnership: US\$ 3,7 million		
6	PT Kalla Kakao Industri (Sultra) 	Capacity building for field staff and farmer partners on climate and weather information, also adaptation in cultivated land. Location: South Konawe District, Southeast Sulawesi Province Beneficiaries: Field staff of PT KKI and cacao farmers that becomes the company partner Value of partnership: US\$ 840,000	<ul style="list-style-type: none"> Climate field school Training of Trainer (ToT) for field staff and farmers group 	<ul style="list-style-type: none"> Improved knowledge of PT KKI field staff about climate and weather information Increased cacao production that lead to increased supplies from farmer to PT KKI
7	Yayasan Sahabat Multi Bintang (YSMB) 	Facilitating climate adaptation participatory planning to reduce impact of hydrometeorology disaster (flooding and landslide) in Pacet Landscape. Location: Mojokerto District, East Java Province Beneficiaries: Local community in four villages (Pacet, Claket, Kemiri, and Padusan) Value of partnership: US\$ 95,836	<ul style="list-style-type: none"> Participatory vulnerability assessment in four villages of Pacet Sub-district 	<ul style="list-style-type: none"> Completing Vulnerability assessment for four villages. Supporting community and YSMB in formulating climate adaptation action (development of bamboo village)
8	PT Pertamina TBBM Wayame, Ambon 	Strengthening cloves and nutmeg farmers through simple-low carbon-technology. Location: Morella Village, Ambon City, Maluku Province Beneficiaries: Cloves and nutmeg farmers, Morella community group Value of partnership: US\$ 43,396	<ul style="list-style-type: none"> Provision of solar dryer and seedlings nursery Grafting training on cloves, nutmeg, and fruit plants 	<ul style="list-style-type: none"> Improved cloves and nutmeg quality Ensured availability of cloves and nutmeg seedlings at the local level
9	PT Pertamina TBBM Kendari 	Strengthening community capacity towards flood through community-based waste management. Location: Kampung Salo Village, Kendari City, Southeast Sulawesi Province Beneficiaries: Disaster Preparedness Group (DPT) and community of Kampung Salo, Kendari City	<ul style="list-style-type: none"> Provision of information about waste bank Training on waste management and provision of supporting tools 	<ul style="list-style-type: none"> Decreased amount of waste in river area Creating new business opportunity for the community

LESSONS LEARNED AND RECOMMENDATIONS FOR PRIVATE SECTOR ENGAGEMENT

- Companies are not willing to invest large amounts of funding for adaptation actions to reduce the impact of weather-related disasters to their businesses if it has not first been tested and proven to be effective. The priority for the businesses is **to see the benefit and return of investment from their money spent on climate resilience actions**. It takes quite some time for businesses to commit to investment on climate resilience actions.

***Recommendation:** Having a multi-stakeholder partnership (government-private sector-donor) to initiate pilot projects in climate adaptation is an advantage, the multi stakeholder's partnership helped to ensure the best practices and can be replicated by other business actors. Ensuring there are shareable lessons learned helps get other businesses interested.*

- **Corporate social responsibility programs can provide a valid entry point** for the businesses to address climate change, especially when it comes to supporting community resilience. **CSR could also be a window to see the benefit from climate resilience actions** for their business operations, and gradually shift forward beyond CSR (i.e. to the CSV approach) to achieve greater benefits for the businesses and local community.

***Recommendation:** There is a need for incentive schemes for companies that perform climate adaptation and/or contribute to resilience building in the community. This could be coordinated by National Government and the Chamber of Commerce (KADIN).*

- To encourage more businesses to engage in the implementation of climate resilience activities, more scientific data and research on specific sectors or sub-sectors is needed. **Relevant scientific data can be a powerful tool** to convince private actors to act and strengthen climate resilience beyond business as usual. Beside budget limitations, companies still have limited capacity on the implementation of climate resilience due to the lack of capacity and lack of data toward climate risk in their sector.

***Recommendation:** Indonesian Government should provide more accessible climate and weather information and encourage sector specific scientific based assessments related to climate impact. This will help businesses with the decision-making process. A coordination platform can help to facilitate dialogue between the government and private sector on this climate and disaster resilience issue.*

RESILIENCE FUND

The APIK Resilience Fund provided the project with a flexible tool for encouraging and enlisting the participation and collaboration of local non-governmental organizations and private sector entities in project-supported activities. By using this resource, APIK was able to leverage technical expertise and resources to achieve task outputs and outcomes. The Resilience Fund supports NGO's and businesses, to conduct activities that help anticipate and/or respond to weather-related disasters or climate impact at all levels— national, provincial, city/district, and community. APIK's strategy was to utilize the Resilience Fund to support diverse partners to develop innovative new products and services, actions and co-investments by NGOs and private businesses with local governments and local communities in climate and disaster risk-reduction measures. As the resilience fund is an integral part of sub national activities, the specific information about Resilience Fund activities in each region is embedded in the regional chapters. An important aspect of the Resilience Fund was to build the capacity of local NGOs and CSOs to implement climate and disaster resilience projects in the future. To this end technical

and administrative training was provided to all participant organizations. The summary of all the grants is included below in Table 7, while the executive summary on the Resilience Fund activities is available in **Annex L**.

Table 7: Summary of Resilience Fund Grants in APIK

NO	GRANTEES	WORKING AREA	ACTIVITY
1	Yayasan PATTIRO <i>Timeline: July 20, 2016 to March 29, 2017</i>	East Java Province Malang District: Gajahrejo, Sumberagung, Ngabab, Ngroto, Karangsari, Wonokerto Village	Mainstreaming of climate impact adaption and disaster risk reduction in village's budget and planning documents.
2	Halu Oleo University Research Institution (LPPM UHO) <i>Timeline: August 10, 2016 to April 10, 2017</i>	Southeast Sulawesi Province South Konawe District: Tanjung Tiram, Puasana, Lallowaru, Wawatu Village	Improving sustainable fisheries through integration of shallow Fish Aggregating Devices (FADs) and bio-reef technology installation to improve livelihood and conservation.
3	Yayasan Walang Perempuan <i>Timeline: May 16, 2017 to October 30, 2018</i>	Maluku Province Ambon City: Leahari, Passo, Soya, Hative Besar Village Central Maluku District: Allang, Negeri Lima Village	Aligning local wisdom (<i>Nanaku</i> and <i>Sasi</i>) with climate and weather forecast produced by BMKG.
4	Yayasan PATTIRO <i>Timeline: June 16, 2017 to August 15, 2018</i>	East Java Province Blitar District: Semen, Sutojayan Village	Improve community and local government resilience in disaster impact (flood and landslide), and improving their capacity and access to climate and weather information services.
5	Destructive Fishing Watch (DFW) Indonesia <i>Timeline: August 25, 2017 to December 24, 2018</i>	Southeast Sulawesi Province South Konawe District: Rumba-rumba, Awunio, Batujaya Village	Building community resilience towards climate and disaster impact, integrating climate and disaster adaptation in village planning and budget, improving mangrove ecosystem and seaweed farming

NO	GRANTEES	WORKING AREA	ACTIVITY
6	Lembaga Pengembangan Masyarakat Pesisir dan Pedalaman (LePMIL) <i>Timeline: August 23, 2017 to January 22, 2019</i>	Southeast Sulawesi Province South Konawe District: Matawolasi, Lamokula Village Kendari City: Poasia, Baruga, Lapulu Village	Rehabilitate Wanggu Watershed and improve its management to reduce flood and landslide risk through social forestry and collaboration of key stakeholders using a landscape approach.
7	Pusat Kajian Teknologi Terapan (PKTT) Fakultas Teknik dan Ilmu Komputer (PTIKA), Yayasan Perguruan Tinggi Islam Raden Rahmat (YPTI), Universitas Islam Raden Rahmat (UNIRA) <i>Timeline: March 5 to November 5, 2018</i>	East Java Province Batu District: Sumberbrantas, Tulungrejo Village	Implementing conservation agriculture through chayote farming and dripping irrigation method as farmers adaptation effort to climate impact and maintaining landscape condition and land use.
8	PATTIRO Malang <i>Timeline: April 9 to November 9, 2018</i>	East Java Province Malang District: Sitarjo, Sukodono Village	Mainstreaming climate and disaster resilience through reducing flood risk in Sitarjo Village through EWS installation and improving coffee good practice agriculture to improves productivity in Sukodono Village.
9	Wahana Edukasi Harapan Alam Semesta (WEHASTA) <i>Timeline: August 10, 2018 to December 9, 2019</i>	East Java Province Mojokerto District: Banyulegi Village Jombang District: Plabuhan, Purisemanding, Bangsri Village	Developing rain water harvesting (RWH) units as a measures to reduce the vulnerability throughout drought and build community climate resilience.
10	Lembaga Partisipasi Pembangunan Masyarakat (LPPM) Maluku	Maluku Province Central Maluku District: Haruku, Wassu, Ameth Village	Providing weather and climate information display and introducing permaculture method as climate adaptation actions.

