NON-PERMANENCE RISK REPORT REFORESTATION AND RESTORATION OF DEGRADED MANGROVE LANDS, SUSTAINABLE LIVELIHOODS AND COMMUNITY DEVELOPMENT IN MYANMAR

Document Prepared by Worldview International Foundation

Project Title	*Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar*
Version	*5.0*
Date of Issue	*07-10-2023*
Project ID	*1764*
Monitoring Period	*15-06-2021 to 14-06-2022*
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1 INTERNAL RISK

Project Management		
Risk Factor	**Risk Factor and/or Mitigation Description**	**Risk Rating**
a)	Species planted (where applicable) associated with more than 25% of the stocks on which GHG credits have previously been issued are not native or proven to be adapted to the same or similar agro-ecological zone(s) in which the project is located. The species identified for this reforestation project are *Rhizophora mucronata*, *Rhizophora apiculata*, *Bruguiera gymnorrhiza*, *Bruguiera cylindrica*, *Bruguiera sexangula* and *Ceriops tagal*. These species are naturally occurring mangrove species in Myanmar. World Widlife Fund (WWF) has documented that these species are distributed in the country predominantly in three regions: the Ayeyarwady, Rakhine and Taninthayi (Annex 1).	0
b)	Ongoing enforcement to prevent encroachment by outside actors is required to protect more than 50% of stocks on which GHG credits have previously been issued. WIF gets the support of the Forest Department officials for the regular monitoring of the area for encroachment. The agreement with the village tracts also ensures sufficient staff be able to take care the plants and in this manner the encroachment of outside players that could intentionally or unintentionally damage the planted areas is avoided. Agreements with the village tract chairmen of each village are provided as evidence.	2
c)	Management team does not include individuals with significant experience in all skills necessary to successfully undertake all project activities (ie, any area of required experience is not covered by at least one individual with at least 5 years experience in the area). The management team responsible for day-to-day activities is from Worldview International Foundation (WIF). Their country office is in Yangon and their field office is in Pathein. Mr Bo Ni, the Managing Director is the former Director of the Watershed Management Division of the Forest Department with over 40 years of experience. Mr. Win Maung, the Project Director is the former Director of the Forestry Department. He has over 30 years working experience in mangrove conservation as a government official; researcher and Project Manager of NGO/UN-LIFT projects. Mr. Aung Aung Myint, GIS Expert, has over 25 years of experience in forestry and mangrove restoration with experience in GIS and mapping. Professor Htay Aung is the scientific advisor and field controller in charge of liaison with Pathein University and local communities. He has over 20 years' experience in marine science research in the project area. Dr. Dhanya M. Nambiar, the Carbon Consultant, does not involve daily project management, but she consults the project monitoring plan. She has 20 years of consulting experience in environment & sustainability. She worked on over 100	0

	projects in the area of climate change mitigation and adaptation. Overall supervisory was done by Dr. Arne Fjortoft, Secretary General of WIF. Annex 2 describes the capacity and experience of the organization and staff to manage the project area.	
d)	Management team does not maintain a presence in the country or is located more than a day of travel from the project site, considering all parcels or polygons in the project area. The management teams are located in the country and are able to reach the project within a 4-hour drive from the Yangon. Country office is in the Yangon and the branch office is within the project area. Contact information for the management team is presented in the Project Description (PD).	0
e)	**Mitigation:** Management team includes individuals with significant experience Management team includes individuals with significant experience in AFOLU project design and implementation, carbon accounting and reporting (eg, individuals who have successfully managed projects through validation, verification and issuance of GHG credits) under the VCS Program or other approved GHG programs. Management team includes individuals with significant experience in AFOLU project design and implementation, carbon accounting and reporting (e.g., individuals who have successfully managed projects through validation, verification and issuance of GHG credits) under the VCS Program. In addition, Dr. Dhanya M. Nambiar is having a regular communication with team for issues related to carbon accounting and reporting.	-2
f)	**Mitigation:** Adaptive management plan in place 1. Field operation The staff consist of ex-forest department officials who were having over 30 years of experience in mangrove planting and management. Their younger staff are graduates from the University of Forestry who have sound knowledge on forest management practices. The species selection was also done after a 3-year research on trial plots. WIF maintains a surplus of planting material (seedlings and propagules) for patching during the following years after the initial planting. 2. Outside actors encroaching on the project area During the 4th monitoring period, an illegal encroachment of 5.19 ha for a hotel construction from the project area was identified. WIF has taken necessary legal measures to prevent any further encroachments by this construction process. Letter issued by the Ayeyarwady Regional Forest Department to take necessary actions on the company owners and a letter issued by the District Administrative Committee with the Company agreeing to the terms of the Regional Government are provided as evidence. 3. Environmental management	-2

	Communities and community representatives are mobilized for environmental education and forest conservation as part of the mitigating measures. Examples of these actions are giving training on fuel efficient stove making, distributing fuel efficient stoves and establishing community energy forest to address the demand of fuelwood consumption.	
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] **= (0) + (2) + (0) + (0) + (-2) + (-2)** **= (-2)** Total may be less than zero.		**-2**

