

Darwin Initiative: Final Report

To be completed with reference to the “Writing a Darwin/IWT Report” Information Note: (<https://www.darwininitiative.org.uk/resources-for-projects/reporting-forms-change-request-forms-and-terms-and-conditions/>).

It is expected that this report will be a **maximum** of 20 pages in length, excluding Annexes)

Darwin Project Information

Project reference	25-005
Project title	Enabling ecosystems to deliver sustainable development goals at Lake Indawgyi
Country(ies)	Myanmar
Lead organisation	Fauna & Flora International (FFI)
Partner institution(s)	<ul style="list-style-type: none">• Nature and Wildlife Conservation Division (NWCD)• Forest Department (FD)• Indawgyi Environmental Conservation and Development Association (IECDA)• Indawgyi Natural Farming Association (INFA)• Inn Chit Thu Social Development and Eco-tourism Group (ICT)• Mohnyin Natural Greening Development Association (NGDA)• Wetlands Work (WW)
Darwin grant value	329,590 GBP
Start/end dates of project	July 2018 - August 2021
Project leader’s name	Frank Momberg
Project website/blog/social media	None
Report author(s) and date	Zaw Min Oo and Ngwe Lwin, 30 November 2021

1 Project Summary

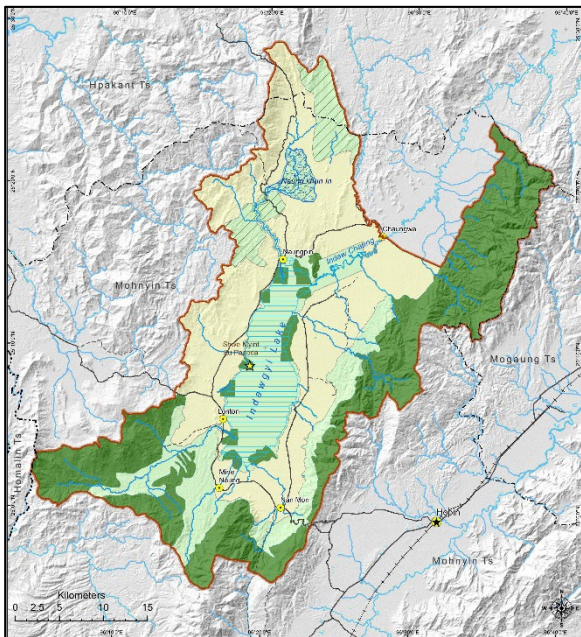
Indawgyi Lake, Ramsar site in the north of the country, covers 100 mi² and is the largest inland lake in Myanmar. It is also Myanmar’s most important wintering ground, being home to more than 20,000 winter and 2,000 resident water birds. Indawgyi’s wetlands, covering around 185 mi² support significant populations of threatened species, including Sarus crane (VU), woolly-necked stork (VU), peacock softshell turtle (EN), hog deer (EN), and six newly described endemic fish species. Watershed forests (approximately 215 mi²) surround the lake and support ecological niches for Chinese pangolin (EN), Asiatic black bear (VU), sun bear (VU), dhole (EN), Shortridge’s leaf monkey (EN), Eastern hoolock gibbon (VU), and rufous-necked hornbill (VU). White-rumped and slender-billed vultures (CR) are also present.

This rich biodiversity is under threat from multiple pressures: unsustainable firewood collection, illegal timber extraction, and agricultural encroachment in the upper watershed are causing soil erosion and sedimentation, whilst traditional low-input rice production is being replaced by more intensive agricultural methods that rely on chemical fertilizers and pesticides, threatening to pollute waterways through agricultural run-off. Poor sanitation facilities are an additional severe

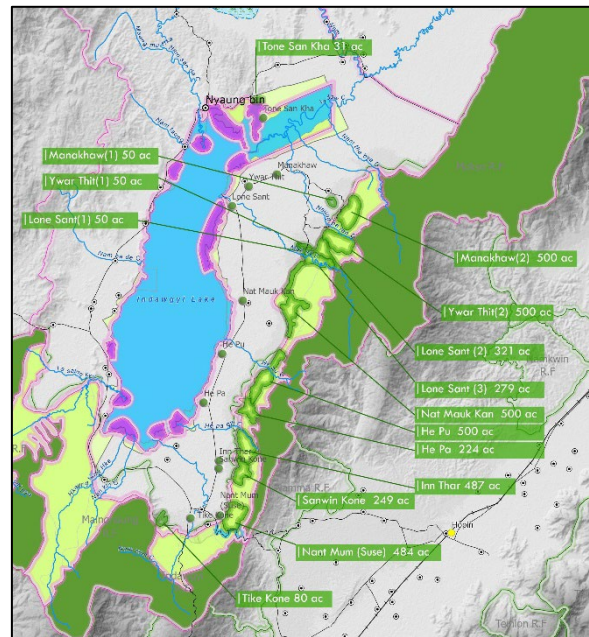
and increasing source of pollution in the wetlands. Elsewhere, at Lake Inle, where exposure to chemical fertilizers and degradation of the watershed have caused the lake to silt by 2m, the lake water has become unsafe for drinking, threatening biodiversity and human health. Taking early and mitigating action at Lake Indawgyi, therefore, was seen as critical.

The livelihoods of 30,000 indigenous people depend on the ecosystem services provided by Indawgyi's wetlands and forests. Most poor households undertake agricultural activities; farm sizes are small and many households lack sanitation. Addressing their urgent development needs is essential to promoting human health, economic development, and protecting the unique biodiversity of this globally important wetland.

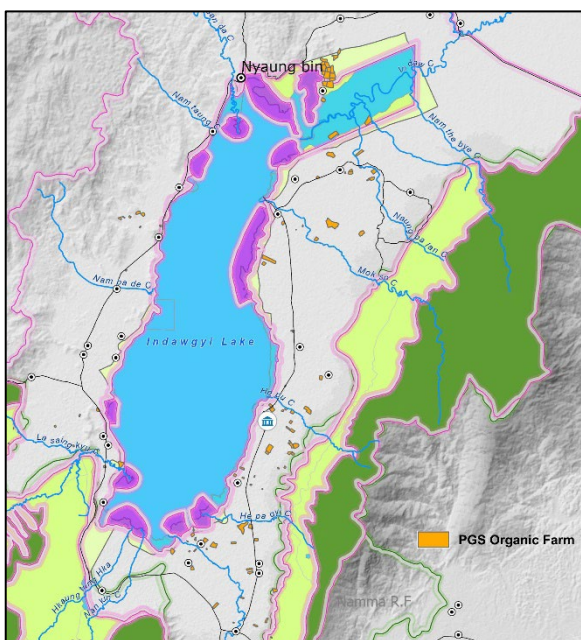
The project will protect forest and wetland biodiversity, including habitat for more than 20,000 birds and numerous threatened species in the globally important Indawgyi Lake Biosphere Reserve. It takes an ecosystems approach, at the watershed scale, building capacity for collaborative conservation management and improving natural resource management and local livelihoods, for benefitting 10,000 people.



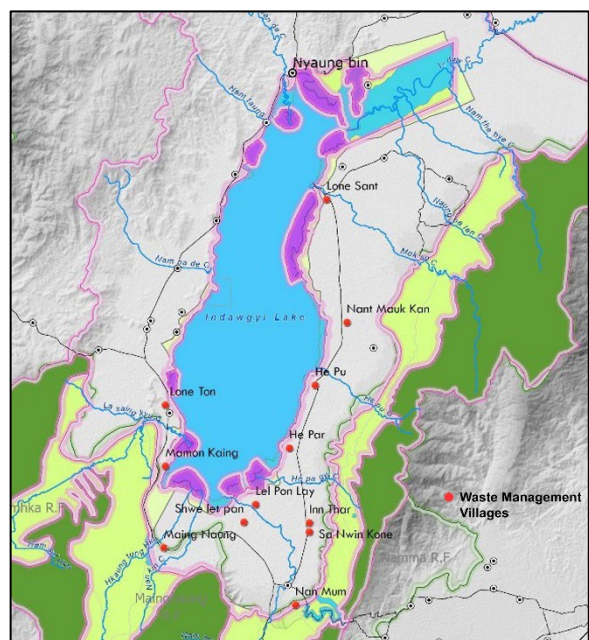
Map 1: Project area map (Indawgyi Biosphere Reserve)



Map 2: Community Forestry area map



Map 3: Organic Farming area map



Map 4: Waste management villages map

2 Project Partnerships

Overall, FFI led the project with several partnerships, with national and local organisations, being central to it. At the output level, specific partners were (see below for detailed descriptions of each partner):

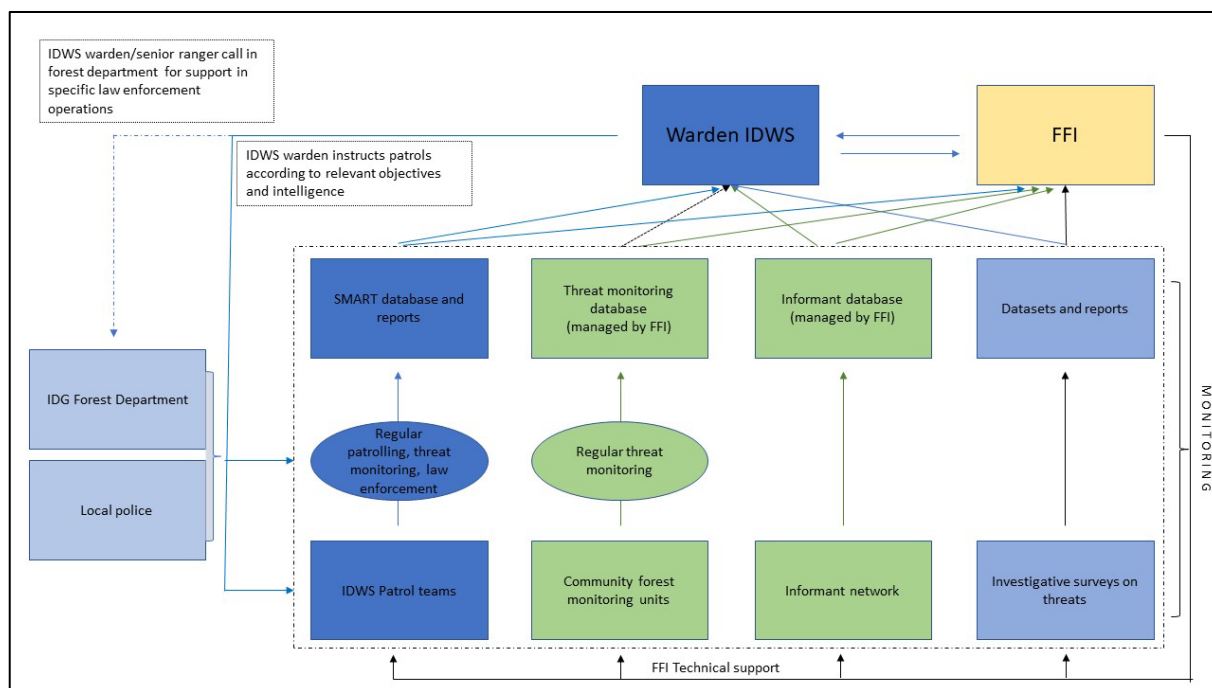
- Output 1 (biosphere reserve management), FFI signed a Memorandum of Understanding (MoU) with the Forestry Department (FD) and closely worked with the Wildlife Sanctuary Park, warden office (Nature and Wildlife Conservation Division - NWCD)
- Output 2 (buffer zone community forestry development), FFI implemented together with its partners, the Indawgyi Environmental Conservation and Development Association (IECDA) and Mohnyin Natural Greening and Development Association (MNGDA)
- Output 3 (organic farming development), FFI worked with the Indawgyi Natural Farming Association (INFA)
- Output 4 (village sanitation and waste management), FFI worked primarily with Inn Chit Thu (ICT) and Wetlands Work (WW). For waste management, FFI collaborated with all local organisations (social welfare, literature and culture association, young villages community) around Indawgyi.