NO	GRANTEES	WORKING AREA	ACTIVITY
	<i>Timeline: August 6, 2018 to November 5, 2019</i>		
11	Perkumpulan Sulawesi Institute (SI)	Southeast Sulawesi Province South Konawe: Roraya, Bungin Permai, Laeya, Sambuli Village	Farming integration system implementation as a strategy for strengthening community livelihood.
	<i>Timeline: October 15, 2018 to October 14, 2019</i>		
12	Yayasan Walang Perempuan	Maluku Province Central Maluku District: Ihamahu, Siri Sori Islam Village	Improving community resilience against climate impact through sustainable livelihoods through permaculture and improving water access during drought.
	<i>Timeline: May 21, 2019 to December 13, 2019</i>		

In addition to the grants scheme, APIK also channeled funds through subcontracts on three occasions. APIK assigned subcontractors to perform specific tasks that were part of a larger activity, that cannot be handled internally and require specific technical capabilities. The list of subcontractors and activities can be seen below:

- Subcontract to CV. Buana Karya Mandiri (Aplikasi Cerdas Indonesia-ACI) on development of an EWS for Kalikatur river, Mojokerto District. Buana Karya Mandiri was responsible for developing the EWS components including ARG and AWLR. They also provided training to the KSB on how to maintain and manage the system.
- Subcontract to CV Alphamas on development of EWS for Panguluran river, Malang District (October 2018 to September 2019). Alphamas was responsible for developing the EWS components including rainfall sensor and water level gauge sensor.
- Subcontract to PT Prabatech on development of CWIS display for Wassu Village, Central Maluku District and Bungin Permai Village, South Konawe District (October 2018 to September 2019). Prabatech was responsible for developing and installing the device.
- Subcontract to Yayasan Sitas Desa on bamboo planting for erosion and sedimentation reduction in Bogel River, Blitar District (October to December 2019). Sitas Desa was mainly responsible for land preparation and labor mobilization for the bamboo planting.

GENDER MAINSTREAMING

In order to truly build resilience in communities it is essential that all strategies and actions are inclusive and a big part of this is ensuring that gender is taken into account from design to implementation to monitoring. APIK started its gender mainstreaming activities by carrying out a gender assessment in each region to understand local cultural differences with regard to gender and how best to design context specific gender integration activities. At the national level, APIK in its early stage also organized

an FGD involving various ministries, agencies, CSOs, and academics to map opportunities and constraints in enhancing women’s participation in climate resilience. Based on the assessment, APIK found that the great diversity of cultures and social structures in communities shapes gender inequalities in a variety of ways. Therefore, there is no single approach to gender mainstreaming in Indonesia and APIK conducted gender mainstreaming activities by contextualizing the gender issues in each region.

INTEGRATING GENDER ISSUES INTO GOVERNMENT DEVELOPMENT PLANNING AND BUDGETING

At the regional level, APIK pushed for gender responsive budget initiatives in order to support the government with budgets that specifically address gender inequalities. APIK conducted gender budget training to raise awareness and identify opportunities to ensure that government budgeted activities considered the role of women in building resilience and build capacity on how to integrate gender within their current budget documents. This activity resulted in a gender budget statement (GBS) for government agencies. APIK followed up with each agency to ensure they started to include gender responsive activities in their budgets. The table below highlights gender activities that are funded through local governments as a result of APIK support.

Table 8: Gender Budget Statement

GOVERNMENT ORGANIZATIONS		NOTES
Batu City Food Security Agency		Support the budget allocation to women’s group in food production sector as well as family income generating through permaculture.
Batu City Agricultural Agency		Support the agency in allocating budget to female farmers in organic farming, crop protection, and climate field schools for vegetable production
Maluku Province Disaster Management Agency		Ensuring budget for the needs of vulnerable groups (women, elderly and children) in emergency shelters.
Ambon City Agriculture Agency		Fund Climate Field School specifically for female farmers.
Kendari City Environment and Forestry Agency		Improving women’s access and participation in Waste management activity at community level.
Kendari City Farming Agency		Conducting capacity building activity for female farmers
Total		

APIK efforts in integrating climate resilience into development planning at the community level, has been acknowledged by the Ministry of Women Empowerment and Child Protection (MoWECP/KPPPA). The ministry has selected a village in APIK’s working area, Sitarjo, as a pilot area

and as a result are providing technical support to develop the village mid-term development plan (RPJMDes) to ensure gender mainstreaming is included in community-based environmental management. The selection shows KPPPA eagerness to replicate APIK's achievements.

ENGAGEMENT WITH GOVERNMENT GENDER PRIORITIES AND INTERNATIONAL EVENTS

In partnership with the KPPPA, APIK developed a module on gender mainstreaming in climate adaptation policy. APIK intervention to the female farmer group, KWT Berkah Mandiri, in Batu City was recognized by KPPPA as a good example of how female farmers are able to organize themselves and improve agricultural products to support their livelihoods. KPPPA has visited KWT Berkah Mandiri to gather lessons learned and share these at a climate resilience training in cooperation with Colombo Plan Secretariat.

KPPPA also invited APIK to share broader lessons learned and best practices on gender mainstreaming in resilience programming to the Colombo Plan Secretariat. APIK presented its approach to gender mainstreaming and program achievements to the participants from Vietnam, Pakistan, Sri Lanka, and Fiji, during the Colombo Plan Secretariat event that took place on November 13, 2018 in Malang.

In addition, APIK also worked together with KPPPA to support the need of RAN-API in ensuring gender was integrated in the four main priority areas: marine and fisheries, health, water, and agriculture. After several workshops, APIK, KPPPA, and RAN-API agreed on forming gender guidelines as a first step in creating a more rigid gender indicator for RAN-API. The latest FGD in October 2019 has resulted in some recommendations related to gender mainstreaming to be included in the new version of RAN-API. This also aligns with UNFCCC mandate that Indonesia should develop a gender action plan (GAP) in order to advance women's meaningful participation and promote gender-responsive climate policy and implementation. The revised RAN-API / NAP document was presented at COP 25 in Madrid and already includes very broad gender best practices and guidelines within the documents, especially in the Health Sector, namely: a) Considering gender within loss and damage calculations and b) Ensuring there are specific interventions with regards to gender and inclusivity.

APIK WOMEN CHAMPIONS

Cici's Story: Village Resilience Champion

Siti Nahda Maasily, also known as Cici, is a young woman that previously had no involvement in development planning in her village. She said that as far as she was aware women were rarely, if ever, involved in the preparation of development plans. Through her involvement in the APIK project, she has now actively engaged in the process of development planning, particularly, the Village Mid-Term Development Plan (RPJMDes). In addition, she had the opportunity to facilitate a meeting to prepare the RPJMDes, and as a result she began to speak in public with more confidence. She also became involved in the use of new technology such as the solar dryer as a drying solution during the rainy season. "This technology is advantageous for women who are usually in charge of drying harvests," she said. She also highlighted that the role of women in her village is now becoming more active and respected.



Nyariwati's Story: From family to community

Nyariwati is a housewife from Sutojayan Village, Blitar District. She is a member of the Sutojayan Disaster Risk Reduction Forum (Forum PRB). Since joining the Forum PRB, she stated that she has gained a lot of knowledge related to disaster management and disaster-prone areas within her neighborhood. As a result, she became much more prepared to face the floods - a threat that often occurs in the area where she lives. When it starts raining, she always monitors the situation through the information shared in their local WhatsApp group. When raining, she monitors the conditions in the upstream area above the village. If it rains for more than two hours, she immediately notifies the other members of the group. She has a pre-packed bag including important documents and valuables, so that if there is a flood, she can immediately carry it all safely. "I practice the [preparedness] that I learned in the forum within my family. I also conveyed it to neighbors around me to be prepared and be more aware of the floods."



Romlah's Story: Climate and Weather Information Village Expert

Romlah is a farmer from Baruga Village, Kendari City. Prior to APIK intervention, she admitted that she didn't know much about the climate and weather information. However, Romlah is now able to understand the importance of climate and weather information in agricultural practices after being involved in the Climate Field School (CFS) facilitated by USAID APIK. "Even though we are farmers, there are so many new things that we get from climate field school activities. Now we are able to see the soil humidity condition. If the humidity is too high, plants will be prone to blast disease. Therefore, we can read the signs to immediately take action to protect plants from blast," she emphasized. In addition, she also shared the information and knowledge she got from CFS with other farmers who have not taken part in any of CFS activities yet. "They came to ask me about the daily weather conditions. That's why I took the initiative to create a WhatsApp group that includes farmers around our villages to spread knowledge and information" she added.



COMMUNICATION, OUTREACH, AND KNOWLEDGE MANAGEMENT

Communication, Outreach, and Knowledge Management (COKM) activities are integrated throughout project operations to support the overall achievement of project objectives and amplify messages to raise awareness of key stakeholders on the importance of climate resilience, as well as to raise their willingness to take real action in climate adaptation. It is critical for the project to share lessons learned and best practices to project partners and wider climate and disaster resilience practitioners or policy makers so that the knowledge gained from the project can be useful for replication and scaling up.

APIK used selected communication channels that have contributed to the successful sharing of knowledge and information. The project has developed plenty of communication materials such as newsletters, fact sheets, infographics, stories, videos, and published multiple activities and learnings to the project's website and social media. Outreach events and engagement with mass media also helped the project to disseminate the learning to a wider audience. In addition, the COKM also functions to ensure all APIK publications including assessments, reports, and guidance comply with USAID branding and marking guidelines.

Realizing that project communication channels will be terminated when the project ends, APIK endeavored to publish some of the learnings to other knowledge management platforms such as *WeAdapt* and *Climatelinks*. These websites are frequently used as reference by climate and disaster

resilience practitioners. A final factsheet that provides an overview of APIK’s approach and results was also developed and is available in **Annex M**. In addition, the lessons of the APIK project have been compiled in a book called “Building Resilience: Strategy, Efforts, and Success Stories in Facing Climate Impact and Disasters” (*available in Bahasa Indonesia and English*). This book is available in **Annex N**. Table 9 details APIK products that have been shared on external knowledge platforms. In addition, all APIK reports and contract deliverables have been uploaded to USAID DEC.