Financial Viability		
Risk Factor	**Risk Factor and/or Mitigation Description**	**Risk Rating**
a)	Project cash flow breakeven point is greater than 10 years from the current risk assessment The project is implemented by Worldview International Foundation (WIF). WIF is an INGO and other partners involved are the University of Pathein and local communities from three village tracts. There is no financial return from mangrove reforestation other than the carbon credit benefits. Therefore, the internal rate of return (IRR) is not applicable for this non-profit project activity. However, the cash flow breakeven point is greater than 10 years.	3
b)	Project cash flow breakeven point is between 7 and up to less than 10 years from the current risk assessment	0
c)	Project cash flow breakeven point between 4 and up to less than 7 years from the current risk assessment	0
d)	Project cash flow breakeven point is less than 4 years from the current risk assessment	0
e)	Project has secured less than 15% of funding needed to cover the total cash out before the project reaches breakeven	0
f)	Project has secured 15% to less than 40% of funding needed to cover the total cash out required before the project reaches breakeven As mentioned above risk factor a), the project is implemented by Worldview International Foundation (WIF) which is an INGO, non-profit organization. The project started in 2015, and the full project implementation was completed by 2019. The project activities are mangrove restoration and planting for ecosystem and biodiversity enrichment followed by community livelihood development. There is no timber harvesting, and so no financial return from mangrove reforestation other than the carbon credit benefits. As it is a reforestation project, the major fund requirements were during	2

	initial years of plantation establishments, which WIF has sourced through internal means. Since the project is successfully implemented and is running as per the planned schedule during last 10 years, it can be inferred that the major funding requirement for the project has already been achieved for the total duration of the project. An IRR or NPV analysis does not apply in this case. However, to document the cost associated with the project a simple cost analysis has been carried out so as to prove that the 15-40 % of the funding requirement is already achieved and the project generate no other financial benefits other than carbon credit revenue.	
g)	Project has secured 40% to less than 80% of funding needed to cover the total cash out required before the project reaches breakeven	0
h)	Project has secured 80% or more of funding needed to cover the total cash out before the project reaches breakeven	0
i)	**Mitigation:** Project has available as callable financial resources at least 50% of total cash out before project reaches breakeven	0
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] **= a + f + i** **= (3) + (2) + (0)** **= 5** Total may not be less than zero.		**5**

Opportunity Cost		
Risk Factor	**Risk Factor and/or Mitigation Description**	**Risk Rating**
a)	NPV from the most profitable alternative land use activity is expected to be at least 100% more than that associated with project activities; or where baseline activities are subsistence-driven, net positive community impacts are not demonstrated	0
b)	NPV from the most profitable alternative land use activity is expected to be between 50% and up to100% more than from project activities	0
c)	NPV from the most profitable alternative land use activity is expected to be between 20% and up to 50% more than from project activities	0
d)	NPV from the most profitable alternative land use activity is expected to be between 20% more than and up to 20% less than from project activities; or where baseline activities are subsistence-driven, net positive community impacts are demonstrated WIF is a non-profit entity and the implemented activities are fully focused on meeting the subsistence needs of local communities. Net positive community impacts of the project activities are well demonstrated in the PD.	0

e)	NPV from project activities is expected to be between 20% and up to 50% more profitable than the most profitable alternative land use activity	0
f)	NPV from project activities is expected to be at least 50% more profitable than the most profitable alternative land use activity	0
g)	**Mitigation:** Project proponent is a non-profit organization The PP, WIF, is a non-profit organization. There is no financial return from mangrove reforestation other than the carbon credit benefits although the project promotes activities for local community life and economy development in addition to the restoration of degraded mangrove forests, improving biodiversity and coastal ecosystem.	-2
h)	**Mitigation:** Project is protected by legally binding commitment to continue management practices that protect the credited carbon stocks over the length of the project crediting period (see project longevity) The project area falls within a forest estate and has been protected in accordance with the existing Forest Law, rules and regulations applicable for Republic of Union of Myanmar. The Section 41 (e) of the Forest Law (2018) and Section 5 of the Forest Rules (1995) state; - "41. Whoever commits any of the following acts shall, on conviction, be punished with imprisonment for a term not exceeding two years or with a fine from a minimum of three hundred thousand kyats to a maximum of five hundred thousand kyats or with both: (e) destroying or damaging the forest plantation established by the Ministry or by any person or organization under permission of the Director General." - As per Section 5 of Forest Rule (1995), the encroachment activities such as construction of new buildings, cutting trees, extraction of forest products, clearing lands, establishment of agriculture practices, fire and grazing lands are not allowed to undertake in the proposed protected public forests. In addition, the three project areas (Magyi, Thabawkan, Thaegone) in total of 2,065.87 ha are fully covered under the category of Protected Public Forests (PPFs) namely, Magyi, Thabawkan, Polaung Gyi and Ohnchaung mangrove PPFs in total of 2,632 ha. As per Section (5) of Forest Law (2018), the purposes of PPFs are clearly defined for protection of water and soil, conservation of mangrove forests, and conservation of environment and biodiversity. Magyi Protected Public Forest has been notified with Letter No. 107/2021 dated 28th September 2021 by the Ministry of Natural Resources and Environmental Conservation of the Union Minister's Office. Then, the remaining three PPFs of Thawbawkan, Polaung Gyi and Ohnchaung have been proposed by Letter No. 5259-60/Sa (Ga) 2 dated	0

	27th July 2022 by Forest Department. The evidence and requirements are provided and demonstrated in Annex (3). By virtue of the above-mentioned Forest Law (2018) and Forest Rules (1995), the three project sites are totally protected under the proposed and notified status of PPFs. Since the initial implementation of project activities, WIF supports funding and required resources to Forest Department for the entire processes of declaring the project areas to strengthen the long-term protection under the forest estate as mangroves PPFs "Protected Public Forests" as well as to reduce GHG emissions. Hence, in view of the above, project area comes under the purview of legal requirement to continue the management practice that sequesters carbon or avoids emissions for the project's longevity. Further, as per Chapter (V) Section (13), sub-section (d), of Forest Law (2018); the Director General of Forest Department has the authority and responsibilities to implement forest related activities (Refer Section 10, 12 (b) and (d), 13, 14, 15, 20, 23(a), 26(a) and 31) and hence, within his authority, has entrusted WIF with the task of carrying out new mangrove plantation activities. This delegation of responsibility reflects a strong binding commitment between Forest Department and WIF to work on mangrove restoration in the project area as part of their efforts to protect and rehabilitate coastal ecosystem and provide livelihood opportunities to vulnerable coastal communities through carbon finance mechanism. Accordingly, WIF in collaboration with the Forest Department has implemented the mangrove restoration activities in the project area since 2015. In addition, to continue management practices that protect the credited carbon stocks over the length of the project crediting period, WIF has the agreements with two village tracts (Thabawkan and Thaegone areas) and Pathein University (Magyi areas) along with respective land use permissions granted by Regional Government for implementation of mangrove restoration activities for a period of 30 years with the possibility of extending the period up to 120 years (Annex 4). The documentary evidences related to all of the above were verified by the VVB during validation and all the previous verifications and no change occurred from the beginning till the last verification. However, to be on a conservative side, PP did not claim scores for this mitigation measure (h). Hence, the score is selected as zero.	
i)	**Mitigation:** Project is protected by legally binding commitment to continue management practices that protect the credited carbon stocks over at least 100 years (see project longevity) The above option (h) is selected, hence this is not applicable.	0
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g + h or i)] **= d + (g + h)** **= (0) + [(-2) + (0)]**		**-2**

	= (-2) Total may be less than 0.	