Each output was assigned with one FFI field officer, working closely with partner-staff. FFI also met regularly (monthly) with partner's committees, to share activity plans and lessons learned. All relations developed positively over the reporting period, with several achievements relating to project planning, implementation, monitoring, achievements, and lessons learned.

2.1 Nature and Wildlife Conservation Division (NWCD), Forest Department (FD)

The capacity of the NWCD management unit (15 staff) for Indawgyi Lake Wildlife Sanctuary/ Indawgyi Biosphere Reserve (IBR) has significantly been improved in the following fields:

- Through a participatory process, the project supported the development and improvement of the overall collaborative law enforcement system:



- The Project has developed improved guidelines for SMART patrolling, provided class room and on-the-job training in collaborative SMART patrolling, which included threat monitoring, community-based intelligence work, patrolling and law enforcement. Intelligence gathering has been significantly improved through the establishment of informant networks, and patrol coverage has significantly increased in north-east, east and south core zone forest.
- The project supported annual drone-based monitoring of encroachment in the critical wetland habitats of the Indaw Chaung seasonally flooded grasslands with over 1,100 ha area. The

monitoring data shows that encroachment has been significantly reduced during the project period, when a comprehensive awareness raising and collaborative patrolling campaign has been in place.

- FFI supported the establishment of joint lake patrols of NWCD rangers with township fishery department officers, which has led to increased capacity of fisheries department officers and NWCD rangers to patrol and enforce fisheries laws, of the no-take zones in the lake.

2.2 Indawgyi Environmental Conservation and Development Association (IECDA) and Community forestry/ Mohnyin Natural Greening and Development Association (MNGDA)

The IECDA was established in 2014 to conserve the watershed forest of Indawgyi, with members mainly from existing community forestry user groups (FUGs). The association initially developed five Community Forests (CF) at Indawgyi in 2012, introducing agroforestry (AF) methodologies to generate additional income for FUG members. Awareness raising activities, such as forest conservation awareness talks, in Indawgyi villages, and an annual exhibition of CF practices, in the Shwe Myit Zue pagoda festival, were led by IECDA.

The Mohnyin Natural Greening and Development Association (MNGDA) is based in Myohnyin township and promotes CF development in the Mohnyin watershed forest, located on the opposite side of Indawgyi watershed forest.

Both IECDA and MNGDA received technical and financial support from the project to develop and improve their activities; IECDA recruited two staff, with financial support from the project, provided training in bookkeeping and distributed CF instructions flyers among FUG members. The project team worked closely with these staff and discussed CF activity plans frequently with IECDA committee members. The project team met occasionally with MNGDA and discussed the status of CF in Mohnyin site, particularly focusing on their importance as a protective boundary for the Indawgyi CF site. The association received CF/AF technical training and organisational development training from the project.

2.3 Indawgyi Natural Farming Association (INFA)

Indawgyi Natural Farming Association (INFA) was formed in 2017 as a local organisation with the aim to conserve the lake ecosystem through natural farming. As soon as the association established, INFA introduced natural farming methods on paddy and dry-season crops (soybean, groundnut and garlic) with 20 acres of land as a field trial and awareness-raising tool. In 2018, the project introduced a Participatory Guarantee System (PGS¹) in Indawgyi to promote organic farming from small group of farmers to the broader farming community.

Through its collaboration with the project, INFA members received training and technical support. Two additional staff were also recruited, using project funds, to implement organic farming activities. Annually, the INFA committee and their staff organised awareness-raising talks in the villages around Indawgyi, to promote interest in organic farming. INFA's membership also increased, in relationship with the township agricultural department, after receiving rice seed production training in 2019.

Training in PGS was delivered by the Myanmar Organic Grower and Producer Association (MOGPA), involving over 200 members of INFA, in 2020. INFA membership also increased, from 12 in 2017 to 160 in 2019. Including INFA members, 193 farmers received a PGS organic certificate in 2020. With a proposal by INFA to produce quality rice for the regional organic market, the building of a 22-ton rice mill, with a 5-ton capacity paddy dryer, was supported by the project. INFA members prepared a supply chain for organic rice in 2021 by establishing a cooperative investment system, based on market demand and milling capacity.

¹ Participatory Guarantee Systems are locally focused quality assurance systems for certifying producers based on active participation of stakeholders. They are built on a foundation of trust, social networks and knowledge exchange ([IFOAM Organics International](#)).

2.4 Inn Chit Thu (“Lovers of Indawgyi”)

With the aim to develop ecotourism in Indawgyi, Inn Chit Thu (ICT) was established in 2013 with 30 members, increasing to 85 by 2020. As a local organisation, ICT delivers tourism services, introducing waste-management awareness and campaigns in villages and festivals. As a partner, ICT work together with FD and FFI, contributing to an environmental awareness program in Indawgyi Wetland Education Centre (IWEC), which opened in December 2020.

Inn Chit Thu also worked together with FFI on the development of household wastewater (‘HandyPod’² – see below) systems, along with waste-management awareness-raising in villages and tourism destinations. The project supported the recruitment of two new staff members to ICT, responsible for implementing and developing sanitation awareness packages, together with the project team. ICT members and local business operators (a group of three people from Lone Ton) received training in the construction of HandyPods, delivered by the project partner Wetlands Work (WW). A total of 144 HandyPods were in placed and used by household family and visitors.

Inn Chit Thu also received training in hospitality, guiding and in management, all in support of their role in running the IWEC. Consequently, ICT improved in organisational development, financial management, work planning and technical reporting, particularly in relation to the visitor education centre.

2.5 Wetlands Work (WW)

Wetlands Work is a social enterprise based in Cambodia. WW introduced innovative wastewater treatment systems in villages around Tonle Sap Lake and promoted awareness of wetland values. They designed and developed a clean sanitation (toilet) system, named HandyPod, by using a series of plastic tanks which can be setup in flooded households.

By partner with WW, ICT and local business operators received technical support from WW facilitated by project team. Members of WW travelled to Indawgyi in 2018, 2019 and formulated HandyPod design which are fitted with Indawgyi households. WW also supported feasible monitoring tools for assessing algae mat distribution.

3 Project Achievements

3.1 Outputs

Output 1. A decentralised and collaborative management committee and mainstreamed ecosystem services approach places the Indawgyi Lake Biosphere Reserve under management systems that respect integrated development and biodiversity needs

The Indawgyi Biosphere Reserve (BR) management committee held major annual meetings, with representatives from local CSOs and communities, to update them on conservation activities and sharing the lessons learned. In addition, more targeted meetings were held, on a regular basis, to discuss possible collaborative activities.

A total of 67 (M60:F7) participants in Year 1, 61 (M52:F9) in Year 2 and 29 (M25:F4) in Year 3 joined the annual meetings, with each stakeholder group sharing information on activities such as patrol coverage and achievements, community forestry operations, organic farming status, sanitation and waste management initiatives, and tourism operations. (Indicator 1.1; Annexes 7.1.1, 7.1.2 & 7.1.3)

The Indawgyi civil society network (each CSO chairman was under BR management support committee) also met, bi-annually, for collaboration of their conservation activities. According to the project’s Knowledge, Attitudes & Perspectives (KAP) survey report, members of CSOs increased their conservation knowledge through exchange and collaboration in activities

² The HandyPod is an innovative wastewater treatment technology pioneered by Wetlands Work, Ltd. for floating and flood prone communities and all challenging sanitation environments ([Wetlands Work Ltd.](#)).

concerned with environmental awareness, eco-tourism development, waste management and financial management (Indicator 1.4; Annex 7.1.8). Fifty-five members from local organisations and communities shared their activity plans and discussed ways to collaborate on activities at five separate meetings in project Years 1, 2 and 3, (Annex 7.1.9).

A MoU between three Biosphere Reserves (Elbe River, Spreewald, Schorfheide-Chorin), of the German state of Brandenburg, and Indawgyi BR was signed in Year 1. According to the MoU, a total of 17 representatives of Indawgyi BR management support committee received training from the three BRs in Germany. Training topics included BR governance and management, environmental education, water quality monitoring, sustainable agriculture, communal waste management and eco-tourism, and were delivered through a regular annual exchange and training program in Years 1 and 2 (Indicator 1.2; Annex 7.1.4).

A total of 15 patrol team members, from Indawgyi BR, Department of Fisheries (DoF), took part in a series of training programmes (November 2018 and November 2019), covering SMART patrolling and the use of CyberTracker for effective and collaborative patrolling. Due to the subsequent improvements in patrolling (15 days/month) to cover more than 50% of the total forest area and 100% of the waterbody, the level of threat from illegal logging, in the Indawgyi BR, decreased within three years (2018-2020) in north-east, east, and south core zone forest. The number of actions taken for illegal logging, such as arrest, written warning, and the destruction and/or confiscation of equipment, fell dramatically from 70 cases in 2018 to two in 2020 (Indicator 1.3; Annexes 7.1.5 & 7.1.6; Table 1).

Table 1. Law Enforcement Indicators for Illegal timber logging (2018-2020)

No.	Year	Arrest	Written warning	Destroyed abandoned camps	Confiscation item	Total
1	2018 (Jan-Dec)	4	32	18	16	70
2	2019 (Feb-Dec)	3	1	9	15	28
3	2020 (Jan-Dec)	0	0	2	0	2
	Total	7	33	29	31	100

A village-based informant network established in Year 1, with 22 informants, received training on methods for collecting and reporting information as well as field skills such as handling GPS and reporting via short message through a mobile network. The number of illegal activities reported by the informant network reduced from 76 in 2018 to 38 in 2020 (Annex 7.1.6; Table 2).

Table 2. Illegal activities reported by the informant network

Description	2018		2019		2020		Total
	1 st half	2 nd half	1 st half	2 nd half	1 st half	2 nd half	
Number of reports	62	14	14	18	30	8	146

Unmanned Aerial Vehicles (UAVs) and satellite imagery were used to assess changes in land-cover and vegetation status, in Indaw Chaung river in Years 1, 2 and 3 (2018 to 2020). Observed data was compared with UAV records from 2016 and 2017, and the subsequent map showed there was no new cultivation along the river, though 248 acres of newly burnt grassland was recorded in Year 1 (Annex 7.1.7).