Table 9: APIK products uploaded to External Knowledge Sharing Platforms

TITLE	LINK
Safeguarding A Coastal Community with Silvofishery	https://www.weadapt.org/placemarks/maps/view/54006
Climate and Disaster Resilience Community Forum in Sutojayan Village	https://www.weadapt.org/placemarks/maps/view/54346
Equipping Farmers with Climate and Weather Knowledge for More Resilient Agriculture	https://www.weadapt.org/placemarks/maps/view/54066
Prepare Children to Deal with Disaster and Climate Impacts	https://www.weadapt.org/knowledge-base/gender-and-social-equality/prepare-children-to-deal-with-disaster-and-climate-impacts
Village Development Plan Helps People in Sumberagung to Fight Landslides and Drought	https://www.weadapt.org/placemarks/maps/view/58366
Using GIS for disease mapping in Ambon City	https://www.weadapt.org/knowledge-base/adaptation-planning/visualizing-data-into-maps-to-improve-access-for-information
Equipping Youth with Knowledge and Capacity to Better Manage Climate Risk	https://www.climatelinks.org/blog/equipping-youth-knowledge-and-capacity-better-manage-climate-risk
Improving Community Preparedness through Flood Early Warning Systems	https://www.climatelinks.org/blog/improving-community-preparedness-through-flood-early-warning-systems

SOCIAL MEDIA AND WEBSITE

APIK increased its presence by maximizing the use of social media channels. The project was regularly using Twitter, Facebook Page, and Instagram as main channels to disseminate activities, learning, and campaigns. APIK took the opportunity to leverage events both at the national and international level such as Earth Day, Children’s Day, etc. and post relevant content in line with the theme. In the early stage of the project, APIK used paid promotions to gain followers and boost reach to raise public awareness. After this initial phase which led to a core group of followers, APIK decided to rely more on organic growth.

SOCIAL MEDIA

APIK utilized social media channels to increase the coverage of website articles, newsletter, and other knowledge products. From the statistics, APIK’s social media audience is more interested in posts with a human-interest story from the field involving community champions and climate or disaster resilience action on the ground.

Table 10: Social Media Channels Information

SOCIAL MEDIA CHANNELS	METRICS AS OF MARCH, 2020
Facebook page – USAID Adaptasi Perubahan Iklim dan Ketangguhan	<ul style="list-style-type: none"> • Total Post = 633 • Followers = 7,083 • Likes = 7,063 • Reach (the number of people saw the content) = 199,712
Twitter – USAID_APIK	<ul style="list-style-type: none"> • Total tweets = 1,174 • Followers = 361 • Impressions/the number of Twitter accounts reached by the tweet = 424,703
Instagram – USAID_APIK	<ul style="list-style-type: none"> • Total posts = 347 • Followers = 809 • Likes = 330 • Impressions/the number of times of APIK’s post could have been seen by users = 111,183

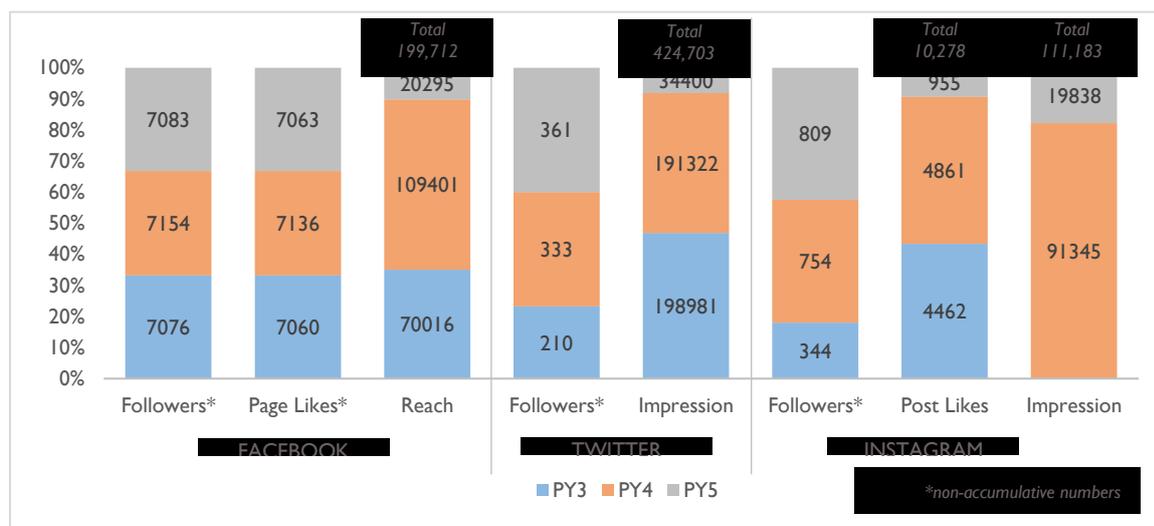
Exhibit 14: Screenshots of APIK’s social media



* From left to right (Facebook, Twitter, Instagram)

APIK had just started to optimize the use of social media channels in the third year of the project. Overall, the reach through Facebook has decreased, while the people reached through Instagram and Twitter continues to grow. APIK has been regularly utilizing these channels for re-sharing communication products from the website, commemorating momentum or special days such as International Women’s Day, Earth Day, National Children’s Day, World Environmental Day, or any other commemoration days related to APIK’s focus, and simply sharing the information through links and infographics. The growing attention of people is demonstrated through the increase in the number of followers and impressions in the range of time throughout APIK implementation (see Exhibit 15).

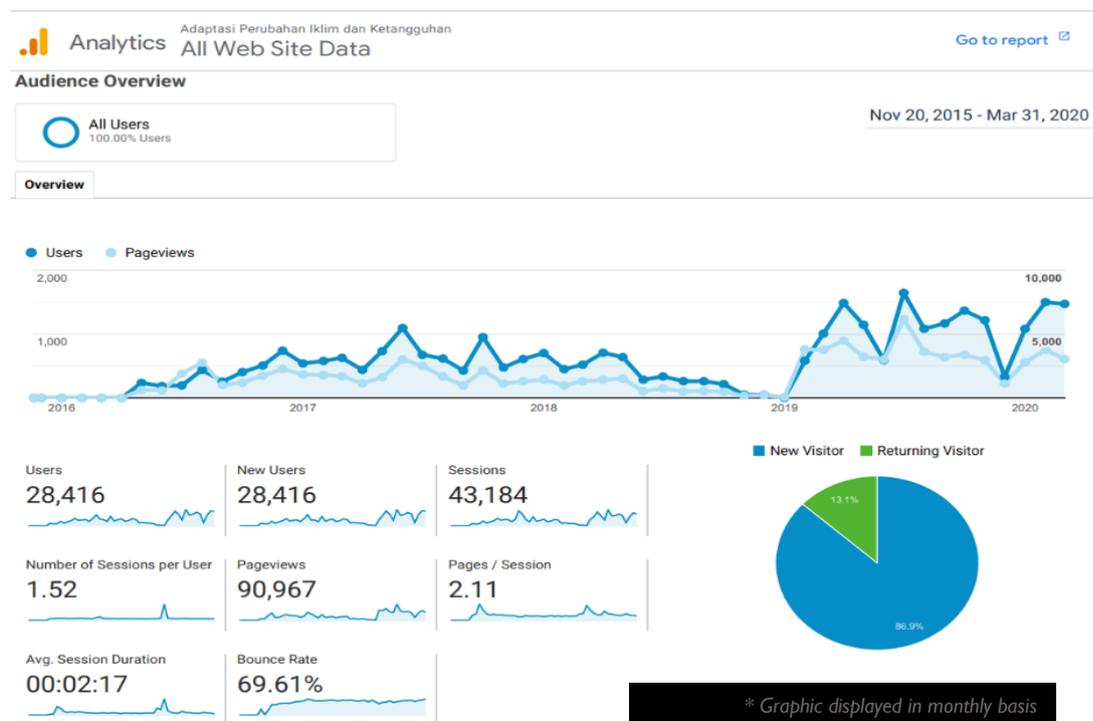
Exhibit 15: APIK Social Media in Numbers throughout PY1-PY5



WEBSITE

APIK’s website has attracted 28,416 users with 90,967 views during the duration of the project. The website started to operate in mid-2016 and was revamped in late 2018. As field activities ramped up, the project pushed out content frequently and this helped increase views on the website. Some of the most visited pages include vacancy information, project information, reports, studies, and stories. The top three stories that gained most attention in terms of page views were stories on women leadership in building resilience, equipping youth with knowledge on climate resilience, and women empowerment through farmer’s groups. Since APIK website hosting will expire in December 2020, APIK coordinated with KLHK to transfer and hand over the knowledge products so they continue to be accessible even after the project is closed.

Exhibit 16: APIK Website Analytics from November 2015 to March 2020



PARTICIPATION IN OUTREACH EVENTS

APIK used opportunities to participate in national events to share best practices and lessons learned from the project. In these events, APIK opened exhibition booths displaying publication materials containing project activities and achievements in strengthening community resilience.

Table 11: APIK Participation in National Events

EVENT TITLE	DATE
Climate Week in KLHK	December 8, 2016
Indonesian Environment Day in KLHK	August 4, 2017
Marine Bachelor (ISKINDO) Gathering and Seminar in Ministry of Fisheries	January 22, 2018
Low Carbon Development Initiative (LCDI) launching (<i>supporting RAN-API Secretariat's booth</i>)	July 31, 2018
Indonesia Climate Change Trust Fund (ICCTF) Day (<i>supporting RAN-API Secretariat's booth</i>)	August 8, 2018
Climate Change Management Action Day 2018 (<i>hosted by KLHK</i>)	October 24-25, 2018
Disaster Risk Reduction Month 2018 (<i>hosted by BNPB</i>)	October 21-24, 2018
Climate Festival 2019 (<i>hosted by KLHK</i>)	October 2-4, 2019
Disaster Risk Reduction Month 2019 (<i>hosted by BNPB</i>)	October 11-13, 2019

MEDIA ENGAGEMENT

APIK was covered 392 times in national and local media over the duration of the project. The detail of the media coverage is available in **Annex O**. In relation to media engagement, APIK disseminated press releases to mass media partners and conducted press conferences to encourage coverage of project activities. APIK regularly invited media to tag along with the team during courtesy visits from USAID and national government representatives to APIK working areas.