Project Longevity		
a)	Without legal agreement or requirement to continue the management practice The project area falls within a forest estate and has been protected in accordance with the existing Forest Law, rules and regulations applicable for Republic of Union of Myanmar. The Section 41 (e) of the Forest Law (2018) and Section 5 of the Forest Rules (1995) state; - "41. Whoever commits any of the following acts shall, on conviction, be punished with imprisonment for a term not exceeding two years or with a fine from a minimum of three hundred thousand kyats to a maximum of five hundred thousand kyats or with both: (e) destroying or damaging the forest plantation established by the Ministry or by any person or organization under permission of the Director General." - As per Section 5 of Forest Rule (1995), the encroachment activities such as construction of new buildings, cutting trees, extraction of forest products, clearing lands, establishment of agriculture practices, fire and grazing lands are not allowed to undertake in the proposed protected public forests. In addition, the three project areas (Magyi, Thabawkan, Thaegone) in total of 2,065.87 ha are fully covered under the category of Protected Public Forests (PPFs) namely, Magyi, Thabawkan, Polaung Gyi and Ohnchaung mangrove PPFs in total of 2,632 ha. As per Section (5) of Forest Law (2018), the purposes of PPFs are clearly defined for protection of water and soil, conservation of mangrove forests, and conservation of environment and biodiversity. Magyi Protected Public Forest has been notified with Letter No. 107/2021 dated 28th September 2021 by the Ministry of Natural Resources and Environmental Conservation of the Union Minister's Office. Then, the remaining three PPFs of Thawbawkan, Polaung Gyi and Ohnchaung have been proposed by Letter No. 5259-60/Sa (Ga) 2 dated 27th July 2022 by Forest Department. The evidence and requirements are provided and demonstrated in Annex (3). By virtue of the above-mentioned Forest Law (2018) and Forest Rule (1995), the three project sites are totally protected under the proposed and notified status of PPFs. Since the initial implementation of project activities, WIF supports funding and required resources to Forest Department for the entire processes of declaring the project areas to strengthen the long-term protection under the forest estate as mangroves PPFs "Protected Public Forests" as well as to reduce GHG emissions.	18

	Hence, in view of the above, project area comes under the purview of legal requirement to continue the management practice that sequesters carbon or avoids emissions for the project's longevity. Further, as per Chapter (V) Section (13), sub-section (d), of Forest Law (2018); the Director General of Forest Department has the authority and responsibilities to implement forest related activities (Refer section 10, 12(b) and (d), 13, 14, 15, 20, 23 (a), 26(a) and 31) and hence, within his authority, has entrusted WIF with the task of carrying out new mangrove plantation activities. This delegation of responsibility reflects a strong binding commitment between Forest Department and WIF to work on mangrove restoration in the project area as part of their efforts to protect and rehabilitate coastal ecosystem and provide livelihood opportunities to vulnerable coastal communities through carbon finance mechanism. Accordingly, WIF in collaboration with the Forest Department has implemented the mangrove restoration activities in the project area since 2015. In addition, to continue management practices that protect the credited carbon stocks, WIF has agreements with two village tracts (Thabawkan and Thaegone areas) and Pathein University (Magyi areas) along with respective land use permissions granted by Regional Government for implementation of mangrove restoration activities for a period of 30 years with the possibility of extending the period up to 120 years (Annex 4). The documentary evidences related to all the above were verified by the VVB during validation and all the previous verifications and no change occurred from the beginning till the last verification. However, to be on a conservative side, PP selected the lowest score of 18 assigned for this risk factor.	
b)	With legal agreement or requirement to continue the management practice The above option (a) is selection; hence this is not applicable.	0
Total Project Longevity (PL) May not be less than zero		**18**

Internal Risk	
Total Internal Risk (PM + FV + OC + PL) **= (- 2) + (5) + (-2) + (18)** **= 19** Total may not be less than zero.	**19**

2 EXTERNAL RISKS

Land Tenure and Resource Access/Impacts		
Risk Factor	**Risk Factor and/or Mitigation Description**	**Risk Rating**
a)	Ownership and resource access/use rights are held by same entity(s) No, ownership and resource use rights are held by different entities. The mangrove forests that will be restored under the project belong to Magyi, Thabawkan and Thaegone village tracts. The ownership of these lands lies with the Government of Myanmar, but the Government has given the lands of Magyi village tract to University of Pathien for a period of 30 years. Similary, lands in Thabawkan and Thaegone have also been given to their respective Village Tract Committees for a period of 30 years. This period can be extended for another 90 years. The University of Pathein and the Village Tract Committees of Thabawkan and Thaegone have agreements with WIF for the development of mangrove reforestation/ restoration project.	0
b)	Ownership and resource access/use rights are held by different entity(s) (eg, land is government owned and the project proponent holds a lease or concession) The project is protected by a legally binding commitment with village tracts committees and Pathein University to continue management practices that protect carbon stocks over the length of the project crediting period.	2
c)	In more than 5% of the project area, there exist disputes over land tenure or ownership There is no dispute over land tenure or ownership. The communities were willing to conserve the mangrove forests since they have evidence that aquatic species such as fish, crabs and clams became abundant and supply for their meals and selling. The insignificant encroachment in the past was already addressed with the support of Ayeyarwady Regional Government in the previous monitoring period. In the meantime, the risk of illegal firewood cutting has been reduced with the mitigation measures such as efficient stoves distribution and job opportunities, and such details of livelihood development activities are clearly mentioned in the MR. Therefore, there are no significant risk of encroachment and illegal cutting activities during the current monitoring period.	0
d)	There exist disputes over access/use rights (or overlapping rights) There is no dispute over use rights.	0