Output 2. Community forestry and agroforestry in designated buffer zones of Indawgyi Lake Biosphere Reserve reduce deforestation and forest degradation, while maintaining access to essential natural resources

After the village awareness meetings on community forestry and forest protection, organised together with IECDA, communities from the Indawgyi region show a good awareness for

conserving their natural forest resources and watersheds area. As the watershed area is an important source of water for village use, communities have shown an interest in reforesting the buffer zone and in becoming members of a CF forest user group (FUG). As the communities increased interest in reforestation, a total 20 FUGs, representing 981 households, were formed in Years 1 and Year 2 (Indicator 2.1; Annex 7.2.3). Each CF FUG set-up a committee based on nomination schemes and formulated responsibilities. With increased FUG member capacity and the establishment of tree nurseries and tree planting schemes, 286 acres of the degraded forest area was reforested during the project. A total of 145 members of 20 FUGs received training, over three sessions, on CF/AF technical concepts and bookkeeping, and basic forest inventory and management planning, in Years 1, 2 and 3 (Annexes 7.2.5, 7.2.6, 7.2.7). 235

In February and December 2020, 74 FUG members received training in basic forest inventory and management planning. Community forestry FUG members expressed an interest in obtaining CF area permission from the FD and 121 members (M=76, F=45), from nine FUGs, joined a CF law awareness talk, in December 2019, to discuss this. Moreover, a total of 332 (M248:F84) members, from 11 FUGs, also participated in a CF law awareness talk in March and December 2020. After the discussion, 11 FUGs delineated their CF area together with Wildlife Sanctuary staff in January 2021, allowing maps and plans for each CF area to be prepared and submitted to Indawgyi Wildlife Sanctuary authority, as application for CF area permission (Indicator 2.2; Annex 7.2.2).

In August and September 2019, nine FUGs, formed in Year 1, planted a total of 35,640 seedlings on 51 acres of degraded land in the Indawgyi BR buffer zone forest. In Year 3, 20 FUGs also produced 180,000 seedlings, with 126,342 trees planted in degraded forest, covering 235 acres of degraded forest (Indicator 2.3; Annexes 7.2.1 & 7.2.2).

Each FUG prepared documents relating to CF operation in buffer zones, submitted them to FD in January 2021. They are, at the time of writing, being processed and if approved, full management plans will be prepared and submitted for CF certificates. (Indicator 2.4)

Up until 2012, when community forestry began in Indawgyi, traditional wood burning stoves were widely used, for household cooking, in Indawgyi villages. In 2014 and 2015, seventeen villages received firewood-saving stoves (locally known Indawgyi stoves), supported by previous FFI projects, to address the extraction of firewood from watershed forests. With the firewood-saving stove, firewood consumption per household can be reduced by up to 50%. From 2015 to 2017, Indawgyi villages were gradually connected to the national power grid, making the use of electric stoves for cooking an option. However, at the start of the current project, in 2018, households showed a preference for using firewood-saving stoves, as access to electricity remained sporadic. Later, households showed an increased interest in both electric and firewood-saving stoves, over more traditional wood-burning alternatives, and firewood-saving stoves were used for both every day and special use (for festivals and events) cooking. According to the stove utilisation survey of FUG members, in July 2021, 78% are now utilising firewood-saving or electric stoves (48% electric stove and 30% firewood-saving stove); the remaining 22% continue to use traditional wood-burning stoves, particularly in farm huts (Indicator 2.5; Annex 7.2.4).

Due to the effectiveness of law enforcement initiatives and the informant's network, illegal logging decreased significantly from 2018 to 2021 (Annex 7.1.6; Table 1).

Output 3. Organic rice farming and value-adding practices result in certified organic products that provide income to at least 200 households and protect wetland biodiversity

From a population of more than 2,000 farmers in the Indawgyi region, 205 farmers were involved in the organic project, becoming members of INFA. Of these, 193 farmers completely followed the Participatory Guarantee Systems standard, passing internal control systems and obtaining certification as organic farms.

The project recruited new farmers annually to take part in training in organic farming, underpinned by growing awareness of the impacts of chemical fertilisers and pesticides on Indawgyi Lake. A total of 205 farmers joined training on organic methods, delivered by Dr. Than Than Sein (MOGPA). (Indicators 3.1 & 3.3; Annexes 7.3.1, 7.3.2, 7.3.3, 7.3.4 & 7.3.5; Table 3).

Table 3. Organic Farming trainings in Indawgyi (2018-2021)

No.	Year	Training Title	Number of Participants
1	2018 (Jun)	Introducing of Organic farming	106
2	2018 (Jul)	Organic farming methods and PGS Internal Control System	61
3	2018 (Aug)	Organic farming methods and PGS Internal Control System	59
4	2019 (May)	Introducing of Organic farming and PGS system	157
5	2019 (Jun)	Organic farming methods and natural fertilizers/ pesticides (<i>Trichoderma</i>) production	52
6	2019 (Aug)	Organic farming methods training and problem-solving meeting	49
7	2020 (Jul)	Introducing of Organic farming and PGS system	41
8	2021 (Jun)	Introducing of Organic farming and PGS system	153

After attending the training, 106 farmers (representing 106 households) followed PGS standards in farming practices in Year 1. In Year 2 and 3, the number of active organic farmers increased from 106 to 205 (Indicator 3.3; Annex 7.3.8).

After installation of a 22-ton rice-mill and 5-ton capacity paddy dryer in December 2020, three INFA members received 5-days training in the operation and maintenance of the rice-mill, as delivered by the mill constructor and local rice-mill expert. Under 14% paddy moisture content, rice mill can produce 18% high quality rice (for consumption) and 7% broken rice (for animal feed) (Indicator 3.2; Annex 7.3.9).

Due to an organic farming awareness talk by INFA, and training delivered by MOGPA from 2018 to 2020, the area of land under organic farming increased from 547.7 ac, in 2018, to 982.26 ac in 2020. Based on 200 organic farming households, farmers who certified PGS organic also increased from 34% in 2018 to 96.5% in 2021 (Indicator 3.4; Annexes 7.3.5, 7.3.6 & 7.3.7; Table 4).

Table 4: Numbers of farmers certified for organic from 2018-2020.

No.	Year	Crop	Certificate Type		Total	Area (ac)
			Organic	Conversion		
1	2018	Paddy	58	-	58	543.8
		Vegetables	10	-	10	3.9
Sub Total			68	-	68	547.7
2	2019	Paddy	87	25	112	828.94
		Fruit Tree	14	2	16	87.50
		Vegetables	15	4	19	14.70
		Tea	10	-	10	19.00
Sub Total			126	31	157	950.14
3	2020	Paddy	104	44	148	831.33

	Fruit Tree	20	-	20	94.43
	Vegetables	13	-	13	16.5
	Tea	12	-	12	40
Sub Total		149	44	193	982.26

The project helped to develop and expand linkages between Indawgyi organic rice and local, Myitkyina, Mandalay and Yangon organic markets. Paddy was bought from organic farmers at prices that were 3.3% higher, per basket, than that of conventional stocks, and milled in the INFA rice-mill. High quality rice was exported to regional markets at 7.4% above the current price. Because of lower production costs and a small premium on the price of rice, 85% of organic farming households increased their income via organic farming; increases ranged from 1.27% to 22.56%, compared to conventional farming (Indicator 3.5; Annex 7.3.10).

As a status indicator of wetland eco-system health and function, the number of waterbirds observed across the open lake and agricultural fields, in Indawgyi, was recorded. According to the annual mid-winter counts (Asia Waterbird Census) carried out over the three years from 2019 to 2021, the number of water birds recorded increased from 16,496 to over 22,000 individuals, during the project period (Indicator 3.6; Annex 7.3.12).

Output 4. At least 1,000 households (c. 5,400 people) participate in community waste collection and safe disposal; at least 200 households (c.1,000 people/ approx. 50% of all households in flood prone areas) benefit from improved sanitation systems in flood prone areas with eutrophication problems

Poor sanitation facilities are an additional, severe and increasing source of pollution in the wetlands. Improved household sanitation was introduced to prevent eutrophication in Year 1. In July 2019, a local business operator (a group of three persons from Lone Ton) and members from Inn Chit Thu received training, delivered by Wetlands Work (WW), on the construction of HandyPods. As of August 2021, 144 HandyPods, representing 144 households in 9 villages and 1 tourist destination (Shwe Taung), were being used, resulting in clean sanitation systems. (Indicator 4.1, Annexes 7.4.1 & 7.4.2)

Plastic waste is another key issue in the Indawgyi area, and one of the main sources of pollution in the lake and the inflow rivers. This is a direct result of the dumping of household and commercial waste into the lake and rivers, itself resulting from a lack of designated land-fill sites and the absence of any waste collecting systems. Since the implementation of waste management awareness-raising, and active waste collection by the Indawgyi Social Development Association (ISDA³), the number of villages participating in village waste collection programmes increased from three in Year 1, to 10 in Year 3. Operational costs were financed by this project and voluntary donations from local users. Each month this represents over 10 tons of waste, from over 2,907 households, being disposed of properly. Moreover, the waste dumping site from six villages and two tourism sites (HoPhar and 11-mile viewpoint) are now regularly maintained by a local waste management group (Indicator 4.2; Annex 7.4.3)

3.2 Outcome

Participatory management systems, sustainable natural resource-use protocols and improved sanitation bring biodiversity benefits to the Indawgyi Lake Biosphere Reserve, as well as livelihoods and health benefits to more than 10,000 residents living around the lake.

- a) By the end of 2020, a collaborative management committee for Indawgyi Lake Biosphere Reserve will be established and operating.

³ ISDA (formerly known as Parami Funeral Association) is a community-based organisation from Nam Mun town and operating village waste collection since 2016, after receiving a small waste-collection truck from another FFI project.

A biosphere reserve management committee was established and meetings with all relevant stakeholders have been organised in July 2018, October 2019 and January 2021. Based on the Biosphere Reserve's five (5) year management plan, stakeholders discussed annual work plans, completed activities, and agreed follow-up actions. (Indicator 1; Annexes 7.1.1, 7.1.2 & 7.1.3)

b) By August 2021, at least 200 farming households adopt organic farming practices near lakeshore areas with eutrophication problems.

As a result of training and technical support provided by the project, a total of 1,178 family members, representing 205 farming households (M605:F573) adopted and followed PGS organic farming practices. As of August 2021, 221 farmers have participated in internal control systems. By following PGS standards, 68 farmers obtained certification in 2018, 157 farmers in 2019 and 193 farmers in 2020 (Indicator 2; Annex 7.3.8).

c) By August 2021, at least 20 forest user groups adopt community forestry (CF) and agroforestry (AF) practices, establish wood-lots and reduce the consumption of firewood.

After the village awareness meetings, on the community forestry and forest protection, nine forest user groups (FUGs) were formed, with a total of 539 households in nine villages located close to the designated buffer zone, in 2019. In 2020, an additional 11 FUGs, with 442 households, were formed. As of 2020, a total of 20 CF user groups, representing 981 households (723 active members) were following CF/AF practices and establishing wood-lots. Annually, from February to June, each FUG raised 8,000 to 10,000 seedlings in tree nursery sites located close to their villages, planting trees in the buffer zone from July to November, each year. The consumption of firewood reduced significantly to 37% (from 90% in 2015). This results from improved access to electricity, from 2017, and the introduction of firewood-saving stoves between 2014 and 2015 (Indicator 3; Annexes 7.2.3 & 7.2.4).

d) By August 2021, improved household sanitation in flood-prone villages and communal waste management reduce pollution of the lake.

Local partners (two members of ICT and a local business operator) received HandyPod construction training in Year 2 and construction was started in 50 households, together with members of Inn Chit Thu, in 2019. Between July 2020 and May 2021, 144 HandyPods were constructed and distributed in nine villages and one tourism site, close to the lake basin (Indicator 4, Annex 7.4.1).