Acknowledging the limited familiarity of climate change among local journalists, combined with the fact that climate change is often seen as a less appealing issue for the public, APIK held several media workshops and discussions to address that challenge. In 2016, APIK held a media discussion in each province titled “kaleidoscope of hydro-meteorological disasters”. In 2017, APIK used the momentum of International Women’s Day to increase media awareness of climate impact on women and children, particularly at the subnational level. Later in 2019, APIK joined a media event organized by Coca-Cola Foundation Indonesia (CCFI) and IUWASH PLUS in East Java to commemorate World Water Day. APIK used the opportunity to expand its network to national journalists. Another media discussion was held in April 2019 in Jakarta to boost national media attention on disaster management and climate resilience issues. During the media discussion, there was technical information and a Q&A with representatives from KLHK, BNPB, BKF (Indonesian Fiscal Policy Agency from Ministry of Finance), and APIK representative who were all at the event as resource people.

PROJECT CLOSEOUT EVENTS

Toward the end of the project, APIK held closeout events in the three provinces and also at the national level. The closeout events celebrated APIK’s achievements and symbolically wrapped up the project activities. The series of the closeout events started in Maluku (December 5, 2019), followed by Southeast Sulawesi (December 11, 2019), East Java (January 21, 2020), and concluded in Jakarta (February 18, 2020).

In Maluku, the Head of Environmental Agency of Maluku Province, Roy Syauta, represented the governor and during the event stated their commitment to include climate and disaster resilience as a critical part in their 2019-2024 provincial mid-term development plan. In Southeast Sulawesi, the Expert Staff for Government, Law, and Politics, Syahrudin Nurdin, represented the governor and highlighted the impact of APIK’s impact to corn production and transboundary flood management cooperation between Kendari and South Konawe. In East Java, the Head of Environment Agency, Dyah Susilowati, on behalf of the provincial government expressed their appreciation for USAID’s contribution to building community resilience in the Brantas Watershed landscape.



The Director General of Climate Change, KLHK (right), Ruantha Agung Sugadirman gave token of appreciation to the East Java Province (left) during APIK provincial closeout event.



One of talk show sessions with representatives from BMKG, KLHK, and BNPB during APIK closeout event in Jakarta.

At the national level, APIK shared its achievements and learnings through a talk show format, hosted by Prita Laura, a national TV news anchor. The talk show involved the project partners and beneficiaries, highlighted three main topics including private sector engagement, climate adaptation at the local level, and mainstreaming climate and disaster resilience into national policy. An exhibition of photos, videos, and publication materials were also available at the venue. During the event, USAID Mission Director Ryan Washburn stated, “USAID is committed to supporting Indonesia’s goals of inclusive and sustainable

economic prosperity and security. Our partnership protects families and safeguards livelihoods from the global threat of climate change for the benefit of our future generations.” APIK also shared the project’s lessons learned book to the national partners at the event, and the public can access the digital version of the book through the APIK website.



Following the established village regulation in mangrove ecosystem protection, community in Awunio Village, South Konawe District, Southeast Sulawesi Province, planted mangrove to protect their coastal area.

SECTION 5: PROJECT MANAGEMENT

The senior management of the APIK project remained the same throughout the life of the project including all key personnel (COP, DCOP, Climate Governance Advisor, Climate Change Adaptation Advisor) as well as the Finance and Operations Director. This consistency and stability in leadership contributed to the success of the project. One of the benefits of the stable leadership was that relationships with GOI officials and all other partners were maintained throughout the project which helped the project more effectively engage with local and national government on planning and budgeting.

Remote leadership was essential for the success of APIK. The project was managed from the Jakarta office; however, each region had an office with a regional manager plus technical and administration staff. This structure relied on excellent communication to ensure activities made strategic sense and were in support of the overall objectives of the project. The starting point for all activities was the annual work plan. The APIK work plan process involved several steps. The first step was to consult with national and local government officials to get their input on priorities for the next year as well as review prior year activities. Following this the whole APIK team came together in a central location to plan activities for the coming year. Once this plan was drafted it was shared with GOI to make sure they agreed. The approved work plan included detail of high-level activities at national and regional levels. Based on the annual work plan, the regional managers submitted monthly work plans to the DCOP and COP for review and approval. These monthly work plans were much more specific and included detail on when support was needed from national level technical specialists and also dates for workshops and meetings with key stakeholders. The project leadership as well as technical specialists made frequent trips to each region to provide support and meet with partners. Through this process APIK was able to ensure all activities in all offices were strategic and aligned with the overall goal of the project.

The main formal connection with the GOI was through the national level Technical Team (Tim Teknis). This team was co-chaired by Bappenas and KLHK and included multiple line ministries such as BMKG, BNPB, KKP, ATR, BIG and BPS. This group met on a quarterly basis with USAID and the APIK team to discuss progress and make recommendations. A Standard Operating Procedure was prepared to provide detail on roles and responsibilities of the Technical Team. The quarterly meetings were also a good way to encourage cohesive strategies between the respective line ministries with regards to climate adaptation.

One of the main challenges impacting the management of the project was the reduction in USAID climate adaptation funding. This created two significant issues for the leadership of the project; 1) how to achieve the project targets and 2) how to keep staff motivated and engaged. This was compounded by the fact that there was a lack of clarity on how much funding the project would ultimately receive. Adaptive management was essential to navigate this challenge. The project was able to successfully leverage government and private sector resources to help achieve project targets and there was a well-established internal selection and approval process for all activities to ensure they were strategic and would lead to tangible outcomes. Priority was also given to those activities where there was co-funding provided by government and private sector. This encouraged field teams to be much more active at getting buy-in from government which also had the positive affect of strengthening local ownership and sustainability. As a result, APIK achieved nearly all of its high-level results despite only receiving 80% of the anticipated funding ceiling and closing down six months earlier than originally planned.



APIK in Maluku improved access of climate and weather information for coastal community including fisherfolk and boat drivers.

SECTION 6: MOST SIGNIFICANT CHANGE

Most Significant Change (MSC) Impact Monitoring enables APIK to hear directly from the people in local government, communities and businesses in areas that APIK works to learn their perspective on where APIK is having the most impact and where improvement is needed. It differs from conventional evaluations in the sense that rather than individuals being prompted by a series of questions linked to project outputs or outcomes it allows people to comment directly on how APIK has helped build resilience for them and their communities. These stories are then collected and analyzed by a team and ultimately one story is selected as the most significant. The initial story collection method involves meeting with APIK stakeholders and beneficiaries at the national, subnational, and community levels and have conversations about climate change and natural disasters in their communities, discuss with them the strategies or initiatives that are being used to reduce risk or build resilience and identify the linkages with APIK activities. As one of the goals of the MSC is to capture any unintended impacts of APIK the discussion will be as open as possible.

MSC ANALYSIS IN JAKARTA

MSC story collection was carried out in Blitar and Malang District of East Java, Ambon Island of Maluku, and lastly in Kendari City and South Konawe District of Southeast Sulawesi. Following the collection of stories, APIK then conducted an analysis process. The analysis workshop was held in Jakarta, from August 27-29, 2019. The analysis process aimed to identify significant changes from and impacts of the four-year project implementation. From the interview activities, 63 MSC stories were collected at the community, government, and academician levels.



Stories Coding and Analysis, Jakarta, August 28, 2019

The 63 stories were narrowed down into four categories as follows:

- (1) Capacity improvement (at individual, collective and institutional levels on Climate Change Adaptation-Disaster Risk Reduction, Economy, and Gender), with a total frequency of 103;
- (2) Integration of climate and disaster resilience into Policies (Regulations, Budget) with a total frequency of 25;
- (3) Actions at Community Level (implementation of climate and disaster resilience actions, with a total frequency of 39; and
- (4) Replication, with a total frequency of 2. The followings are findings from the 63 stories.

I. IMPROVED CAPACITY (ADAPTIVE CAPACITY)

- a) At the individual level, improved capacity was evident in the use of climate and weather information in agriculture, agro-forestry and marine sectors; better planning of activities using Geographic Information System (GIS); improved understanding on climate and disaster resilience to identify hazards. At the individual level, adaptive capacity was found equally in all regions among women and men

- b) At the collective level, which was evident in: community preparedness to disaster; better management of disaster response; stronger climate-change related collaboration among stakeholders; synergy among stakeholders to develop the economy of the community
- c) At the institutional level: village institutions have had more capacity in developing well-targeted programs and budget using the village fund available; MoU between Disaster-Prepared Groups and Community Health Clinic (Puskesmas) in disaster response was established; improved capacity of the village in risk reduction

Adaptive capacity has specifically led to economic resilience in some people. This was evident in the increase of income from the previous planting season of rice and sugarcane commodities as a result of APIK's intervention.