e)	WRC projects unable to demonstrate that potential upstream and sea impacts that could undermine issued credits in the next 10 years are irrelevant or expected to be insignificant, or that there is a plan in place for effectively mitigating such impacts To demonstrate that potential upstream and sea impacts in WRC project that could undermine issued credits in the next 10 years irrelevant or insignificant, the impacts of sea level rise and potential upstream has been analyzed by a WIF hydrological expert with the technical support of GIS and RS team. As per the analyzed results on the impact of sea level rise, the project area will not be exposed to the risk of sea level rise from a low greenhouse gas emission scenario to a high greenhouse gas emissions scenario until the year 2100 and hence the impacts of seal level rise to the project area are found insignificant. In addition, as per the technical assessment, it is clearly mentioned about three key points of hydrological connectivity of the project areas with the outsides of the project areas, "absence of major dams or water projects", "no water disruption", and "no alteration in water supply". It also implies that the project's activities do not have a substantial effect on the existing water supply in the area. Hence, the natural flow of water or the hydrological connectivity of water body within the project areas does not show any alteration and disruption of water bodies with different water sources within the region." Hence, there are no significant impacts of potential upstream and sea impacts on issued credits over the next 10 years.	0
f)	**Mitigation:** Project area is protected by legally binding commitment (e.g., a conservation easement or protected area) to continue management practices that protect carbon stocks over the length of the project crediting period The project area falls within a forest estate and has been protected in accordance with the existing Forest Law, rules and regulations applicable for Republic of Union of Myanmar. The Section 41 (e) of the Forest Law (2018) and Section 5 of the Forest Rules (1995) state; - "41. Whoever commits any of the following acts shall, on conviction, be punished with imprisonment for a term not exceeding two years or with a fine from a minimum of three hundred thousand kyats to a maximum of five hundred thousand kyats or with both: (e) destroying or damaging the forest plantation established by the Ministry or by any person or organization under permission of the Director General." - As per Section 5 of Forest Rule (1995), the encroachment activities such as construction of new buildings, cutting trees, extraction of forest products, clearing lands, establishment of agriculture practices, fire and grazing lands are not allowed to undertake in the proposed protected public forests.	0

In addition, the three project areas (Magyi, Thabawkan, Thaegone) in total of 2,065.87 ha are fully covered under the category of Protected Public Forests (PPFs) namely, Magyi, Thabawkan, Polaung Gyi and Ohnchaung mangrove PPFs in total of 2,632 ha. As per Section (5) of Forest Law (2018), the purposes of PPFs are clearly defined for protection of water and soil, conservation of mangrove forests, and conservation of environment and biodiversity.

Magyi Protected Public Forest has been notified with Letter No. 107/2021 dated 28th September 2021 by the Ministry of Natural Resources and Environmental Conservation of the Union Minister's Office. Then, the remaining three PPFs of Thawbawkan, Polaung Gyi and Ohnchaung have been proposed by Letter No. 5259-60/Sa (Ga) 2 dated 27th July 2022 by Forest Department. The evidence and requirements are provided and demonstrated in Annex (3).

By virtue of the above-mentioned Forest Law (2018) and Forest Rule (1995), the three project sites are totally protected under the proposed and notified status of PPFs. Since the initial implementation of project activities, WIF supports funding and required resources to Forest Department for the entire processes of declaring the project areas to strengthen the long-term protection under the forest estate as mangroves PPFs "Protected Public Forests" as well as to reduce GHG emissions.

Hence, in view of the above, project area comes under the purview of legal requirement to continue the management practice that sequesters carbon or avoids emissions for the project's longevity.

Further, as per Chapter (V) Section (13), sub-section (d), of Forest Law (2018); the Director General of Forest Department has the authority and responsibilities to implement forest related activities (Refer section 10, 12(b) and (d), 13, 14, 15, 20, 23 (a), 26(a) and 31) and hence, within his authority, has entrusted WIF with the task of carrying out new mangrove plantation activities. This delegation of responsibility reflects a strong binding commitment between Forest Department and WIF to work on mangrove restoration in the project area as part of their efforts to protect and rehabilitate coastal ecosystem and provide livelihood opportunities to vulnerable coastal communities through carbon finance mechanism. Accordingly, WIF in collaboration with the Forest Department has implemented the mangrove restoration activities in the project area since 2015.

In addition, to continue management practices that protect the credited carbon stocks, WIF has agreements with two village tracts (Thabawkan and Thaegone areas) and Pathein University (Magyi areas) along with respective land use permissions granted by Regional Government for implementation of mangrove restoration activities for a period of 30 years with the possibility of extending the period up to 120 years (Annex 4).

The documentary evidences related to all the above were verified by the VVB during validation and all the previous verifications and no change occurred from the beginning till the last verification.