In February 2020, ISDA received financial support from the project to extend village waste collection activities to seven villages: Maing Naung, Sanwinkone/Innthar, Hepar, Shwe Let Pan/Lel Pon Lay, Ma Mon Kaing, Hepu and Nant Mauk Kan (three villages in Year 1; four in Year 2). Since December 2018, the ISDA waste-truck was collecting from three villages once a week, and from February 2020, a waste-truck was operating 14 days per month (three days in Nam Mun and the rest in other villages) in seven villages (Maing Naung, Sanwinkone/Innthar, He Par, Shwe Let Pan/Lel Pon Lay, Ma Mon Kaing, Hepu and Nant Mauk Kan), properly disposing of 10 tons of waste per month. By the end of August 2021, a total 2,907 households were actively participating in the village waste management system (Indicator 4; Annex 7.4.3).

3.3 Monitoring of assumptions

All assumptions remain valid and there have been few changes during the project implementation; though it must be noted that COVID-19 restrictions came into force from March 2020 and a military coup, disrupting life throughout the country, occurred in February 2021.

Outcome Assumptions

1) Myanmar government continues to support multi-stakeholder engagement in protected area management.

Until January 2021, the Myanmar government fully supported collaborative protected area management, working with multiple stakeholders. However, from February 2021 (post-coup), the relationship between the FD and local communities, local organisations and international organisations, came close to collapse; communications partially resumed in July 2021.

2) The security situation in Indawgyi remains safe.

In geographical location, Indawgi BR is surrounded with high elevation forest, acting as a barrier between other townships. Although conflicts frequently occurred in townships close to the northern region of Indawgyi BR, travelling around Indawgyi remains possible and the area remains safe, with only two conflict-events occurring in Indawgyi during the project period.

- 3) The market demand for value-added organic/ gluten-free rice products (rice flour) continues to grow.

Market demand for organic rice continues to grow in both local and regional markets, particularly in Myitkiyna city. In Mandalay and Yangon markets, Indawgyi organic rice became very popular for making sushi rolls and rice porridge.

- 4) Myanmar government continues to support the issuance of community forestry licences in the buffer zones of protected areas.

A total of 20 CF user-groups applied to the FD for CF land permits, via the park warden, and these are, at the time of writing, being processed. As indicated in Outcome Assumptions (1), FD partially resumed their operations in June 2021, after the military coup.

- 5) Improvements in waste management and sanitation lead to a decrease in water-borne disease and infection.

As 10 villages are now participating in village waste collection and dump site maintenance, overall waste management has improved in Indawgyi. However, we were not able to detect a decrease (or otherwise) in water-borne diseases and infections, during the project period.

Output 1 Assumptions

- 1.1) Myanmar government continues to support multi-stakeholder engagement in protected area management.

Refer to Outcome Assumption 1.

Output 2 Assumptions

- 2.1 Myanmar government continues to support the issuance of community forestry licences in buffer zones of protected areas.

Refer to Outcome Assumption 4.

- 2.2 Major natural disasters do not take place within the project sites and period that undermine the access to or availability of forest and forest products.

This assumption still reflects the situation at the end of project; there was no high-risk disaster in the project site to access the forest area. Twenty FUGs established tree nurseries with tree numbers ranging from 8,000 to 10,000, per FUG, in Years 2 and 3 and planting in areas of the degraded buffer zone occurred annually.

Output 3 Assumptions

- 4.1 The domestic and international markets for organic rice and gluten free products continues to grow during the project period.

Refer to Outcome Assumption 4.

- 4.2 The ability of Myanmar to export to international markets does not alter significantly during the project period.

Indawgi rice is mainly distributed in local and regional markets. Based on market assessment, Indawgi rice (non-organic) is also exported to international markets through border trade with China. As a result of the military coup, and the Covid-19 pandemic, border trading closed from February 2021.

- 4.3 SMM remain financially stable and committed to developing the Indawgyi supply chain.

Based on the market demand and INFA proposal, a rice mill was setup in Indawgyi to produce quality rice instead of rice flour. SMM (Shan Maw Myae) itself produces rice flour and has recorded a drop in demand from Indawgyi, thus the project changed its plan in Year 2 and ended its partnership with SMM.

- 4.4 If only organic agricultural inputs are in use then the chemical inputs and run off will proportionally reduce.

As of Year 3, a total of 205 farm households following PGS organic standards with limited use of chemical and thus partially reduced run off from agricultural field.

Output 4 Assumptions

- 4.1 Local communities willing to change behaviour in favour of improved sanitation and waste management.

Local communities are willing to change their behaviour in favour of improved sanitation and waste management, as demonstrated by a total of 2,907 households actively participating in the new village waste management scheme.

- 4.2 There are no significant lakeside developments in this project period that cause an additional source of untreated waste pollution to the lake.

There were no development projects on the lake site during the project period.

3.4 Impact: achievement of positive impact on biodiversity and poverty alleviation

The impact of the project, as stated in the application form, was: The collaborative management and ecosystem services approach achieves effective biodiversity conservation and improved livelihoods in Indawgyi. Lessons learned are shared in Myanmar and through the global network of Biosphere Reserves.

Regular meetings between the Indawgyi BR management committee and key stakeholders, and regular meetings of the Indawgyi CSOs network, increased collaboration between the management committee and key stakeholders and among the CSOs network. Based on the KAP survey conducted in 2021, levels of knowledge about biodiversity conservation increased amongst BR management committee and CSO members, leading to improved collaboration and participation in biodiversity conservation (Annexes 7.1.1, 7.1.2 & 7.1.3).

Twenty forest user-groups formed during the project, produced seeds, and planted seedlings in degraded forest areas, located in the buffer zone of Indawgyi BR, in 2018, 2019 and 2020. A total of 286 acres of degraded forest area in Indawgyi Biosphere Reserve was reforested with 94,870 seedlings (Annexes 7.2.1 & 7.2.2).

Members of the Indawgyi Natural Farming Association increased their knowledge on organic agricultural systems; 205 farmers followed the organic rice farming practice in the 2020 farming season. Institutional capacity of INFA was also improved and INFA has already capacity to operate organic rice mill (Annex 7.3.8).

Members of patrol units, for both forest and lake patrols, have significantly improved their capacity in SMART patrols to control illegal activities. In particular, the fishery department improved their skills for patrolling and law enforcement operations. Functioning of informant networks was also one of these activities. During 2018 and early 2021, more than 50% of illegal timber extraction and firewood collection decreased due to the regular patrol and informant network operation (Annexes 7.1.5 and 7.1.6).

Annual waterbird censuses were conducted in 2019, 2020 and 2021 to monitor changes in waterbird numbers on the lake and showed an increase in 2020 (Annex 7.3.12). The area coverage of algae bloom, which normally occurs in the lake between September and November, was calculated with remote sensing and indicated that the area of algae bloom had not increased since 2017 (Annex 7.4.2). Based on these two indicators, the water quality of the Indawgyi Lake can be assumed to be, at least, stable during the project period.

A total of 2,907 households from ten villages actively participated in the waste collection and landfill site management programme and reduced plastic pollution on land and in lake (Annex 7.4.3). A total of 144 households at nine villages used the HandyPods sanitation system, introduced by the project, and reduced the release of sewage into the lake (Annex 7.4.1).

A household income survey showed that 85% of organic farmers increased their income via organic farming from 1.27% to 22.56%, when compared to conventional farming (Annex 7.3.10).

4 Contribution to Darwin Initiative Programme Objectives

4.1 Contribution to Global Goals for Sustainable Development (SDGs)

This project supports SDG#15 by protecting and sustainably managing forests, and associated biodiversity, through collaborative protected area management; contributes to Targets 15.1, 15.2, 15.5 & 15.7, by introducing and fostering decentralised and collaborative management structures that encourage greater community voice and participation.

Additionally, through the approach and activities, this project contributes to SDG#1, Target 1.1, by decreasing the number of people living on less than \$1.25 per day, through the introduction of post-harvest processing and production of value-added organic rice products that secure premium prices and for which market demand is increasing. Target 1.4 is addressed by securing legal access rights, for local communities, to forest and wetland resources through implementing newly designated buffer zones.

The project contributes to SDG#2, Target 2.4, by implementing resilient agricultural practices – organic rice and dry-seasons crops - that maintain ecosystem services, and that mitigate an emerging threat to land and water quality, namely chemical agricultural inputs.

Women are actively involved in management and this project is ensuring women take meaningful decision-making roles, thereby contributing to SDG#5, Target 5.5.

Promoting organic agriculture mitigates the use of chemicals, thereby safeguarding and improving water quality, contributing to SD#6, Target 6.3; addressing water and sanitation needs around the lakeside also contributes to Targets 6.2, 6.6 and 6b.

The project has contributed to sustainable production by promoting organic inputs and achieving organic certification, thereby positioning natural resources explicitly as the economic asset on which this economic activity depends. This decouples economic growth from environmental degradation, directly contributing to SDG#8, Target 8.4; as does the project's support to farmers achieving organic certification.

4.2 Project support to the Conventions or Treaties (e.g. CBD, Nagoya Protocol, ITPGRFA, CITES, Ramsar, CMS, UNFCCC)

The project has supported 205 rice farmers to establish sustainable rice cultivation in the Indawgyi area to reduce the impact on the lake.

Sustainable rice cultivation is a particular area of focus for the CBD in Myanmar, recognizing the threats and opportunities posed by the industry. Target 7.1 requires that 'By 2020, SRI and other forms of environmentally friendly rice production have been implemented in 10% of rice paddy area'. This project, through Output 3, directly addresses this target and both supporting actions.

The NBSAP aims for improved management of protected areas. The project contributed to improved collaborative management of the Indawgyi Biosphere Reserve, including collaborative patrolling and law enforcement.

4.3 Project support to poverty alleviation

The project is supporting poverty alleviation by improving the rice cultivation system from non-organic agriculture to organic agriculture, enabling farmers to decrease costs (from agricultural inputs) and increase household income from higher sale prices, thus improving profit margins.

The project also supported market development for stakeholder's products, by improving linkages with the premium market for their quality products. From Year 2, Indawgyi organic rice received 6% higher price than non-organic rice in regional and Mandalay markets. From 2019 to 2021, 985 bags (48kg) were sold, contributing to increases in the incomes of 18 households. From Year 3, a newly set-up rice mill was operating and INFA received income from the rice mill.

The project supported the improvement of 144 household sanitation systems, through the installation of the HandyPods sanitation device, and in waste management systems at ten villages, covering 2,907 households, by organising the collection of over 10 tons of waste, each month and preparing village waste-dumping sites.

The project supported 20 forest user groups in the production of seedlings and in the planting of trees in their community forest areas; during the project period, more than 161,982 seedlings were planted in 286 acres of degraded forest area.

These improvements in sanitation and waste management systems, and the support of tree planting in degraded forest areas, sustained forest ecosystem services and contributed to a cleaner freshwater ecosystem for local communities living in the Indawgyi region.

4.4 Gender equality

Both women and men are key stakeholders in all aspects of the project. However, under equal opportunity, more men than women participated in trainings (about 80% men and 20% women) and meetings (about 80-90% men and 10-20% women). The project also encouraged women to join the community forestry and farmer groups, particularly families, with female heads of household, who do not own farmland. The project also facilitated the forming of a group to join the Green Land Social Development Association (42-woman group) and delivered value-added products (dry bamboo shoot, fry soybean, dry turmeric and dry garcinia fruit) producing training in August 2020 and April 2021. With the facilitation of the project, the Green Mother group (M=4, F=16) regularly received technical support from MOGPA to produce Indawgyi organic tea.