2. INTEGRATION OF CCA-DRR INTO POLICIES (ENABLING ENVIRONMENT)

Integration of climate and disaster resilience into policies took place at five different levels:

- a) Village level: new policies on the protection of water springs; establishment of community evacuation center using village fund; development of village Medium Term Development Plan; stopping the rate of destruction to mangrove forest areas
- b) District level: establishment of the Centre for Mangrove Restoration Center and Coastal Ecotourism Development; Village Medium Term Development Plan and Disaster Risk Index as development indicators; climate and disaster resilience perspectives in resilient-city policies
- c) Provincial level: Regional Regulation (*Perda*) Number 11/2019 on CCA (specific to Southeast Sulawesi)
- d) University level: stronger collaboration between universities

Adaptive capacity at the institutional level within the government has established the enabling environment for the integration of climate and disaster resilience in the subsequent stage. The integration of climate and disaster resilience into policies and budgeting at the village, district and provincial levels took place among those who have developed collective or institutional adaptive capacity.

3. ADAPTATION ACTION AT THE COMMUNITY LEVEL (ACTION TAKEN)

Adaptation actions took the form of climate and disaster resilience implementation:

- a) Climate adaptation implementation: solar dryer that speeds up drying of commodities for sale; climate and disaster resilience forum; rainwater harvesting; establishment of evacuation routes; availability of water collection containers; adoption of agricultural practices in accordance with the Climate Field School; repair of pipes to facilitate water flow
- b) DRR implementation: establishment of disaster-prepared groups; use of gong-like equipment (*kentongan*) in evacuation processes; availability of disaster risk maps

In addition to the above categories, specific changes have taken place in the replication of APIK's ways of working and activities by the government. The replications were observed in the application of methods/tools as well as direct action, for example in the use of GIS in presenting information to the

public and the establishment of the Centre for Mangrove Restoration and Coastal Tourism Development with the support of government funding of IDR 135,000,000.

From the above three categories, most significant changes primarily took place in the form of adaptive capacities.

In the end, all MSC stories collected are linked with the APIK M&E framework to measure project achievements and impacts. There were three impact nodes within the M&E framework, namely adaptive capacity, enabling environment, and action taken. Findings from the MSC stories confirmed and complemented APIK's High Level Result (HLR) and Task Level Result (TLR) achievements. Within the 'Enabling Environment' and 'Action Taken' domains, the collected stories of change confirmed that the outcomes of APIK program interventions were as anticipated.

In the 'Adaptive Capacity' domain, difference remained between the project achievements as measured by the project monitoring and the results of the analysis of MSC stories at the institutional and individual levels in terms of improvement of capacity. The organizational adaptive capacity has confirmed APIK's achievement of the project indicators. Meanwhile, at the individual level, although achievements remained below target, the MSC stories indicated that APIK capacity building activities for individuals have brought about significant benefit and impacts that could compensate the below-target achievements of the quantitative indicators at the project level. Therefore, the findings from the analysis confirmed the strength of MSC as expressed by Rick Davis, the founder of the technique, in his guide. MSC has become the "tool" to facilitate a project to portray changes that are otherwise not observable by M&E tools that APIK commonly uses.

Changes during the four-year implementation of the project should not be seen as represented by the results of the analysis of the 63 stories of changes only. However, the analysis has demonstrated at which levels or which domains changes have taken place and how the changes were linked with the expected impact: Increased Resilience to Climate Change and Disasters.

MOST SIGNIFICANT STORY

This is the story of Mrs. Iis, a cadre from the Maternal and Child Health Service Center (Posyandu) in Sumberagung Village, Malang District. She is also a member of the Climate and Disaster Resilience Forum (Pokja API) in the village.

The Rain that Changes Our Mindset



Mrs. Iis (center, blue veil), member of POKJA API from Sumberagung Village.

For me, through USAID Adaptasi Perubahan Iklim dan Ketangguhan (USAID APIK) project, our families have become well prepared to face long drought when water is scarce. In our village, it's common that water from the wells are empty during the dry season. In order to meet our daily consumption needs we must buy water from neighboring villages. I have had experience with water difficulties since a long time ago, because I was born and raised in this village. Water difficulty in the dry season has become part of everyday life. But with the support from USAID APIK, we have gained a lot of new knowledge on how to deal with drought. We are now more prepared to face long drought with different ways of thinking.

It began when APIK accompanied us to do participatory village disaster mapping and develop the action plans to deal with disasters. We shared our stories about how we dealt with water shortages. The only way I knew to overcome drought was buying water. Apparently, there is another way to face it that is by storing rainwater to be utilized during the dry season.

Previously, we relied on well water and spring piping. Unfortunately, the springs were also dry when the dry season lasted at least for three months. Our piping system were not sustained, because we left them without proper maintenance. The well also dried and could not be utilized during the dry season.

My perspective on rainwater has also changed. Previously, using rainwater seemed to be unusual. Many people were scared of having rainwater as a source of water for their household use.

Until now, our family has not implemented rainwater harvesting, but by seeing others' experiences I have become convinced that it can become an applicable choice. Moreover, I heard that one container of rainwater storage can be used for three months. When the long dry season occurs, we could spend approximately IDR 70,000 for 1,000 liters of water that would only last for three or four days for a large family.

Currently, my mindset in dealing with drought has changed. We used to be confused and not knowing what to do, but now we can deal with the drought better. We are able to solve the problem individually, by discussing and sharing our experience to another amongst community. If previously we had only one choice to overcome the problem, that is buying water, now we have additional option, rainwater harvesting.

Being able to understand about the rainwater harvesting technique is critical for me. Although we have not used it in larger quantities, at least we have appreciated the rainwater more than before, and we are convinced and have no doubt to utilize it as a water source in the household. Besides being able to reduce our household expenses, rainwater contains less limestone than our well water that we usually use.

MOST SIGNIFICANT STORY

This is the story of Agus Catur Susilo, a secretary of Disaster Risk Reduction (DRR) Forum in Semen Village, Blitar District. The forum was established in 2017 as part of APIK intervention in the area. Agus also leads outdoor adventure tours as part of the eco-based village tourism in Semen Village.

Using Weather and Climate Information in Disaster Management



Agus is showing the Handy Talkie he uses in the DRR Forum.

Before joining the forum, I have been actively involved as a volunteer at Disaster Preparedness Youth Group (TAGANA) and volunteer at Indonesian Red Cross. So, when Mr. Slamet, our Village Head at that time, asked me to join Semen Village DRR forum as a volunteer, I joined without hesitation. Every two weeks, the DRR Forum and USAID APIK held a meeting. We learned a lot from USAID APIK on disaster-prone area mapping, assessing and managing disaster risk, practicing emergency first aid, using a seasonal calendar, proposing activities at the village level, and also accessing weather and climate information from BMKG.

As a disaster relief volunteer there are two useful lessons I learned from the forum; how to conduct a disaster risk assessment and how to use climate and weather information. Through the assessment, we can learn about the real condition of our village. It helps us to identify parts of the village that are prone to landslides. Semen Village, especially Parang Hamlet is located in the slope of Kawi Mountain. The cliffs are fragile and can collapse during heavy rainfall. By being informed of the weather and climate information through BMKG apps on my android cellphone, I have become more aware of when it will start to rain.

This has helped me as an outbound instructor at my eco-based tourism site for river outbound activity, when it is about to rain, I can offer my guests the option of whether they want to continue the activity or not. If they want to keep going, then we will continue despite the rain. However, after being trained on CWIS and disaster risk management, I can now decide to call it off when the rain falls. Since then, I've learned that there is a risk of a strong river current from the upstream part because of heavy rainfall that can lead to a flash flood.

For me the most significant change is on how I get informed on climate and weather information. In Semen Village, especially in the north and eastern part of the village, many people live in the cliff area. Knowing that an intense rainfall is coming, my friends and I can inform the people living in that landslide prone area to be aware and to evacuate if necessary.

The handy talkie (HT) provided by USAID APIK is very beneficial. My first experience using the HT was when a farmer found a dead body in a forest located on the slope of the Kelud Mountain. As soon as I heard the news, my friend and I went directly to the location shown by the farmer. Since it was late in the evening, we decided to split up and relied on the HT for our communication. After one hour of searching, the dead body was found. I used the HT to inform the other volunteer in the Gandusari Sub-district post. They quickly responded and helped me evacuate the body. My other experience using the HT was when a landslide occurred and hit a cattle pen with three cows in it. I used the HT to report the incident to the other volunteers and the Local Disaster Management Agency of Blitar District. With their help and response, the cows were safely evacuated.

MOST SIGNIFICANT STORY

This is the story of Riki Wiryawan Samson, a staff at Health Agency of Ambon City who is in charge of the tuberculosis program. In his office, he is also responsible for supervising, reporting, and becomes a resource person in training activities.

Spatial Mapping Makes Monitoring Easier



Mr. Riki is really motivated to improve the health sector monitoring

My involvement with USAID Adaptasi Perubahan Iklim dan Ketangguhan (APIK) began in 2016. I participated in APIK's activity to improve my capacity and knowledge in climate change. I also joined APIK's Geographic Information System (GIS) training that helped me learn about mapping. The climate and disaster issue that APIK brings is relevant to our work in the health sector. For example, the transition from dry season to rainy season actually can increase the risk of Dengue Hemorrhagic Fever (DHF) outbreak. Before APIK's assistance, the data we had was only in *Excel* sheet forms (tables) and manually drawn maps. With APIK's assistance, my skills in spatial mapping have improved and now I can put them into practice. The knowledge is very useful for me, because it helps me in monitoring a disease and making an evaluation

report out of it. In addition to mapping, together with my 22 colleagues from 22 Public Health Centers (Puskesmas) in Ambon City, we received a training on how to use 'KoBo Collect' application for mosquito location mapping, malaria disease monitoring, and immunization tracking. This KoBo Collect application helps us in monitoring and evaluating the work of our staff.

Being able to convert an *Excel* data into a map is one thing that I consider critical for me. It is a skill that my organization and I really need. I can say that 70% of my colleagues that have learned from me, now have a better knowledge of mapping. Moreover, the Health Agency of Maluku Province replicated this training by mapping Malaria, together with the Puskesmas Hutumuri in Leitimur Selatan Sub-district. This replication activity in August 2017, was supported by APIK. The flexible learning process made it easier for us to understand throughout the training.