In addition, to strengthen the protection in the project area, since the

	initial project implementation in 2015, the project has adopted effective protection structure, assigned regional coordinator, and appointed community forest guards (15 staff from local communities) who regularly patrol and protect the project areas in collaboration with Forest Department staff, one of the project entities and stakeholders. The evidences of the above-mentioned protection activities and legal requirements are provided in the Annex 3. However, to be on a conservative side, PP did not claim scores for this mitigation measure, Hence, the score is selected as zero.	
g)	**Mitigation:** Where disputes over land tenure, ownership or access/use rights exist, documented evidence is provided that projects have implemented activities to resolve the disputes or clarify overlapping claims No dispute has been occurred over land tenure because the project area is under the jurisdiction of Forest Law (2018) and Forest Rules (1995). Hence, to be conservative, the project does not claim scores for this mitigation measure same as in the case of validation and previous four verifications, and the score remains unchanged and selected as zero.	0
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f + g)] **= b + c + d + e + f + g** **= (2) + (0) + (0) + (0) + (0) + (0)** **= 2** Total may not be less than zero.		**2**

Community Engagement		
Risk Factor	**Risk Factor and/or Mitigation Description**	**Risk Rating**
a)	Less than 50 percent of households living within the project area who are reliant on the project area, have been consulted More than 50% of the local people residing in the villages within the project boundary were given awareness about the degradation of the mangrove forest and the necessity and benefits of restoring them. Village Tract Committees were formed in each village tract and community development programs have been implemented. agreements with each village tract were also signed between WIF and the village tracts. Therefore, there is no risk and set it to 0.	0
b)	Less than 20 percent of households living within 20 km of the project boundary outside the project area, and who are reliant on the project area, have been consulted	0

c)	**Mitigation:** The project generates net positive impacts on the social and economic well- being of the local communities who derive livelihoods from the project area Lands belonging to the project have been categorized as severely degraded and not containing any forest by the Regional Ministry of Agriculture, Livestock, Natural Resources & Environment. The project generates net positive impacts on the social and economic well-being of the local communities.	-5
Total Community Engagement (CE) [where applicable, (a + b + c)] **= (0) + (0) + (-5)** **= -5** Total may be less than zero.		**-5**

Political Risk		
Risk Factor	**Risk Factor and/or Mitigation Description**	**Risk Rating**
a)	Governance score of less than -0.79	6
b)	Governance score of -0.79 to less than -0.32	0
c)	Governance score of -0.32 to less than 0.19	0
d)	Governance score of 0.19 to less than 0.82	0
e)	Governance score of 0.82 or higher	0
f)	**Mitigation:** Country implementing REDD+ Readiness or other activities such as: a) The country is receiving REDD+ Readiness funding from the FCPF, UN-REDD or other bilateral or multilateral donors b) The country is participating in the CCBA/CARE REDD+ Social and Environmental Standards Initiative c) The jurisdiction in which the project is located is participating in the Governors' Climate and Forest Taskforce d) The country has an established national FSC or PEFC standards body e) The country has an established DNA under the CDM and has at least one registered CDM A/R project Myanmar is an UN-REDD partner country since December 2011. Myanmar received UN-REDD targeted support in 2013 to develop a REDD+ Readiness Roadmap and used that Roadmap to develop a funding proposal in November 2013 based on a full UN-REDD National Programme2 (Annex 5). Myanmar has a DNA (Ministry of Environmental Conservation and Forestry) under the CDM which is available on	-2

	UNFCCC website here (https://cdm.unfccc.int/DNA/DNA/view.html?CID=148) (Annex 5).	
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] **= a + f** **= (6) + (-2) = 4** Total may not be less than zero.		**4**

According to the historical record of the governance indicators as applied to Myanmar, the average score over the last five years is -0.944. The scores and calculations are presented in Annex 6 and a summary is presented in following table.

The World Bank Institute Worldwide Governance Indicators are available at: https://databank.worldbank.org/source/worldwide-governance-indicators#

Country Name	Country Code	Series Name	Series Code	2016	2017	2018	2019	2020
Myanmar	MMR	Control of Corruption: Estimate	CC.EST	-0.62101	-0.56529	-0.58075	-0.61494	-0.65371
Myanmar	MMR	Government Effectiveness: Estimate	GE.EST	-0.97636	-1.04663	-1.06539	-1.14944	-0.99652
Myanmar	MMR	Political Stability and Absence of Violence/Terrorism: Estimate	PV.EST	-0.80462	-1.08484	-1.26885	-1.32807	-1.51314
Myanmar	MMR	Regulatory Quality: Estimate	RQ.EST	-0.86832	-0.82988	-0.74803	-0.76079	-0.6323
Myanmar	MMR	Rule of Law: Estimate	RL.EST	-0.88718	-0.94402	-1.03303	-1.06303	-1.17882
Myanmar	MMR	Voice and Accountability: Estimate	VA.EST	-0.79677	-0.86467	-0.90517	-0.85726	-0.94431

External Risk	
Total External Risk (LT + CE + PC) = 2 + (-5) + 4 = 1 Total may not be less than zero.	1

3 NATURAL RISKS

Myanmar is vulnerable to natural disasters such as flooding, drought, earthquakes, cyclones, and communicable and infectious disease outbreaks. Myanmar ranks as one of the most vulnerable

countries to the effects of climate change and the impacts of natural disasters are expected to increase in the immediate future.

The country has made significant progress in its disaster management policies, plans, and procedures since 2008, when Cyclone Nargis impacted the country leaving devastation in its aftermath. The Government of Myanmar has modified the government structure and created new authorities and plans to improve the effectiveness of disaster management at all levels[1] (Annex 7).

Natural Risk (Fire)	
Significance	Mangroves are grown in coastal saline or brackish water. The mangroves in the Ayeyarwady Region have not been affected by any forest fire in the past.
Likelihood	Since the ecosystems where mangroves are grown are not susceptible to forest fire, the risk of fire is not applicable to the project area.
Score (LS)	0
Mitigation	Not applicable in mangrove areas. If small unexpected cases happen, the mitigation measures are readily available as the projects fall under the coastal wetlands in the tidal submerged areas.