However, in recognition of gender bias in activities such as CF, FFI organised a gender equality training workshop in Year 2, with 27 participants (M16:F11), targeting FFI project staff and members of CSOs working in the Indawgyi area. The training developed guidelines for participation of women across all project activities and these are now being applied from Year 3 activities onwards (Annex 4.4.1). In organising trainings and meetings, the project team sent separate invitation letters to ensure that information was received by both men and women.

4.5 Programme indicators

- **Did the project lead to greater representation of local poor people in management structures of biodiversity?**

The project promotes community forestry in degraded buffer zone forest and organic farming in the lowlands around the lake basin, to reduce threats on biodiversity. A total of 981 households were participating in community forestry tree planting in degraded buffer zone, to restore watershed forests and generate additional income from agroforestry crops. Reforested degraded land contribute ecological spaces for mammal and bird species. A total of 205 farm households, representing 1,178 family members, transforming organic farming thus supporting lake biodiversity by decreasing chemical run off.

- **Were any management plans for biodiversity developed and were these formally accepted?**

N/A

- **Were they participatory in nature or were they ‘top-down’? How well represented are the local poor including women, in any proposed management structures?**

N/A

- **How did the project positively influence household (HH) income and how many HHs saw an increase?**

During the reporting period, agroforestry crops are under development and there is no more additional household (HH) income from it. However, HH from organic farming received additional income via the sale of organic rice with 6% premium price.

- **How much did their HH income increase (e.g. x% above baseline, x% above national average)? How was this measured?**

Annually, most organic paddy was sold by farmers directly to local buyers, with the current price, to repay loans taken for land preparation. INFA also didn't have enough capacity to

collect all organic paddy and transport organic market. During the project, 18 PGS farmers received 6% higher price than non-organic paddy.

4.6 Transfer of knowledge

All the projects activities, outputs and finding were shared in BR stakeholder meetings regularly. Moreover, collaborative plans and achievements were also discussed in Indawgyi civil society network meetings. Local communities raised awareness on organic products and farmers who joined organic farming training increased capacity on food-safety and environment. CF members increased knowledge on nursery establishment and tree planting.

4.7 Capacity building

During the project implementation, six staff (M5:F1) were recruited by three partners (NECDA, INFA and ICT) with financial support from the project; two staff for each partner, with the title of Field-team Leader and Assistant Field-team Leader. After project end, FFI continues to support each partner staff as a part time field assistant.

5 Sustainability and Legacy

Sustainability has been built-in to the project from the first year, through our focus on capacity building for local partners and by supporting local communities with the implementation of sustainable development interventions. Organic rice production will endure, based on the capacity built by the project, the initial success of the farmers involved, and the favourable market indicators that suggest room for growth.

The waste management interventions are also likely to endure because this activity was led by a local group, based at Nan Mon village, in collaboration with the waste management groups from each of the villages involved. After the project, the Nan Mon village group will continue to coordinate waste management interventions, together with the village groups, as facilitated by the waste-collecting fee contributed by beneficiary communities.

Although there is uncertainty, under the present political conditions in Myanmar, with regards to the processing of community forestry certification applications, the forest user groups have confirmed their plans to continue with the production of seedlings and with tree planting until their targets are reached.

6 Lessons learned

Activities

Organic Farming Development: In organic farming, 106 farmers joined the PGS organic system at the start of the project. In Year 2, the number of participating farmers increased, stabilising in Year 3. Unfortunately, some farmers were not able to follow the PGS organic standard completely after joining, due to an issue with excessive weeds in the growing season. Based on meetings and discussions with farmers, the proliferation of weeds is a key issue with the organic farming approach. During the project period, different natural herbicides and traditional control methods were introduced; all are partially eliminating weeds (some only work in wet soil conditions whilst some methods are not easy for the farmers to follow). Further experiments or tools are still needed to develop organic farming at a large scale. Expanding market linkages and advanced paddy buying by INFA are major factors in increasing the number of farmers participating in organic farming in the future because most farmers sold their paddy straight from harvest, and at a relatively low price, to local buyers because of pressure to repay loans.

Community Forestry Development: In Indawgyi, 20 FUGs are formed and participating in buffer zone forest restoration. Although, the groups were establishing nurseries annually, with technical and financial support from the project, additional household income directly generated from CF site is under lower condition. Promoting agroforestry crops and market development along with CF fields will support FUG members in achieving sustainable forest restoration.

Villages Sanitation: A total of 144 HandyPods, in nine villages, have been used in Indawgyi. Discharge water from HandyPods with a two-tank design, were installed in Years 2 and 3 but released an unpleasant smell that affected some neighbouring households, particularly in villages located on the west-side of the lake. It was assumed that different soil types in these areas may be responsible, releasing the smell from discharge water. Soil types from the east side of the lake have a high sand content, absorbing discharge water rapidly. The project updated two different designs of HandyPods to solve the issue: (1) Two tanks with filter sand bed for existing HandyPod unit and (2) three tanks with filter sand bed for newly installed units.

Village Waste Management: One of the waste management activities is giving awareness talks on waste separation at waste collecting points to people disposing of rubbish. This activity is an effective way to deliver knowledge of waste separation, indicated by an increased number of people who practiced waste separation in Year 3.

Partnership: During the project period, each of three partners (IECDA, INFA and ICT) received two staff, supported by the project. By closely working together, partner staff increased capacity that can be applied for future development of their organisation.

6.1 Monitoring and evaluation

The project was monitored and evaluated by FFI teams, together with partner staff, based on the project work plan and the agreed measurable indicators (Annexes 1 & 2). There have been no changes to the M&E plan during the reporting period.

We shared progress with all project partners and local communities at the annual multi-stakeholder meetings, ensuring that they were up to date on the overall progress of the project and giving them the opportunity to provide feedback. Monthly progress updates were also submitted to the Forest Department. The internal team supporting the M&E were:

- Finance Manager, Wint War Tun, evaluated financial issues, working closely with Eaint, Indawgyi finance officer.
- Ngwe Lwin – project management oversight, provided feedback and technical support for Biosphere Reserve committee operation.

6.2 Actions taken in response to annual report reviews

Comment 1: Please provide an updated/revised implementation timeline with the Final Report – indicating actual periods of Activity implementation.

Followed in final report.

Comment 2: Comment on how the partnerships have been managed; how day-to-day communication has been affected; and any challenges or problems encountered.

See Section 2 (Project Partnerships).

Comment 3: Ensure you provide evidence to support narrative claims of success in delivering indicators, and make sure these are clearly signposted in the narrative text.

See Section 3.1 (Outputs) and 3.2 (Outcome).

Comment 4: Even at this late stage it is worth considering the logframe amendments suggested in AR1R (and repeated in AR2R (Comments for Project Leader) (and here). These should be done via a Change Request.

Logframe amendments and Change Request were submitted to Darwin and approved in August 2021.

Comment 5: Please explain the roles of Succow Stiftung and USFWS to this DI project (or why their logos appear on the Annexed reports). Is the project part of a larger programme?

Darwin's investment (25-005) exclusively financed activities in the Indawgyi Biosphere Reserve. However, Darwin-funded agroforestry/community forestry interventions were part of a larger community forestry program in Kachin state, where other donors (including NORAD, Helmsley Charitable Fund) finance community forestry interventions outside the Indawgyi lake basin. Reports that detail all community forestry interventions across Kachin state, therefore feature the logos of all supporting institutions, including Darwin. The use of the Succow Foundation and

USFWS logos refer, in principle, to those institutions' contributions to other parallel components of a larger Indawgyi integrated conservation and development project. They contribute to parallel projects not financed by Darwin, such as community-based eco-tourism, sustainable fisheries, gibbon conservation and a CSO small-grants program. In specific relation to the Succow contribution to organic farming, the costs for the building, rice mill and dryer were more expensive than anticipated, primarily due to increases in prices caused by covid-related supply chain interruptions. We therefore secured additional funding from Succow Foundation, through its CSO small grants programme (itself facilitated by our Darwin partner, INFA), to overcome the budget shortfall.

Comment 6: Please comment on the observation that the project effort (at least as far as the community forestry component is concerned) is focused only on the east side of Lake Indawgyi. What happens on the other side?

The Buffer zone is primarily located on the east side of Indawgyi BR (between village boundaries and the BR's Core zone) while most forest in west side are included in the Core Protection zone.

7 Darwin identity

All project activities with communities, partners and government stakeholders conveyed that the activities were supported by the Darwin Initiative; all publications, training materials and workshop resources produced by the project, featured the Darwin Initiative logo.

8 Impact of COVID-19 on project delivery

Due to Covid-19 measures, travel was restricted for significant portions of the project implementation period, with most community meetings having to be postponed. Unavailability of public transportation during mid- and the end of 2020 delayed market supply for organic products to regional markets.

Trainings and workshops, which were organised annually and seasonally, like the multi-stakeholder BR management meeting, CF technical trainings and organic farming trainings had to be cancelled, due to Covid-19 restrictions, with some trainers subsequently not being available during the project period.

Phone conversations became the main means of communication with project partners and stakeholders, whilst the exchange of documents and materials, among communities was often delayed. Staff were often not able to access project sites due to village-based quarantine restrictions developed during the pandemic. The Viber and Facebook Messenger apps became a popular tool, among local communities, to exchange documents between each other.

9 Finance and administration

9.1 Project expenditure

Project spend (indicative) since last annual report	2018/21 Grant (£)	2018/21 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Others (see below)				
TOTAL				

Staff employed (Name and position)	Cost (£)
Ngwe Lwin, FFI Project Manager (reduced hours from February 2020; completing PhD studies)	
Aung Thet Swe, FFI Project Manager (covering Ngwe Lwin)	
Zaw Min Oo, FFI Field Coordinator	
Zaw Win, FFI Small grants manager	
Nant Ei Phyu Sin – FFI Finance Officer, Yangon	
Wint War Tun, FFI Finance Manager, Yangon (from Jan 2019)	
Moet Moet Aung, FFI Finance Manager, Yangon (until Dec 2018)	
Aung Myint Kyaw, FFI Logistics Officer (from May 2019)	
U Naing Lwin Htoo, FFI Logistics Officer (until Apr 2019)	
Noe Noe Aung, FFI Sustainable Farming / Livelihoods Advisor	
Mark Grindley, FFI Myanmar Program Director (from Nov 2018)	
Frank Momberg, FFI Myanmar Program Director (until Oct 2018)	
Emma Scott, FFI Agriculture & Biodiversity Expert, UK	
Amy Duthie, FFI M&E Reporting Advisor	
Partner - Staff salaries - Wetlands Work	
Partner - Staff salaries - Inn Chit Thu	
Partner - Staff salaries - CF Association	
Partner - Staff salaries - Farmers Association	
TOTAL	

Capital items – description	Capital items – cost (£)
Partner - Rice flour mill	
TOTAL	

Other items – description	Other items – cost (£)
FFI - Consumables FFI - Phone/ internet FFI - Bank fees FFI - Equipment maintenance Small grants for CF, organic farming, sanitation Consumables Phone/internet Bank fees Printing/ publications Organic certification	
TOTAL	

9.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
Helmsley Charitable Trust	
Michael Succow Foundation	
TOTAL	

Source of funding for additional work after project lifetime	Total (£)
Michael Succow Foundation	
TOTAL	

9.3 Value for Money

The funds have been used efficiently and within the proposed expenditure plan. The grant allocated resulted in a tremendous positive impact on the local communities, in line with the conservation effort. Some of the lessons learned from the project to improve efficiency include:

- Most of the project staff are based at Indawgyi office in the project area to reduce travel expense along the project.
- The project was largely implemented by local people, from the Indawgyi region, to create job opportunities and build local capacity. Senior project staff have good English skills for e-mail correspondence, reporting and communication with international expertise, reducing potential translator costs.
- FFI procurement policy was followed, to ensure the highest value of goods and services procured with the project fund (e.g., when we purchased the rice mill, we asked three quotations from the suppliers and checked the quality of their previous products).
- We conducted preliminary research into the installation of the HandyPod system for household sanitation, to find materials with lowest price and highest quality.