Again, it is very important for us to turn data from *Excel* sheets into thematic map formats. In every meeting, I need to make a presentation and it often involves various maps such as disease distribution maps, locations for tuberculosis and malaria incidents, mosquito larvae locations, and so on. This aligns with the policy from the Health Minister and Health Directorate General that mandated the region to map disease distribution. Why do I keep saying that turning *Excel* data into maps is important for me? Because it makes my work more effective and efficient. It makes reporting and evaluation a lot easier. It really fulfils the need of my work. The shortfall is currently we have no budget to support the activity. While the budget advocacy process is still on going, I will ensure that the GIS mapping activity is allocated within the budget.

In 2020, I am planning to make "Kontak Serumah" a tuberculosis program that mandates that every health officer visit tuberculosis patients and track the risk of other incidents. At the same time, we can map the locations of where those patients live. To support coordination between agencies and to maximize the utilization of the map. I hope in the future, there will be a mini workshop that invites multi-stakeholders from different sectors to participate.

MOST SIGNIFICANT STORY

This is a story of Sunarji, a 52 years-old man living in Aepodu Village, South Konawe District. Sunarji was one of the participants in Corn Climate Field School (CFS) held by USAID APIK in 2018.

Improving Knowledge and Practice on Climate Resilient Corn Farming



Sunarji is proud of his corn field

My wife is the head of the women's farmer group in Aepodu Village. At that time, she said that there would be a Climate Field School (CFS) on corn farming. I did not enroll myself on that training initially. However, one participant cancelled his attendance and my wife asked me to take his place. Then I decided to join because I have to admit that this village has so much potential for agriculture.

A lot of things happened after the CFS. I learned a lot of weather and climate information. Now I know the weather condition that is suitable to plant corn seeds and the correct amount of water needed. Here, we do the planting in January because it is not too dry with a little bit of rain. The weather is not extreme. Four months later, we start to harvest the crops. We are happy because after the CFS we have a *WhatsApp* group including people from the Meteorological Office (BMKG). Farming is closely related to weather condition. If we just finished fertilizing the plants but rain falls, it will become useless because the fertilizer is washed away. With this weather information, we can be more prepared. Aside from that, since I'm working a lot in my workshop, I become motivated in developing planting tool. I feel bad watching my wife experiencing back pain every time she comes home from the corn field. She has to bend down to do the farming activity manually. I've developed a tool that can help us farmers to plant, fertilize, and cover the ground without having to bend down as much as the way we do before. Those three activities are usually done manually, and we can spend Rp 800,000 per hectare to pay three persons to do that. With this tool, we can save the cost to Rp 400,000 per hectare. The local government has seen this tool and they brought it to an appropriate technology exhibition event in Bali. The Head of South Konawe District also participated in that event. Now, a lot of my neighbors come to me and borrow the planting tool that I developed.

For me, the biggest change that I feel is now I can do corn farming from planting, harvesting, and selling it. Without the CFS from APIK, maybe this will not happen. My wife is a farmer, but I'm not. I used to have very little knowledge on how to farm, but now I'm implementing what I've got from the training and I can say I feel the economic benefit. Since the training, my wife and I implement the knowledge into practice and we managed to harvest the crops, sell them, and make profit. We recently harvested 4.2 tons of corn from a half-hectare plot of land. We sold this at IDR 3,200 per kilogram getting around IDR 13 to 14 million in total. Most of the farmers here are not interested in cultivating corn before because the market is very limited. Through the CFS, APIK did not only deliver a training, but they connected us with private businesses that are looking for corn, like JAPFA for example. They contacted us, we made a deal, and they picked our corn right away.

I'm happy if I can be useful for other people. I benefitted from the village government that is willing to lend me vacant land in the village so that I can use it for farming. Since a lot of my neighbors are rice farmers, they can see how I am successfully cultivating corn and they are interested to try corn farming because it offers more profit. A lot of them, including the members of women farmer group led by my wife, are coming to us and learning on corn farming. That makes me feel useful as a person.



Local stakeholders were highly involved during vulnerability assessments so they have better understanding and sense of ownership.

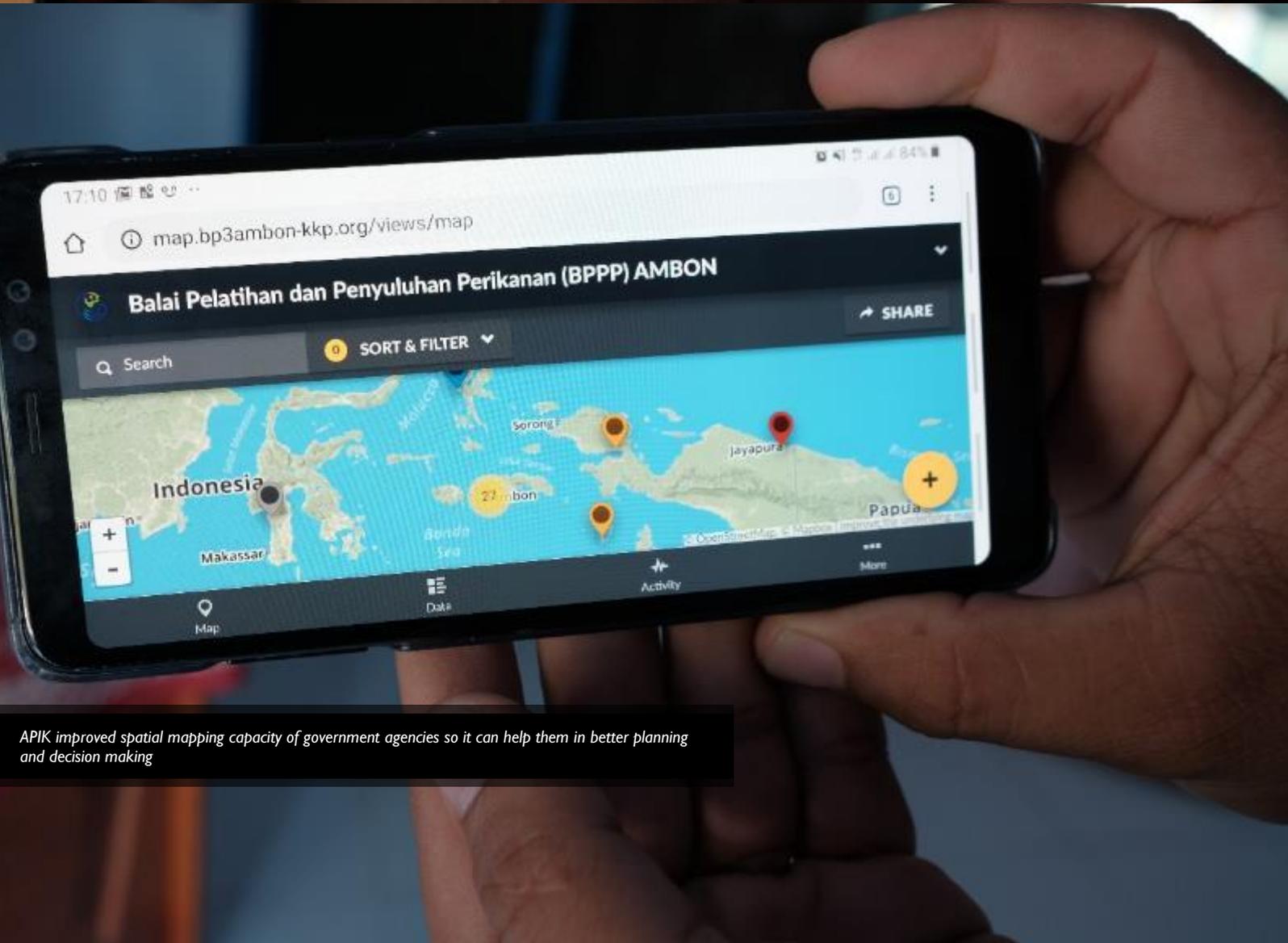
SECTION 7: CHALLENGES ENCOUNTERED DURING PROJECT

The following table summarizes challenges encountered by APIK during the project and the solutions implemented to reduce the impact of these challenges.

Table 12: Challenges, Impact, and Action Taken

CHALLENGES	IMPACT	ACTION TAKEN
Changes within the GOI including, organizational restructuring, leadership changes and frequent staff rotation both at national and subnational levels.	Unclear commitment and support toward building climate resilience. Often having to spend time building relationships with new government officials	To those new in their positions, APIK reintroduced the concept of climate and disaster resilience and the objectives and activities of the APIK project, as well as results achieved. The team also sought commitment and support from government to continue to partner on these activities. During the life of project, APIK had to reintroduce the project to a new Director General at KLHK, governors/deputy governors in all the 3 provinces, and also 6 of the 12 district/city leaders where APIK worked.
General election at national level and local elections at provincial and district/city level, as well as elections at village level.	Uncertainty and/or delays of work plan implementation.	In some instances, APIK postponed implementation of activities due to security situation caused by political rift and reprogrammed activities at village level as new village head needed to be engaged. When situation returned to normal, APIK caught up with activities, often times multiple activities in relatively short period yet still assuring good quality results.
Natural disasters hit APIK areas, e.g. a 6.5 magnitude earthquake hit Maluku on September 26, 2019 destroying houses and infrastructure as well as caused panic among people particularly in Ambon and Lease Islands. The other two provinces also experienced big disaster events; flooding in Kendari and South Konawe in Southeast Sulawesi and prolonged drought and a big tornado in East Java.	Activities were delayed where targets might not be achieved and APIK operation was disrupted, e.g. APIK office in Ambon was closed for one day as staff could not get to the office during the earthquake event.	APIK postponed activities and later on caught up when situation got back to normal. Staff were advised to work from home as necessary and return to work when things got back to normal. APIK also supported related local government agencies and other stakeholders by sharing technical/scientific documents such as climate projections, as well as provided technical expertise to help address and identify proper responses in case the disaster event occurs again in the future, particularly hydro-meteorological ones.