Natural Risk (Pest & Disease Outbreaks)	
Significance	There are no reported pest attacks in the coastal mangrove area. However there have been few pest attacks in Sonneratiaceae family and Avicenniaceae family in the delta mangrove area. There is no reported insect 'tide watching mangrove moth' Aucha velans. There are reports of some propagules and seedlings in young stage being attacked by crabs, but the significance is insignificant.
Likelihood	As a conservative measure it is estimated that there is likelihood for a pest or disease outbreak to occur in less than every 10 year time.
Score (LS)	1
Mitigation	Pest and disease outbreaks are also preventable using proper measures. The staff of WIF has experience in implementing mitigation activities, which will be the following: a. Training - Training regarding the identification of the principal species that affect the health of the planted trees. Training will be conducted by personnel with experience in the identification of pests and diseases that harm mangroves. b. Monitoring – Project proponent will be in charge of monitoring the health of the planted

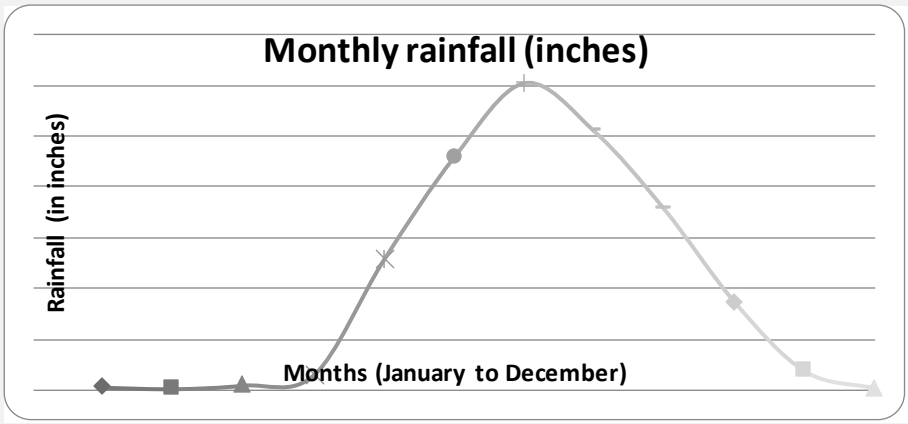
[1] https://reliefweb.int/report/myanmar/myanmar-disaster-management-reference-handbook-march-2020

	trees. In addition, annual monitoring activities will be implemented. The objective is to identify the presence of pests and diseases in the planted trees. c. Evaluation - The incidence and severity of pests and diseases identified in the field will be determined during annual monitoring. Due to the implementation of these activities, a mitigation factor of 0.50 is selected, resulting in a risk rating of 1.00 for pest and disease outbreaks

Natural Risk (Extreme weather)

Significance

Rain & Floods - Most of the rain falls during the monsoons between mid-May and mid-November. It is cool and dry from mid-October to mid-February when temperatures begin to rise with pre-monsoon squalls in April and early May. Data from 2007-2016 indicate an annual rainfall of 3000 mm (122 inches) for the past 10 years. Results also indicate that the area has got approximately 130 days with rain per year. Heavy rains with thunder usually occur in the coastal region during the afternoons and late nights of April and May.



Monthly rainfall in Pathein area for the period of 2007-2016

Month	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
January	0.0	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.2
February	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
March	0.0	0.0	0.0	0.0	3.4	0.2	0.0	0.0	0.7	0.4
April	0.0	5.4	3.1	0.0	4.3	0.0	0.0	0.0	2.2	0.0
May	17.0	31.2	9.6	8.9	7.8	4.0	14.3	3.4	15.7	16.6
June	18.2	23.0	23.4	14.4	20.7	31.6	15.8	20.6	31.0	30.7
July	37.2	27.3	39.2	15.1	28.7	32.3	34.2	27.7	34.3	26.1
August	24.0	15.2	22.3	19.7	19.2	43.8	20.1	32.3	18.7	39.1
September	21.0	11.2	25.1	19.8	20.3	16.4	15.6	25.5	9.7	12.9
October	10.9	4.6	13.2	11.3	4.2	5.6	7.7	6.7	8.8	13.3

November	3.5	2.4	3.9	0.2	0.0	0.0	0.4	5.6	0.0	2.5
December	0.0	0.0	0.0	0.5	1.3	0.0	0.0	0.0	0.0	0.0
Total	131.7	122.3	139.9	89.8	111.0	133.8	108.1	121.8	121.1	141.7

Source: Department of Meteorology and Hydrology, Myanmar

Different types of floods can be seen in different areas of Myanmar:

- ***Riverine floods*** in the river delta;
- ***Flash floods*** in the upper reaches of the river systems, normally the mountainous areas, caused by the heavy rainfall striking at head water region for considerable period of 1-3 days.
- ***Localized floods*** in urban area due to a combination of factors such as cloudburst, saturated soil, poor infiltration rates and inadequate or poorly built infrastructure (such as blocked drains) and in rural areas due to the breakage of water resistance structures as dams, dykes and levees
- ***Flooding due to cyclone and storm surge*** in the coastal areas

In general, the catchment areas of major rivers in the north and central zone are prone to riverine floods. The Southern Delta faces riverine floods when there is flood tide and high river water flow at the same period. In these areas, the lands are protected from floods by earthen dykes, but there were times when flood overpower the dykes and cause losses of lives and properties.

No such above-mentioned flood disasters have been reported for the project area and nearby.

Cyclones

Cyclones have historically caused the most destruction of natural disasters in Myanmar. During the period of 1947 to 2007, 34 cyclones crossed Myanmar coast, of which 7 cyclones claimed lives (Hazard Profile of Myanmar, 2009). Strong winds and storm surges (flooding) associated with the cyclones have caused the most damage. Of the cyclones that caused the greatest disaster, 11 of them made landfall in Rakhine State and 2 in the Ayeyarwady Delta Region. The most devastating cyclone by far was Cyclone Nargis of 2008.

Cyclone risk is highest during the month of May; though, during the last 100 years cyclones also have occurred during April, October, November and December.