10 OPTIONAL: Outstanding achievements of your project during the (300-400 words maximum). This section may be used for publicity purposes

I agree for the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

Annex 1 Project's original (or most recently approved) logframe, including indicators, means of verification and assumptions.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Impact:</p> <p>The collaborative management and ecosystem services approach achieves effective biodiversity conservation and improved livelihoods in Indawgyi. Lessons learned are shared in Myanmar and through the global network of Biosphere Reserves.</p>			
<p>Outcome:</p> <p>Participatory management systems, sustainable natural resource use and improved sanitation bring biodiversity benefits to the Indawgyi Lake Biosphere Reserve and livelihoods and health benefits to more than 10,000 residents.</p>	<p>0.1 By the end of 2019, a collaborative management system for Indawgyi Lake Biosphere Reserve is established.</p> <p>0.2 By August 2021 at least 200 farming households adopt organic farming practices near lakeshore areas with eutrophication problems, by the end of the project.</p> <p>0.3 By August 2021, at least 20 forest user groups adopt community forestry, agro-forestry practices, establish wood lots and reduce the consumption of firewood.</p> <p>0.4 By August 2021, improved household sanitation in flood-prone villages and communal waste management reduce pollution of the lake.</p>	<p>0.1 Government decision on management committee and minutes of committee meetings.</p> <p>0.2 Organic farming certificates, internal annual audit and inspection reports.</p> <p>0.3 Community forestry management plans, CF certificates, annual forest user group reports.</p> <p>0.4 Sanitation and waste management reports</p>	<p>Myanmar government continues to support multi-stakeholder engagement in protected area management.</p> <p>The security situation in Indawgyi remains safe.</p> <p>The market demand for value-added organic/ gluten-free rice products (rice flour) continues to grow.</p> <p>Myanmar government continues to support the issuance of community forestry licences in buffer zones of protected areas.</p> <p>Improvements in waste management and sanitation lead to a decrease in water-borne disease and infection.</p>
<p>Output 1:</p> <p>A decentralised and collaborative management committee and</p>	<p>1.1 Collaborative multi-stakeholder Biosphere Reserve Management Committee operating by 2018.</p>	<p>1.1 Minutes of meetings.</p>	<p>Myanmar government continues to support multi-stakeholder engagement in protected area management.</p>

<p>mainstreamed ecosystem services approach places the Indawgyi Lake Biosphere Reserve under management systems that respect integrated development and biodiversity needs.</p>	<p>1.2 The Biosphere Reserve Management Committee is trained in collaborative protected area management by end of 2019 and starts implementing integrated conservation and sustainable development plans.</p> <p>1.3 By end of the project improved law enforcement through collaborative patrolling; illegal commercial logging and firewood extraction, forest and wetland encroachment reduced by 50% against baseline.</p> <p>1.4 By December 2020, all BR stakeholder committee members and at least 70% of all beneficiaries exhibit improved environmental knowledge, attitude and behaviour against baseline KAB survey.</p>	<p>1.2 Training reports/ participant evaluation; annual Biosphere Reserve progress reports for the implementation of the 5-year management plan.</p> <p>1.3 Monthly SMART patrol reports, drone-based threat assessment at the beginning and end of the project.</p> <p>1.4 Minutes of meetings of BR stakeholder committee; Knowledge/Attitude and Behaviour surveys pre and post project interventions.</p>	
<p>Output 2: Community forestry and agroforestry in designated buffer zones of Indawgyi Lake Biosphere Reserve reduce deforestation and forest degradation, while maintaining access to essential natural resources.</p>	<p>2.1 At least 20 community forestry user groups established representing >1,000 households (c. 5,400 people, app. 50 households per group) by December 2018.</p> <p>2.2 At least 20 community forestry management plans established by December 2019.</p> <p>2.3. At least 20 wood lots established by December 2020.</p> <p>2.4. At least 20 community forestry licences issued by August 2021.</p> <p>2.5. At least 50% of forest user group members utilise fire-wood saving or electric stoves by August 2021.</p> <p>2.6. Reduction of illegal logging roads by at least 50% by December 2020.</p>	<p>2.1 Training reports (participant evaluation, monitoring & evaluation reports.</p> <p>2.2 Group formation reported to forest department.</p> <p>2.3 Annual reports on Community forestry implementation.</p> <p>2.4. Community forestry certificates.</p> <p>2.5. Firewood household survey before and post interventions.</p> <p>2.6. UAV survey at the beginning and end of the project.</p>	<p>Myanmar government continues to support the issuance of community forestry licences in buffer zones of protected areas.</p> <p>Major natural disasters do not take place within the project sites and period that undermine the access to or availability of forest and forest products.</p>

<p>Output 3:</p> <p>Organic rice farming and value-adding practices result in certified organic products that provide improved income to local households and protect wetland biodiversity.</p>	<p>3.1 By August 2021, farmers representing at least 200 households, are trained in organic farming rules and concept of group certification.</p> <p>3.2 INFA operated rice mill/ rice flour mill established and processing brown rice/ rice flour by December 2020.</p> <p>3.3 By August 2021, at least 200 households (c.1,000 people) in the Indawgyi Lake Biosphere Reserve are using only organic agricultural inputs and zero chemical fertilisers and chemicals.</p> <p>3.4 By August 2021, at least 70% of target farmers have achieved organic certification by national and/or international standards.</p> <p>3.5 Offsetting the decreased per-hectare yields usually associated with converting from conventional to organic farming, lower agricultural input costs, and/or higher market prices available to organic products, mean that household revenues increase by at least 1% after adopting organic rice farming, compared to previous conventional farming, by August 2021.</p> <p>3.6 Number of resident waterbirds is stable or increasing</p>	<p>3.1 Training reports.</p> <p>3.2 Rice mill/ rice flour mill (INFA equipment register) records (moisture content of processed rice/ % of broken rice).</p> <p>3.3 Stock control, invoices and financial records showing volumes sold; prices and income to INFA by household.</p> <p>3.4 Organic certification.</p> <p>3.5 Survey report, comparing household revenues from rice at project beginning and project end.</p> <p>3.6 Annual mid-winter water bird census.</p>	<p>The domestic and international markets for organic rice and gluten free products continues to grow during the project period.</p> <p>The ability of Myanmar to export to international markets does not alter significantly during the project period.</p> <p>SMM remain financially stable and committed to developing the Indawgyi supply chain.</p> <p>If only organic agricultural inputs are in use then the chemical inputs and run off will proportionally reduce.</p>
<p>Output 4:</p> <p>Local households in flood prone areas benefit from improved sanitation systems in flood prone areas with eutrophication problems and from solid waste collection and safe disposal.</p>	<p>4.1 By August 2021, at least 200 new treatment systems are in place located in flood prone areas with severe eutrophication.</p> <p>4.2 By end of project, at least 1000 households in Lake Indawgyi area are participating in waste collection; land fill sites established in 6 villages where dumping of waste in the lake is most severe, paid for by users.</p>	<p>4.1 Photo evidence of treatment systems, Wetland Works report.</p> <p>4.2 Photo documentation of land fill sites, technical report.</p>	<p>Local communities willing to change behaviour in favour of improved sanitation and waste management.</p> <p>There are no significant lakeside developments in this project period that cause an additional source of untreated waste pollution to the lake.</p>

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

- 1.1 Facilitate regular meeting of the Biosphere Reserve Indawgyi management/ stakeholder committee (quarterly).
- 1.2 Facilitate regular meeting of the Indawgyi civil society network (bi-annual).
- 1.3 Facilitate regular meetings of law enforcement agencies (forest department, Indawgyi wildlife sanctuary/ biosphere reserve management authority, fisheries department police).
- 1.4 Recruit and train local informant network.
- 1.5 Recruit local community rangers.
- 1.6 Establish two collaborative patrol units (5 pax each), including wildlife sanctuary rangers and community rangers for forest patrols.
- 1.7 Establish collaborative lake patrol team (fisheries department, WS, community ranger).
- 1.8 Provide basic field equipment (GPS/ cameras/ field gear).
- 1.9 Provide initial SMART patrolling training to collaborative patrol units, on the job training first 3 months.
- 1.10 Provide SMART refresher training.
- 1.11 Monthly collaborative SMART patrols, operate informant network.
- 1.12 Annual UAV monitoring of encroachment and illegal logging areas.
- 2.1. Establish forest user groups.
- 2.2 Train forest user groups in forest inventory and forest management planning.
- 2.3 Forest inventory and forest management planning.
- 2.4 Train FUGs in tree nursery development.
- 2.5 Establish and manage nurseries operational.
- 2.6 Train FUGs in reforestation/ agroforestry techniques.
- 2.7 Establish woodlots and agroforests.
- 2.8 Facilitate community forestry certification?
- 3.1 Undertake participatory consultation with farmers to establish their knowledge and priority learning needs (knowledge baseline).
- 3.2 Develop training resources that are targeted to the farmer learning needs identified in 3.1, and pilot.
- 3.3 Roll out amended training modules and offer refresher training.
- 3.4 Review the governance structure and capacities of the INFA and identify priority development needs to enable scale-up, pending the anticipated new membership numbers.
- 3.5 In consultation with INFA and the organic certifier, agree timeline and responsibilities for the certification process.
- 3.6 Train internal auditors.