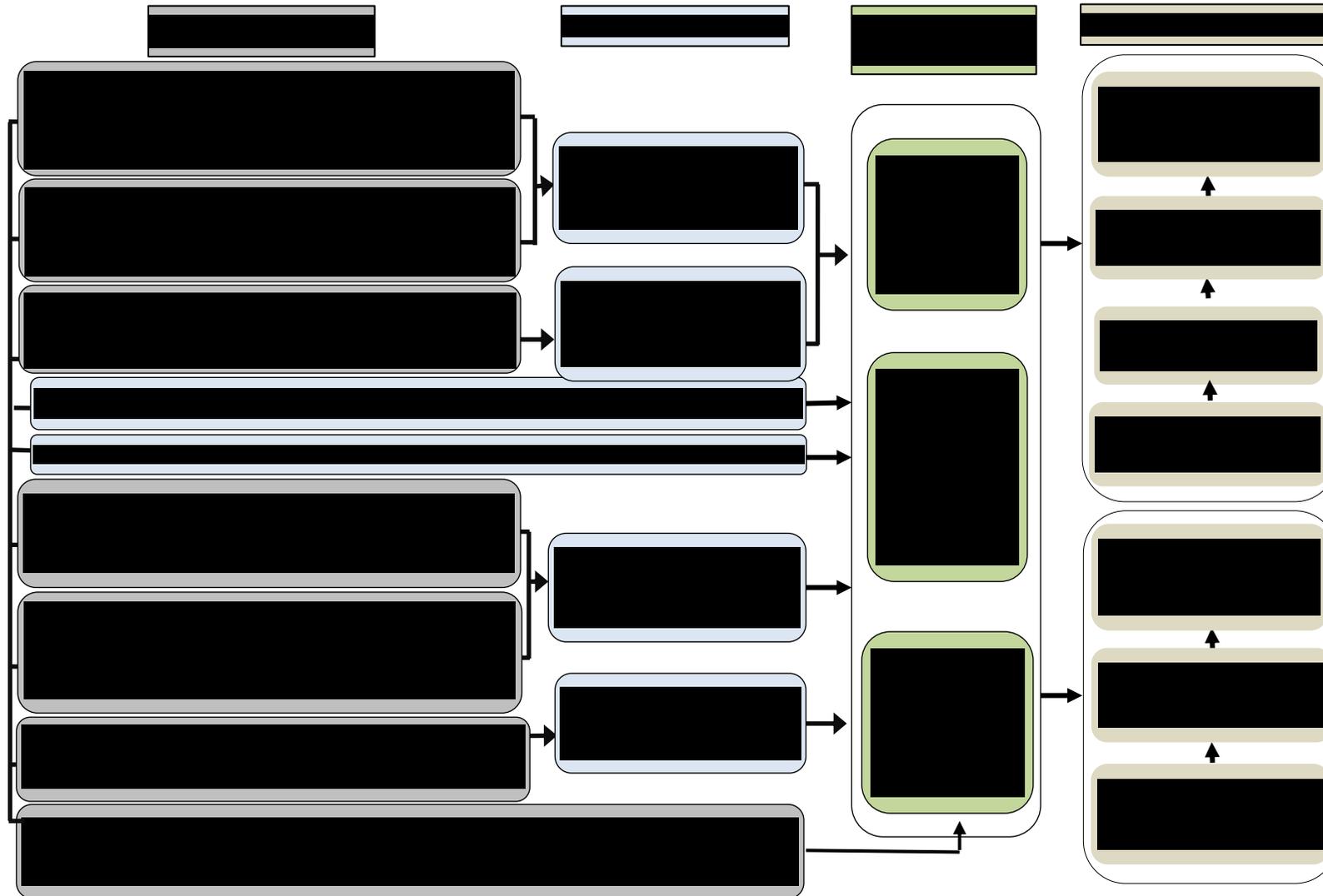
CHALLENGES	IMPACT	ACTION TAKEN
BAST process.	Uncertain settlement of the BAST impacts financial reporting within related GOI agencies and USAID.	APIK held meetings with KLHK and other APIK Technical Team members to discuss activities, outputs, and deliverables. Upon inputs during the Technical Team meetings, deliverables were revised. Related GOI agencies have already accepted deliverables for PY1 and PY2 and BAST for those project years was completed accordingly. BAST for PY3 and PY4 is still being finalized.
APIK staff turnover.	Delay in activities and loss of knowledge when a team member departs.	To mitigate adverse impacts towards APIK targets and goals, APIK required one-month notice for staff resigning and during the one-month period APIK did a recruitment process for a replacement. During the one-month transition period, there was a formal handover of documents, activities and also informing partners as well as introducing other team members to any key contacts to avoid any gaps or relationship issues with partners.
Early closure of APIK as no more funding is available.	Potential for expectations of partners not met as several activities were cancelled and several targets would not be completely achieved. In addition, there was an impact on team motivation.	<p>Management informed all staff as well as partners both at national, province, district/city, and community of the situation and planning for early closure. In parallel, APIK revised the workplan.</p> <p>APIK management emphasized the positive impact of the project when discussing the closure with the team and everyone is very proud of all that has been accomplished.</p> <p>USAID and APIK met with KLHK and Bappenas to inform them of the early closure. USAID and APIK also informed partners in Maluku, Southeast Sulawesi, and East Java.</p>



APIK improved spatial mapping capacity of government agencies so it can help them in better planning and decision making

SECTION 8: PERFORMANCE MONITORING

Exhibit 17: APIK Result Framework



PERFORMANCE MONITORING

INDICATOR RESULT

The tables and exhibit below detail APIK's performance regarding *High Level Results (HLRs)* and *Task Level Results (TLRs)*. Throughout PY 4 and into the first quarter of PY 5 APIK continued to provide extensive training at the regional level and as a result the project has achieved 74.17% (22,250 people) of the target of HLR 1. Due to the shortfall in funding and early closure of APIK, there was no further opportunity to increase the number of people trained in the project. However, APIK has exceeded targets for all other HLR's. Detail on HLR achievement can be seen in Exhibit 18.

The project reported against 20 task level results (TLRs). Of these there are TLRs where the target has not been met, this has largely been as a result of the reduced budget and condensed timeframe for project implementation. TLR 1b is the number of national forums to strengthen coordination on climate change and disaster resilience, the project has only achieved 40% of the target for this indicator (6 of 15). The national forums that the project supported have proven to be very effective such as the coordination between KLHK and Kemendesa which resulted in positive changes to the village law to incorporate climate resilience. However, developing these coordination mechanisms proved to be very time consuming given the lack of clear incentives for inter-ministerial coordination. In addition, TLR 2d is number of landscape approaches implemented at regional level. The project has achieved 70% of this target (7 of 10 landscape level initiatives) with agreements between Batu City, Malang City and Malang District; between Ambon City and Central Maluku District; and between Kendari City and South Konawe District. The agreements between cities and districts require approval from the legislative branch of local government (DPRD) and getting this buy-in took a long time. APIK is happy with this achievement and the project has learned a lot about building these types of agreements in the future. These lessons and tips are included in the *Building Resilience – Lessons Learned Book* included in **Annex N**. TLR 4a is the number of businesses implementing climate change measures and the project has achieved 65% of the target (13 of 20). APIK was able to develop strong partnerships with multiple businesses throughout the project and had a number of other partnerships in the early stages of development when the project started the early closedown process. In addition, APIK worked with multiple SME's through the Indonesian Chamber of Commerce on business continuity planning, many of those businesses are at the early stages of implementing climate resilience measures but are not included in the results. TLR 4b measures private sector pilot activities in building resilience, APIK was able to reach 9 out 10 (90%) of the targeted activities.

Exhibit 18 summarizes the percentage achievement of all HLR's to date. In Table 13, APIK provides details of APIK HLR achievements. Table 14 shows APIK progress on TLR's achievements.