Summary of Existing Investigations of Cyclone in Ayarwady Region and Rakhine coastal region

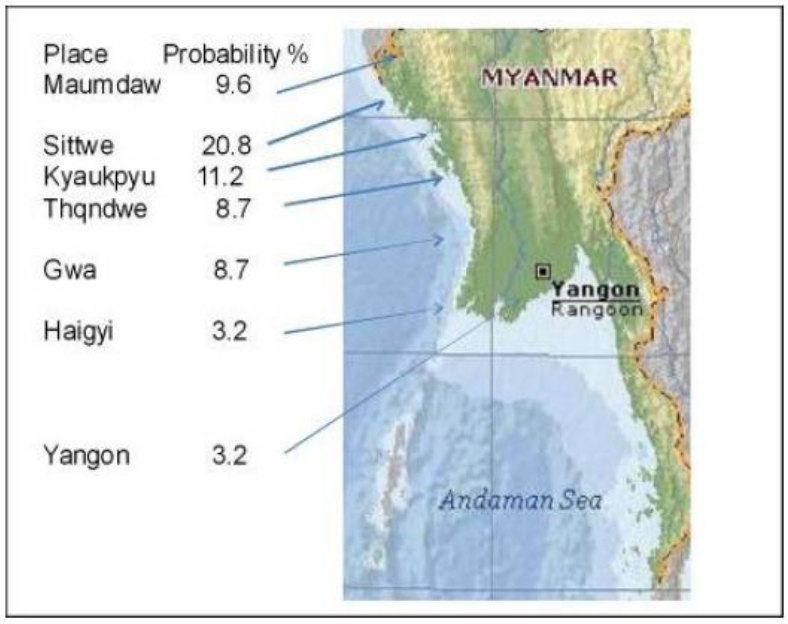
Date	Location	Cyclone Name	Remarks
May, 2013	Northen coast of Rakhine	Viyaru	
October, 2010	Northen coast of Rakhine	Giri	
May, 2008	Ngapadudaw, Labutta, Mawlayeinkyine	Nargis	Affected in the Project Area

May, 2007	Northen coast of Rakhine	Akash	
April, 2006	Irrawaddy, Southen coast of Rakhine	Mala	
May,1975	Pathein	Pathein	Affected in the Project Area

Likelihood

Referring to scientific data and publications, it is likely that the region may affect from cyclones and other extreme weather conditions. As per the above table, the past cyclone events affected in our project area happened in May 1975 and May 2008, which clearly denotes the occurrence of such events once within the period more than 30 years. Therefore, to be conservative it is expecting an extreme weather event once in every 10 - 25 years.

Cyclone landfill probability along Myanmar Coast (1947 – 2008)



Storm surge –

Storm surge is an extraordinary flooding due to a storm. It generally occurs due to waves generated by the strong wind in tropical revolving storms. The slope of the coastline is considered as one of the important factors controlling the intensity of storm surge.

According to the distribution of Storm surge hazard potential (in percent) of Townships in Ayeyarwady Division in the report Hazard Profile of Myanmar (2009) the project area (Pathein) has a 90% of low hazard potential due to storm hazard.

Hazard Zones	Low	Moderate	High	Very High
Ayeyarwady Division				
Bogale	0	15	60	25
Einme	100			
Kangyidaung	100			
Kyaiklat	55	45		
Kyaunggon	100			
Laputta	15	20	40	25
Maubin	100			
Mawlamyinegyun	50	30	20	0
Myaungmya	95	5		
Ngaputaw	60	12	15	13
Pantanaw	100			
Pathein	90	10		
Pyapon	0	25	55	20

Score (LS)	5
Mitigation	Mangrove species are quite adaptable for extreme weather events such as cyclones. An article published by Bahinipati & Sahu (2012) mention that studies have emerged at the global level, particularly following the aftermath of the 2004 Indian Tsunami, showing the importance of coastal vegetation in the context of reducing physical impacts. Tri et al. stated that mangrove planting is a 'win-win' solution for reducing future cyclonic risk and minimizing vulnerability in Vietnam. Adger et al. highlighted that the force of Tsunami waves was reduced by natural barriers like mangroves in Sri Lanka. Further, Dahdouh-Guebas et al. assert that the mangroves play a critical role in storm protection that based on their post-tsunami observations; they argued that it depends on the quality of the mangrove forests[2] (Annex 8). Darryl E. Marois & William J. Mitsch (2015) in their review of coastal protection from tsunami and cyclones provided by mangroves highlighted the results from several numerical and physical models support the mitigating capabilities of mangroves for cyclone storm surges and small tsunamis. Studies on the economic valuation of mangroves have estimated coastal protection to be a major portion of their total value[3]. Therefore, it is evident that planting mangroves itself is an adaptation measure to reduce the impact of extreme weather events in the project area. The tree replacement program contemplates planting additional mangrove trees to compensate for expected mortality. The implementation of these measures permits the utilization of a mitigation factor of 0.50, because of which the meteorological risk will be 5.00 x 0.5 = 2.50.

Natural Risk (Earthquake)	
Significance	Earthquakes in Myanmar have resulted from two main sources namely:

[2] http://www.indiawaterportal.org/sites/indiawaterportal.org/files/ajedm_paper_chandra_and_nirmal_0.pdf

[3] http://www.tandfonline.com/doi/full/10.1080/21513732.2014.997292

- The continued subduction (with collision only in the north) of the northward-moving Indian Plate underneath the Burma Platelet (which is a part of the Eurasian Plate) at an average rate of 3.5 cm/yr; and
- The northward movement of the Burma Platelet from a spreading centre in the Andaman Sea at an average rate of 2.5–3.0 cm/yr (Bertrand et al., 1998; Curray, 2005).