- 3.7 Revise and update the INFA governance structures and financial control mechanisms.
- 3.8 Establish supply chain control points for rice and rice flour.
- 3.9 Set up and prepare for physical installation of rice mill.
- 3.10 Procure rice mill.
- 3.11 Deliver training on rice mill use and maintenance.
- 3.12 Develop INFA detailed 3-year business plan.
- 3.14 According to the business plan, identify the priority investments/ infrastructure/ capacities required and support INFA to address these.
- 3.15 According to business plan, establish local sales distribution systems for rice.
- 3.16 Support INFA to produce and sell rice.
- 3.17 Base and end line surveys on household incomes and expenditures related to farming.
- 4.1 Develop a core team between Inn Chit Thu and Wetlands Work. Develop a HandyPod training programme for construction training and sanitation marketing using informational materials, presentations, workshops, field work, and demonstration sites.
- 4.2 ID and train local business operators from the target villages who serve the HandyPod's supply side elements.
- 4.3 Organise a Sanitation Raffle (lucky draw) for flood-prone households in each target village involving various leadership levels; promotion, prizes, events coordination
- 4.4 Install winning HandyPods in dry season.
- 4.5 Provide faecal sludge management guidance and demonstrations.
- 4.6 Monitor and evaluate initial target village strategies; adapt as needed.
- 4.7 Explore and specifically define broader scale up of sanitation activities around Lake Indawgyi.
- 4.8 Establish baseline information: nearshore pathogens (E. coli) and algal mat density in Year I wet and dry season.
- 4.9 Develop waste management awareness materials.
- 4.10 Implement waste management awareness campaign.
- 4.11 Facilitate establishment of village-based waste management systems, identify supply chain for recycling materials.
- 4.12 Establish village land fill sites for safe disposal of waste
- 4.13 Provide support to the new waste collection system

Annex 2 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements July 2018 - August 2021	Actions required/planned for next period
<p>Impact</p> <p>The collaborative management and ecosystem services approach achieves effective biodiversity conservation and improved livelihoods in Indawgyi. Lessons learned are shared in Myanmar and through the global network of Biosphere Reserves.</p>		<p>Increased collaboration between the management committee and key stakeholders and among the CSOs network due to regular meetings. Based on knowledge, attitude and practice survey conducted in 2021, improved the knowledge on the biodiversity conservation of the BR management committee members and CSOs members and consequently their collaboration and participation on biodiversity conservation were increased. (Annexes 7.1.1, 7.1.2, 7.1.3 & 7.1.8)</p> <p>Total of 286 acres of degraded forest area in Indawgyi Biosphere Reserve was reforested with 161,982 seedlings. (Annexes 7.2.1 & 7.2.2)</p> <p>205 farmers, member of INFA followed the organic rice farming practice in 2020 farming season and INFA operated organic rice mill. (Annex 7.3.8)</p> <p>During 2018 and early 2021, more than 50% of illegal timber extraction and firewood collection decreased due to the regular patrol and informant network operation. (Annex 7.1.6)</p> <p>Annual waterbird census was conducted in 2019, 2020 and 2021 to monitor the change of number of waterbird in the lake. The results showed the waterbird number was increased in 2020 (Annex 7.3.12). The area coverage of algae bloom which</p>	

		<p>normally occurred in the lake between September and November was calculated with the remote sensing comparing between 2017 and 2021. The result indicated the area cover of algae bloom was not increased from 2017 (Annex 7.4.2). Based on these two indicators, the water quality of the Indawgyi Lake can be assumed to be stable during the project period.</p> <p>Reduced plastic pollution on land and in the lake by participation of 2,907 households from ten villages in the waste collection and landfill site management (Annex 7.4.3) and reduced release of sewage to lake body which case eutrophication by using Handy Pods at 144 households at nine villages (Annex 7.4.1).</p> <p>Increased incomes of member of INFA, organic farmers by practicing organic rice. A household income survey showed that 85% of organic farmers increased their income via organic farming from 1.27% to 22.56% when compared to conventional farming (Annex 7.3.10).</p>	
<p>Outcome</p> <p>Participatory management systems, sustainable natural resource use and improved sanitation bring biodiversity benefits to the Indawgyi Lake Biosphere Reserve and livelihoods and health benefits to more than 10,000 residents.</p>	<ol style="list-style-type: none"> 1. By the end of 2019, a collaborative management system for Indawgyi Lake Biosphere Reserve is established. 2. By August 2021 at least 200 farming households adopt organic farming practices near lakeshore areas with eutrophication problems, by the end of the project. 3. By August 2021, at least 20 forest user groups adopt community forestry, agro-forestry practices, 	<ol style="list-style-type: none"> 1. A biosphere reserve management committee was established and meetings with all relevant stakeholders have been conducted in 2018, 2019 and January 2021. 2. Total of 205 farm households, or 1,178 people (M605:F573) followed PGS organic farming practices in 2021. Among them, 	

	<p>establish wood lots and reduce the consumption of firewood</p> <p>4. By August 2021, improved household sanitation in flood-prone villages and communal waste management reduce pollution of the lake.</p>	<p>157 farmers certified organic in 2020.</p> <p>3. Total of 20 CF user groups, representing 981 households, were established by the project in 2019; all follow CF/AF practices and established wood lots.</p> <p>4. The project has setup 144 HandyPod in 9 villages and Shwe Taung area till the end the project and a total 2,907 households were actively participating in the villages waste management system by the end of August 2021.</p>	
<p>Output 1.</p> <p>A decentralised and collaborative management committee and mainstreamed ecosystem services approach places the Indawgyi Lake Biosphere Reserve under management systems that respect integrated development and biodiversity needs</p>	<p>1.1 Collaborative multi-stakeholder Biosphere Reserve Management Committee operating by 2018</p> <p>1.2 The Biosphere Reserve Management Committee is trained in collaborative protected area management by end of 2019 and starts implementing integrated conservation and sustainable development plans</p> <p>1.3 By end of the project improved law enforcement, through collaborative patrolling; illegal commercial logging and firewood extraction, forest and wetland encroachment reduced by 50% against baseline.</p> <p>1.4 By December 2020, all BR stakeholder committee members exhibit improved environmental knowledge and attitudes against baseline knowledge, attitude and practice survey.</p>	<p>1.1 Township level multi-stakeholder BR management committee meeting was organized in July 2018, October 2019 and January 2021 to update annual conservation intervention and to discuss Biosphere Reserve operational plan.</p> <p>1.2 In 2018 the project facilitated a 1-week study tour/ training program for six BR management committee members (government agency representatives) at German Biosphere Reserves in Brandenburg State. In July 2019, six BR CSO representatives were trained in collaborative protected area management as part of study tour to Germany. In October 2019, an additional study tour/ training was joined by six BR CSO representatives, for exchanging collaborative area management plan.</p> <p>1.3 Due to intensive training and refreshment training, the law enforcement team improved their capacity and now implement regular collaborative lake and forest patrols and law enforcement operations.</p> <p>1.4 KAP survey was conducted in July 2021 and it was observed that BR stakeholder committee members improved in environmental knowledge.</p>	
<p>Activity 1.1 Facilitate regular meetings of the Biosphere Reserve Indawgyi management/ stakeholder committee (quarterly)</p>		<p>Township level multi-stakeholder BR management committee meetings were organised in July 2018, October 2019, and January 2021.</p>	

Activity 1.2 Facilitate regular meetings of the Indawgyi civil society network (bi-annual)	Indawgyi civil society network meeting organised in November 2018, January 2019, September 2019, February 2020, December 2020, and May 2021.
Activity 1.3 Facilitate regular meetings of law enforcement agencies (forest department, Indawgyi wildlife sanctuary/ biosphere reserve management authority, fisheries department police).	Forest department, fishery department and police occasionally met to prepare law enforcement plan.
Activity 1.4 Recruit and train local informant network	Total 22 informants received training and are providing information on a regular basis to IWS.
Activity 1.5 Recruit local community rangers	Five community rangers were recruited from March 2019.
Activity 1.6 Establish two collaborative patrol units (5 pax each), including wildlife sanctuary rangers and community rangers for forest patrols	Forest department established two patrol units with community rangers from Year 1.
Activity 1.7 Establish collaborative lake patrol team (fisheries department, WS, community ranger)	Collaborative patrol was started in January 2019 by forest department, fishery department and community rangers.
Activity 1.8 Provide basic field equipment (GPS/ cameras/ field gear)	2 GPS, 2 cameras, 2 spotlights (for night patrols) and 10 lifejackets were provided to the patrol team.
Activity 1.9 Provide initial SMART patrolling training to collaborative patrol units, on the job training first 3 months	Theoretical and on-the-job training was conducted in February 2019, to train fisheries department officers and community rangers in collaborative SMART lake patrols.
Activity 1.10 Provide SMART refresher training	SMART refresher training and CyberTracker training was provided in November 2018 and 2019.
Activity 1.11 Monthly collaborative SMART patrols, operate informant network	Regular patrolling (15 days/month) and law enforcement are conducted by the Indawgyi Wildlife Sanctuary (IWS), supported by one community ranger for each patrol. Two forest patrols operated during the dry season months and one patrol team operated throughout the rainy season.
Activity 1.12 Annual UAV monitoring of encroachment and illegal logging areas	FFI GIS team conducted UAV monitoring in March 2018 and March 2019 along Indaw Chaung river to assess land-cover changes. In 2020, due to Covid-related travel restrictions, only Satellite images analysis was conducted to investigate vegetation cover.
Output 2 Community forestry and agroforestry in designated buffer zones of Lake Indawgyi Biosphere Reserve reduce deforestation and forest degradation, while maintaining access to essential natural resources	2.1. At least 20 community forestry user groups established representing >1,000 households (c. 5,400 people, app. 50 households per group) by December 2018. 2.2. At least 20 community forestry management plans established by December 2019.
2.1 Nine groups (549 households) in Year 1, 11 groups in Year 2 (442 households). Currently 981 households are members of forest user groups. 2.2 Initial meetings for preparing a management plan were carried out in Year 2. CF land permission request letter, including mini-management plan, was prepared in Year 3 and submitted to the Wildlife Sanctuary authority. The request is currently being processed by the Forest Department.	

	<p>2.3. At least 20 wood lots established by December 2020.</p> <p>2.4. At least 20 community forestry licences issued by August 2021.</p> <p>2.5. At least 50% of forest user group members utilise fire-wood saving or electric stoves by August 2021.</p> <p>2.6. Reduction of illegal logging roads by at least 50% by December 2020.</p>	<p>2.3 20 FUGs planted seedlings in their community forest area in Year 3.</p> <p>2.4 By August 2021, applications for community forestry land permission are being processed by the Forest Department. Subsequent license will be issued after receiving CF land permission.</p> <p>2.5 Survey of stove utilisation among FUGs members was conducted in August 2021; 78% utilise fire-wood saving or electric stoves (30% & 48%, respectively).</p> <p>2.6 Five main logging roads were blocked, to stop logging trucks entering the forest area, in Years 1 and 2. The SMART patrol data indicated that there was a 60% reduction in illegal logging.</p>
Activity 2.1. Establish forest user groups (FUGs)		20 FUGs (9 in Year 1; 11 in Year 2).
Activity 2.2 Train FUGs in forest inventory and forest management planning		Basic forest inventory and management plan development training was organised in February 2020, December 2020, and April 2021.
Activity 2.3 Forest inventory and forest management planning		Forest inventory was not conducted because planted trees were too young to collect forest inventory. However, trees survival counting survey was conducted by IECDA in 9 CF site during January 2020.
Activity 2.4 Train FUGs in tree nursery development		Nursery development and management training was conducted in May 2019 for 9 FUGs, and February and December 2020 for 20 FUGs.
Activity 2.5 Establish and manage nurseries operational		Nine FUGs established the nursery in Year 2 and 20 FUGs established nursery in Year 3. Each FUG raised 8,000 to 10,000 seedlings annually.
Activity 2.6 Train FUGs in reforestation/ agroforestry techniques		Agroforestry plants propagation techniques was delivered along with CF/AF technical training.
Activity 2.7 Establish woodlots and agroforests		Nine FUGs established woodlots in Year 2 and 20 FUGs established in Year 3.
Activity 2.8 Facilitate community forestry certification		Field measurement and documents preparation are completed and submitted to Indawgyi Wildlife Sanctuary authority in Year 3.
<p>Output 3</p> <p>Organic rice farming and value-adding practices result in certified organic products that provide income to</p>	<p>3.1 By August 2021, farmers representing at least 200 households, are trained in organic farming rules and concept of group certification.</p> <p>3.2 INFA operated rice mill established and processing milled rice by December 2020.</p>	<p>3.1 205 farmers were trained in both Year 2 and 3 for the organic farming rules and concept of group certification.</p> <p>3.2 Rice mill is already setup and began operating in December 2020 (Year 3). Under 14% paddy moisture content, rice mill can produce 18% high quality rice and 7% broken rice.</p>