Exhibit 18: Graph Representation of HLR Achievement Against the Life of Project (LOP) Targets

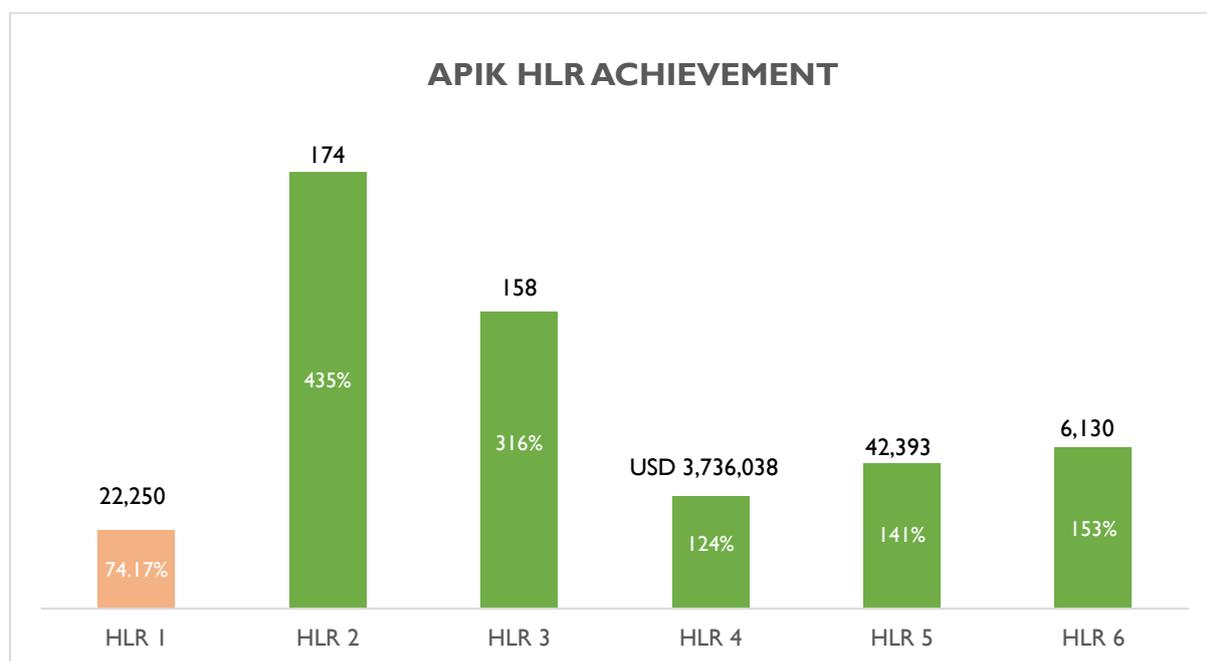


Table 13: High Level Results

HIGH LEVEL RESULT							
HLR 1. People participating in CCA/DRR training programs and activities							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
	Target						
Number of people trained in climate change adaptation or disaster risk reduction (with at least 30% demonstrating increased CCA/DRR capacity)	Target people trained			2,100	30,000		
	Target people trained (in water)			200	1,500		
	Target women trained				12,000		
	Target increased capacity				9,000		
	Target women increased capacity					3,600	
	Achievement						
	People trained	20,642	40	1,608	22,250	76.57%	74.17%

	People trained (in water)	830		0	830	0.00%	55.33%
	Women trained	8,310	18	794	9,104	>100%	75.87%
	Increased Capacity	7,498	18	253	7,751	>100%	86.12%
	Women Increased Capacity	2,694	8	110	2,804	>100%	77.89%
HLR 2. National/subnational Institutions with improved capacity to integrate and address climate change and natural disaster risk							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of institutions with improved capacity to assess or address climate change and natural disaster risks	Target			0	40		>100%
	Achievement	174	0	0	174		
HLR 3. Laws, policies, strategies, plans or regulations addressing CCA/DRR							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of Laws, policies, strategies, plans or regulations addressing CCA/DRR revised, proposed, or adopted at the national/subnational level	Target			0	50		>100%
	Achievement	150	7	8	158		
HLR 4. Amount of investment mobilized (in USD) for climate change as supported by USG assistance							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Amount of investment mobilized (in USD) for climate change or disaster risk reduction as supported by USG assistance	Target			\$0.00	\$3,000,000		>100%
	Achievement	\$3,693,321.28	\$33,268.57	\$47,256.85	\$3,736,038.89		

HLR 5. People supported to adapt to the effects of climate change or be more resilient to natural disasters							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of people supported by the USG to adapt to the effects of climate change or be more resilient to natural disasters (with at least 40% women)	Target: People Supported			0	30,000		
	Target: Women			0	12,000		
	Achievement: People Supported	39,696	196	2,697	42,393		>100%
	Achievement: Women	15,085	94	1,255	16,340		>100%
HLR 6. People using climate information or implementing risk-reducing actions to improve resilience to climate change or natural disasters							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of people using climate information or implementing risk-reducing actions to improve resilience to climate change or natural disasters	Target			0	4,000		
	Achievement	6,023	0	107	6,130		>100%

Table 14: Task Level Results

TASK 1							
TLR Ia. Laws, policies, strategies, plans or regulations addressing CCA/DRR revised, proposed, or adopted at the national level							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of national-level laws, policies, strategies, plans, or regulations	Target			1	10	100%	100%
	Achievement	9	0	1	10		
TLR Ib. National forums, tools, or other approaches operationalized to strengthen coordination on CCA/DRR mainstreaming							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of forums, tools, or other approaches operationalized to strengthen coordination on CCA/DRR mainstreaming among GOI ministries/agencies both horizontally (between sectors) and vertically (between levels of government)	Target			5	15	20%	40%
	Achievement	5	0	1	6		
TLR Ic. Changes made to the RAN-API based on lessons learned from the local level							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of changes made to the RAN-API based on lessons learned from the local level	Target			1	10	>100%	>100%
	Achievement	9	4	5	14		
TLR Id. CCA/DRR practitioners access new or strengthened networks for sharing lessons learned and best practices at the provincial and local levels							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of CCA/DRR	Target			0	500		>100%

practitioners that access new/strengthened networks for sharing lessons learned and best practices at the provincial and local levels	Achievement	611	0	0	611		
TLR 1e. Increased awareness of national stakeholders of the economic and other impacts of climate change and weather-related natural disasters							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Percent change of awareness of national stakeholders of the economic and other impacts of climate change and weather-related natural disasters	Target			35%	35%	0%	>100%
	Achievement	37.50%	0	0	37.50%		
TASK 2							
TLR 2a. Local government development plans, processes, budgets and/or operations reflect and address CCA and DRR							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of local government plan, budgets, process that integrate CCA/DRR Best Practices	Target			0	30		>100%
	Achievement	143	7	8	151		
TLR 2b. Subnational government staff demonstrate improved capacity to address and mainstream CCA/DRR							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of sub-national government staff who demonstrate improved capacity to address and mainstream CCA and DRR	Target			0	500		>100%
	Achievement	1,330	0	15	1,345		

TLR 2c. Climate change and disaster risk assessments are completed to inform and prioritize risk reduction, and capacity to update and replicate them is institutionalized							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of risk assessments completed with capacity to update/replicate institutionalized	Target			0	13		>100%
	Achievement	54	0	0	54		
TLR 2d. Multiple districts coordinating implementation of CCA/DRR measures that improve climate and disaster resilience at the landscape level							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
At least 10 districts coordinating through the establishment of landscape resilience strategies to address shared climate and disaster vulnerabilities	Target			0	10		70%
	Achievement	6	0	1	7		
TLR 2e. Community CCA/DRR measures implemented with sustainable support from local government							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of CCA/DRR measures implemented with sustainable support from local government	Target			10	100		>100%
	Achievement	125	0	6	131	60%	
TLR 2e-i. Number of people gaining improved service quality or access to basic drinking water services as a result of USG assistance							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 4%	LOP %
(i) Number of people gaining access to basic drinking water services or (ii) receiving improved	Achievement						
	Male	663	456		1119		

service quality from an existing basic water service	Female	682	299		981		
	Rural	1,345	755		2,100		
	Urban	0	0	0	0		
TLR 2e-ii. Number of people benefiting from the adaptation and implementation of measures to improve water resource management as a result of USG assistance							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of people benefiting from the adaptation and implementation of measures to improve water	Achievement	595	52		647		
	Male	307	27		334		
	Female	288	25		313		
	Water Allocation	0			0		
	Watershed Protection	286			286		
	Risk Reduction	302	59		361		
TASK 3							
TLR 3a. Climate and weather information (CWI) services/systems/products improved or developed to respond to relevant climate and disaster risks							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of climate and weather information (CWI)	Target			1	10	>100%	>100%
	Achievement	12	0	3	15		

services/systems/ products improved or developed in response to relevant climate and weather risks							
TLR 3b. Institutions in targeted areas with improved capacity to develop, disseminate, or apply tailored weather and climate information services as a result of APIK activities							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of institutions in targeted areas with improved capacity to develop, disseminate, or apply tailored weather and climate information services as a result of APIK activities	Target			7	65	42.86%	>100%
	Achievement	68	0	3	71		
TASK 4							
TLR 4a. Climate risk management actions implemented as part of business operations in companies across multiple sectors							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of companies, by sector, implementing climate risk management measures	Target			1	20	0%	65%
	Achievement	13	0	0	13		
TLR 4b. Private sector-related pilot activities contribute to local resilience							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of private sector-related pilot activities designed to reduce climate/disaster risks and	Target			1	10	0%	90%
	Achievement	9	0	0	9		

contribute to local resilience building							
TLR 4c. Awareness of the economic and other impacts of climate change and weather-related natural disasters improved among the private sector							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Percent change of awareness of targeted private sector stakeholders of the economic and other impacts of climate change and weather-related natural disasters	Target			35%	35%		> 100%
	Achievement	37.50%	0	0	37.50%		
TASK 5							
TLR 5a. Models developed and disseminated on successful integration of district, provincial and national strategies for CCA and DRR mainstreaming							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of models and examples of the successful integration of CCA and DRR by national and sub-national government agencies documented and disseminated to government agencies and donors across Indonesia	Target			0	12		> 100%
	Achievement	18	13	14	32		
TLR 5b. Tools/approaches/methodologies for integrating CCA and DRR vulnerability analysis and response/adaptation strategies used by other projects including USAID/OFDA							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of tools or methodologies developed by APIK and used	Target			0	10		100%
	Achievement	10	0	0	10		

by other projects including USAID/OFDA resulting in increased capacity to integrate CCA and DRR into their respective project activity plans							
TLR 5c. Number of APIK project update reports reviewed and approved/endorsed by technical team at semi-annual meetings							
Indicator	Performance	PY 1 - PY 4 Achievement	Q2 PY 5	PY 5	LOP (due date)	PY 5%	LOP %
Number of APIK project report (progress/annual) reviewed and approved/endorsed by technical team in every semi-annual meeting	Target			0	10		>100%
	Achievement	15	2	3	18		

APIK

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