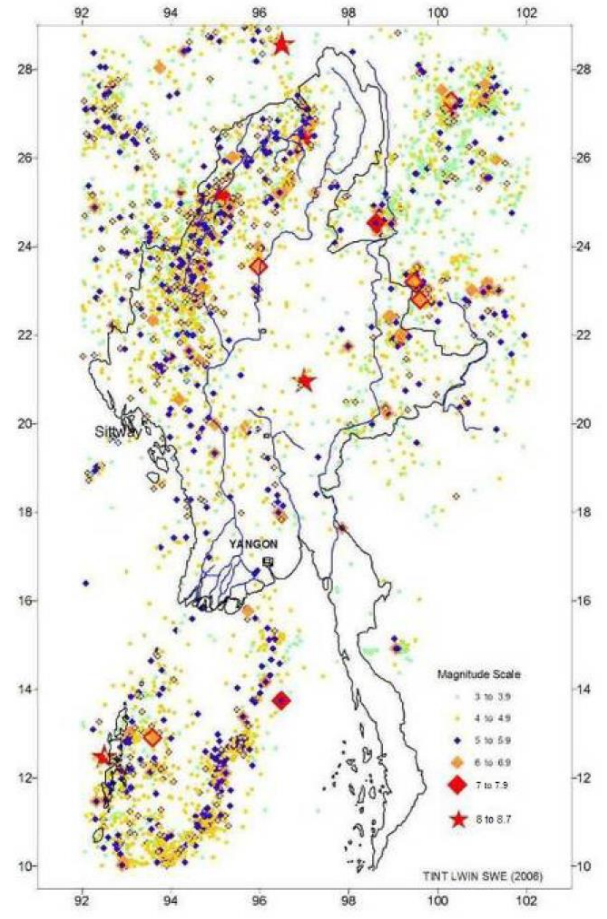
The following map indicates earthquake occurrences in the Myanmar region (Annex 9: Hazard Profile of Myanmar, 2009)

The seismic records show that there have been at least 16 major earthquakes with Richter Scale (RS) ≥ 7.0 within the territory of Myanmar in the past 170 years. The highest intensity zone designated for Myanmar is the Destructive Zone, which is equivalent to Modified Mercalli (MM) class IX. There are four areas in that very vulnerable zone; namely, Bago-Phyu, Mandalay-Sagaing-Tagaung, Putao-Tanaing, and Kale-Homalin areas. Although the latter two have major earthquake hazards, they may be less vulnerable as are sparsely populated.

Important cities and towns that lie in Zone IV (Severe Zone, with probable maximum range of ground acceleration 0.3 – 0.4 g) are Taungoo, Taungdwingyi, Bagan-Nyaung-U, Kyaukse, Pyin Oo Lwin, Shwebo, Wuntho, Hkamti, Haka, Myitkyina, Taunggyi, and Kunglong. Yangon spans the boundary between Zone II and Zone III, with the old and new satellite towns in the eastern part in Zone III, and the original City in Zone II.

Based on scientific studies it can be conservatively concluded that although Myanmar has the risk of earthquakes, the project area has not had any affects from earthquakes during the past hence this natural risk has not been considered.

Earthquake occurrences in Myanmar

	 Earthquake data: from NEIC for 1964 – 2004; from other sources for 1912 – 1963; data are in Richter Magnitude (modified after Tint Lwin Swe, 2006)
Likelihood	The likelihood is not applicable.
Score (LS)	0
Mitigation	Not applicable. Similar to the above first risk mitigation, if small unexpected cases happen, the mitigation measures are readily available as the restored mangroves serve as natural greenbelts.

Natural Risk (Tsunami)	
Significance	The tsunami induced by the 2004 Sumatra Earthquake (M9.1) caused around 60 missing and dead in the delta area of southern Myanmar. It also caused USD 500 million in losses, corresponding to 1.25% of the GDP at that time. There are other

	records of tsunamis induced by earthquakes in 1750 and in 1930. The tsunami in 1930 affected around 500 victims in Myanmar[4].
Likelihood	Following is a summary known tsunami that affected the *Ayeyarwady Delta* area. **Date/ Year** / **Affected Region** 1750 / Myanmar coast 1930 / Myanmar coast Dec.2004 / The delta area of southern Myanmar According to the reference, likelihood for a tsunami affecting the area is once in 100 years or more.
Score (LS)	0
Mitigation	Not applicable. Similar to the above first risk mitigation, if small unexpected cases happen, the mitigation measures are readily available as the restored mangroves serve as natural greenbelts.

Risk Category Factors		Likelihood	Mitigation	Risk Rating
a)	Fire (F)	0	0.25	0.00
b)	Pest and Disease Outbreaks (PD)	1	1.00	1.00
c)	Extreme Weather (W)	5	0.50	2.50
d)	Geological Risk (G)	0	0.25	0.00
e)	Other natural risk (ON1)	0	0.25	0.00
f)	Other natural risk (ON2)			0.00
g)	Other natural risk (ON3)			0.00
Total Natural Risk [F + PD + W + G + ON]				3.50

4 OVERALL NON-PERMANENCE RISK RATING AND BUFFER DETERMINATION

[4] ADB (2005). From Disaster to Reconstruction: A Report on ADB's Response to the Asian Tsunami

EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be
Japan International Cooperation Agency (JICA) (2012): "Data Collection Survey on ASEAN Regional Collaboration in Disaster Management"

UNDP (2011). Multi-hazard Risk Assessment in the Rakhine State of Myanmar

UNDP (2012). Multi-hazard Risk Assessment in Nargis Affected Areas, Myanmar

4.1 Overall Risk Rating

Risk Category	Rating
Internal Risk	19
External Risk	1
Natural Risk	3.50
Overall Risk Rating (a + b + c)	**24**
Total Risk Assessment	**24%**

4.2 Calculation of Total VCUs

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)	Buffer pool allocation	VCUs eligible for issuance
15.06.2021 – 31.12.2021	0	33,000.19	0	33,000.19	7,920.05	25,080.14
01.01.2022 – 14.06.2022	0	27,225.15	0	27,225.15	6,534.04	20,691.11
Total	**0**	**60,225.34**	**0**	**60,225.34**	**14,454.09**	**45,771.25**

Lists of Annex

Annex 1: Species Distribution

Annex 2: Management Structure

Annex 3: Evidence of protection activities and legal requirements

Annex 4: Agreements and Permission

Annex 5: Proof for UNREDD partner country and Proof for DNA of CDM, UNFCCC

Annex 6: Worldwide-Governance-Indicators

Annex 7: Myanmar Disaster Management Reference Handbook

Annex 8: Mangrove Conservation as Sustainable Adaptation to Cyclone

Annex 9: Hazard profile of Myanmar 2009