households and protect wetland biodiversity.	<p>3.3 By August 2021, at least 200 households (c.1,000 people) in the Indawgyi Lake Biosphere Reserve are using only organic agricultural inputs and zero chemical fertilisers and chemicals</p> <p>3.4 By August 2021, at least 70% of target farmers have achieved organic certification by national and/or international standards</p> <p>3.5 Offsetting the decreased per-hectare yields usually associated with converting from conventional to organic farming, lower agricultural input costs, and/or higher market prices available to organic products, mean that household revenues increase by at least 1% after adopting organic rice farming, compared to previous conventional farming, by August 2021.</p> <p>3.6 Number of resident water-birds is stable or increasing.</p>	<p>3.3 205 farm households followed PGS organic standards in Year 3.</p> <p>3.4 Sixty-eight, 157 and 193 farmers certified PGS organic in 2019, 2020 and 2021 respectively, representing 96.5% of target farmers. Additionally, 60 farmers from 2019 growing season also obtained Control Union EU certification.</p> <p>3.5 Household income survey, in August 2021, indicated that 85% of organic farm households had increased their income, via organic farming, by 1.27% to 22.56%, compared to conventional farming.</p> <p>3.6 Annual water-bird counts were conducted every January; results indicate a significant increase in Year 2, followed by a slight decrease in Year 3.</p>
3.1 Undertake participatory consultation with farmers to establish their knowledge and priority learning needs (knowledge baseline)		Participatory consultation with farmers was conducted with MOGPA in Year 1.
3.2 Develop training resources that are targeted to the farmer learning needs, identified in 3.1, and pilot		Project worked with MOGPA for development of training resources such as Internal control system and organic input production in Year 1, 2 and 3.
3.3 Roll out amended training modules and offer refresher training		Dr. Than Than Sein, from MOGPA, provided training in Internal Control Systems and in the production of organic fertilisers and pesticides, in Years 1, 2 and 3.
3.4 Review the governance structure and capacities of the INFA and identify priority development needs to enable scale-up, pending the anticipated new membership numbers		The review of INFA governance structure and capacities was conducted by Christina Archer in December 2018. Christina stated "INFA members did not raise any immediate concerns and showed good levels of understanding on the purpose, structure and governance of the group." However, she suggested some action points to follow up. (Annex 7.3.13)
3.5 In consultation with INFA and the organic certifier, agree timeline and responsibilities for the certification process		During the project preparation period, a consultation was organised with INFA, who agreed to establish the certification process with the support of MOGPA. PGS Internal Control System will apply for the whole process of rice cultivation such as seed selection, seed bed preparing, transplanting, harvesting, drying and storage.

3.6 Train internal auditors		Organic Farmer groups (each with 5 to 10 farmers) were trained for Internal Control system on organic cultivation by Dr. Than Than Sein and her team from 2018 to 2021.
3.7 Revise and update the INFA governance structures and financial control mechanisms		Based on the assessment by Christina Archer, there is no need to revise the INFA governance structures. Project provided organisation development training and basic bookkeeping training and facilitating the appointment of two staff.
3.8 Establish supply chain control points for rice and rice flour		In Years 1 and 2, INFA milled and distributed Indawgyi organic rice in local region and delivered to Mandalay and Yangon. In Year 3, INFA produced organic rice from their own mill and expanded market in Myitkyina and KhoKoeYar Yangon organic shop.
3.9 Set up and prepare for physical installation of rice mill		A 22-ton rice mill was installed in Year 3 and operating now.
3.10 Procure rice mill		High quality rice producing mill (de-husking paddy and polishing rice) was procured and handed over to INFA in December 2020 to start operation.
3.11 Deliver training on rice mill use and maintenance		Two INFA members received 5-days rice training of rice mill handling and maintenance.
3.12 Develop INFA detailed 3-year business plan		After conducting a market survey by FFI marketing expert, together with INFA members in Yangon, Mandalay and Myitkyina from May to July 2021, a 3-years business plan was developed together with INFA committee. (Annex 7.3.11)
3.14 According to the business plan, identify the priority investments/ infrastructure/ capacities required and support INFA to address these		Based on Business plan developed in 2021, INFA members will supply paddy in advance to rice mill to fill the gap between organic rice order and delivery time.
3.15 According to business plan, establish local sales distribution systems for rice		INFA members milled the rice at own rice mill and distributed organic rice in Indawgyi region, Myitkyina shops, Mandalay organic market and Yangon KhoKoeYar organic shop.
3.16 Support INFA to produce and sell rice		INFA staff can operate rice mill and distribute organic rice in Indawgyi region, Myitkyina, Mandalay and Yangon organic shops.
3.17 Base and end line surveys on household incomes and expenditures related to farming		According to end line survey on household incomes and expenditures in August 2021, 85% of organic farm households increased income via organic farming ranging from 1.27% to 22.56% compared to conventional farming.
Output 4 Local households in flood prone areas benefit from improved sanitation	4.1 By August 2021, at least 200 new treatment systems are in place located in flood prone areas with severe eutrophication	4.1 144 sanitation systems were set up in 9 villages and Shwe Taung tourism designation place.

systems in flood prone areas with eutrophication problems and from solid waste collection and safe disposal.	4.2 By end of project, at least 1000 households in Lake Indawgyi area are participating in waste collection; land fill sites established in 6 villages where dumping of waste in the lake is most severe, paid for by users	4.2 Project extended community-based waste management system at ten villages in Year 1, 2. In Year 3, the project also introduced a waste separation system. The project already over-exceeded the target with more than 2,900 households participating in community-based waste management.
4.1 Develop a core team between Inn Chit Thu and Wetlands Work. Develop a HandyPod training programme for construction training and sanitation marketing using informational materials, presentations, workshops, field work, and demonstration sites		In Year 1, Inn Chit Thu and Wetlands Work formed a local partner team and started implementation of the sanitation activity. HandyPod construction training programme was completed in Year 2.
4.2 ID and train local business operators from the target villages who serve the HandyPod's supply side elements		Local partner team from Lone Ton (a group of 3 people) already trained for HandyPod setup method and total 144 HandyPods has been setup in 9 villages and in Shwe Taung area.
4.3 Organise a Sanitation Raffle (lucky draw) for flood-prone households in each target village involving various leadership levels; promotion, prizes, events coordination		Sanitation Raffle was cancelled due to Covid-19 restrictions. Flood prone households survey was conducted in 5 villages in October 2020, together with village heads, to determine numbers of households with improper sanitation system. Then, HandyPods were supported to such household.
4.4 Install winning HandyPods in dry season		According to ICT flood households survey and villages head meeting, HandyPods were installed in households which meet sanitation selection criteria in dry seasons.
4.5 Provide faecal sludge management guidance and demonstrations		The guidelines for usage and maintenance of HandyPod was developed in local language during December 2019 and distributed to every households which used clean sanitation system. 10 sludge management demonstrations were conducted in 3 villages (Lone Ton, He Par and Lone Sant).
4.6 Monitor and evaluate initial target village strategies; adapt as needed		Monitoring and evaluation was carried out in Year 2 and 3. The result indicated that HandyPod system is more accepted in villages located on the east of the lake than villages in the west. For villages in the west of the lake, one additional HandyPod box (total 3 boxes) and filter tank needed to add to reduce smell from discharge water.
4.7 Explore and specifically define broader scale up of sanitation activities around Lake Indawgyi		Both Inn Chit Thu group and Education Centre staff are promoting sanitation awareness at festivals, villages and education centre. In 2021, the local HandyPods constructor team has increased by one member.
4.8 Establish baseline information: nearshore pathogens (E. coli) and algal mat density in Year 1 wet and dry season		Aerial drone trial was operated to assess algae mat in December 2018 in Nyaung Pin and Lone Ton village. Subsequent assessments were conducted by using satellite images analysis and the result show that algae occurrence is not increased in 3 successive year.

	Nearshore pathogens (E. coli) concentration test was unable to examine due to technical and transportation to laboratory issue caused by Covid-19 pandemic travel restriction.
4.9 Develop waste management awareness materials	Waste awareness signboards were developed and erected at 6 villages and Shwe Myit Zu pagoda in Year 2 and 3.
4.10 Implement waste management awareness campaign	Waste awareness frequently conducted by ISDA with small groups of people along with the waste collection truck. Waste awareness talk was organised in primary school of each village on the day while waste collection operated by ISDA till to the end of 2020.
4.11 Facilitate establishment of village-based waste management systems, identify supply chain for recycling materials	The project provided financial support to the one CSO (ISDA) and one CBO to establish village-based waste management systems.
4.12 Establish village land-fill sites for safe disposal of waste	ISDA and He Par CBO received financial support to develop landfills and maintain 6 dump sites. ISDA also developed various plastic burning stove.
4.13 Provide support to the new waste collection system	ISDA regularly (14 days a month) collected and disposed carefully village waste in ten villages.

Annex 3 Standard Measures

Code	Description	Total	Nationality	Gender	Title or Focus	Language	Comments
Training Measures							
1a	Number of people to submit PhD thesis						
1b	Number of PhD qualifications obtained						
2	Number of Masters qualifications obtained	1	Netherlands	F	Value chain development	English	
3	Number of other qualifications obtained						
4a	Number of undergraduate students receiving training						
4b	Number of training weeks provided to undergraduate students						
4c	Number of postgraduate students receiving training (not 1-3 above)						
4d	Number of training weeks for postgraduate students						
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification (e.g., not categories 1-4 above)						
6a	Number of people receiving other forms of short-term education/training (e.g., not categories 1-5 above)						
6b	Number of training weeks not leading to formal qualification						
7	Number of types of training materials produced for use by host country(s) (describe training materials)						
Research Measures		Total	Nationality	Gender	Title	Language	Comments/ Weblink if available

9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (ies)						Participatory process?
10	Number of formal documents produced to assist work related to species identification, classification and recording.						
11a	Number of papers published or accepted for publication in peer reviewed journals						
11b	Number of papers published or accepted for publication elsewhere						Location?
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country						
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country						
13a	Number of species reference collections established and handed over to host country(s)						
13b	Number of species reference collections enhanced and handed over to host country(s)						

Dissemination Measures		Total	Nationality	Gender	Theme	Language	Comments
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work						
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	1	Myanmar	Female	Collaborative patrolling	English	

Physical Measures		Total	Comments
20	Estimated value (£s) of physical assets handed over to host country(s)		INFA Rice Mill
21	Number of permanent educational, training, research facilities or organisation established		
22	Number of permanent field plots established		Please describe

Financial Measures		Total	Nationality	Gender	Theme	Language	Comments
23	Value of additional resources raised from other sources (e.g., in addition to Darwin funding) for project work <i>(please note that the figure provided here should align with financial information provided in section 9.2)</i>						

Annex 4 Aichi Targets

	Aichi Target	Tick if applicable to your project
1	People are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	X
2	Biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	
3	Incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	
4	Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	
5	The rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	
6	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	
7	Areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	X
8	Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	
9	Invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	
10	The multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	
11	At least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	
12	The extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	
13	The genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and	

	implemented for minimizing genetic erosion and safeguarding their genetic diversity.	
14	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	
15	Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	
16	The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	
17	Each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	
18	The traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	
19	Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	
20	The mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	

Annex 5 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. web link, contact address etc)

Annex 6 Darwin Contacts

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Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	X
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 10)?	
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	X
Do you have hard copies of material you need to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	
Have you involved your partners in preparation of the report and named the main contributors	X
Have you completed the Project Expenditure Table fully?	X
Do not include claim forms or other communications with this report.	