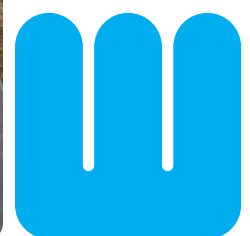


# Does WASH Infrastructures conform to Nature Based Solutions?

*An exploration of FSTP at Shakhipur*



**WaterAid**



**ICCCAD**

International Centre for  
Climate Change and  
Development

***Contributing Authors***

**WaterAid Team**

Adnan Ibne Abdul Qader, Partha Hefaz Shaikh,  
Faysal Abbas, Sumon Saha, Shakhawat Hossain,  
Hasin Jahan

***Research by***

**ICCCAD Team**

Afsara Binte Mirza, Savio Rousseau Rozairo,  
Fatema Akhter, Ali Mohammad Rezaie and  
Saleemul Huq

**Published by:**

WaterAid Bangladesh

**Published on:** 2022-10-30

**ISBN:** 978-984-35-3221-3

This study or any portion thereof cannot be copied or used for any commercial purpose. Data therein can, however, be used and published with acknowledgement of the sources.



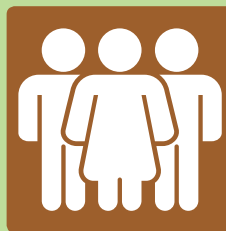


Does WASH Infrastructures conform  
to Nature Based Solutions?

*An exploration of FSTP at Shakhipur*



# Abbreviation



<b>BBS</b>	Bangladesh Bureau of Statistic
<b>BASA</b>	Bangladesh Association for Social Advancement
<b>DAE</b>	Department of Agricultural Extension
<b>FGD</b>	Focus Group Discussion
<b>FSM</b>	Faecal Sludge Management
<b>FSTP</b>	Faecal Sludge Treatment Plant
<b>FPIC</b>	Free, Prior and Informed Consent
<b>IRF-FSM</b>	Institutional Regulatory Framework for Feacal Sludge Management
<b>IUCN</b>	International Union for Conservation of Nature
<b>ICCCAD</b>	International Centre for Climate Change and Development
<b>JMP</b>	Joint Monitoring Programme
<b>M&amp;E</b>	Monitoring and Evaluation
<b>O&amp;M</b>	Operation and Maintenance
<b>SDG</b>	Sustainable Development Goals
<b>SFD</b>	Shit flow Diagram
<b>SMART</b>	Specific, measurable, attainable, realistic, and timely
<b>UN</b>	United Nations
<b>UNDRIP</b>	United Nations Declaration on the Rights of Indigenous Peoples
<b>UNICEF</b>	United Nations Children's Fund
<b>WASH</b>	Water, Sanitation and Hygiene
<b>WHO</b>	World Health Organization



# Preface

This report is the first of our 'WASH and NbS' series, where we are exploring the linkages and disconnects of WASH technologies with Nature Based Solutions (NbS). WaterAid Bangladesh understands that it is imperative to harness the power of nature to tackle climate change's impact on water, sanitation, and hygiene.

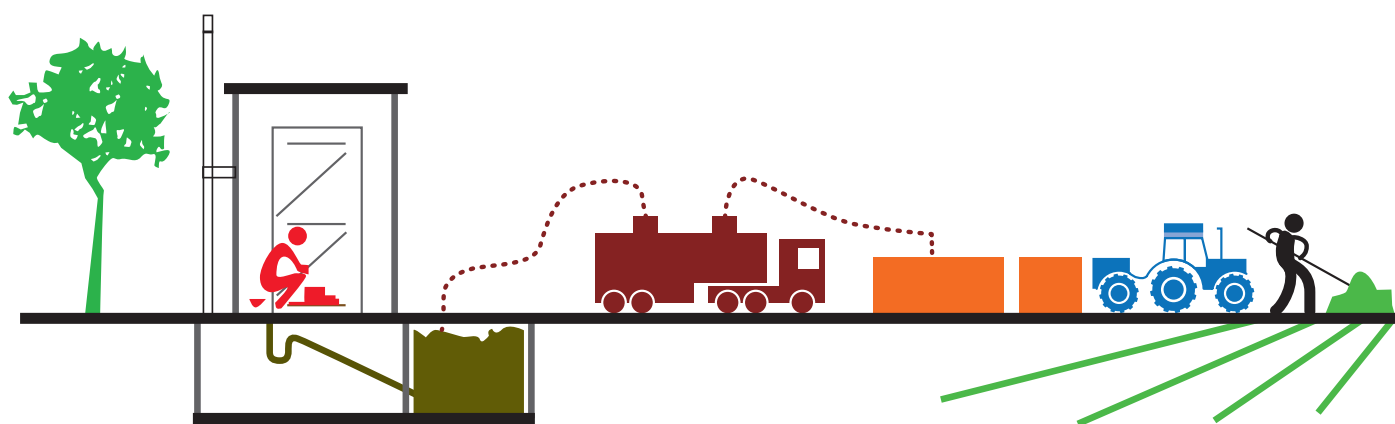
The report is a candid exploration of a Faecal Sludge Treatment Plant (FSPT), which WaterAid Bangladesh is promoting as a core sanitation solution to achieve safely managed sanitation that contribute to achieving SDG 6.2. We took the global guideline of IUCN as a benchmark for the assessment of the FSTP and tried to answer the question "Does WASH Infrastructures conform to Nature Based Solutions?" and have titled the report as such.

We have delved into 8 core principles of IUCN's NbS and tried to answer those considering what has been done for the FSTP situated at Sakhipur, Tangail, Bangladesh. The answers that we

came up with is an eyeopener of us as we have understood how hard and critical it is to really implement something that can be terms as 'Nature Based Solution'.

We recognize the collaboration of International Centre for Climate Change and Development (ICCCAD) in this endeavor with WaterAid Bangladesh as the research team, while the views and opinions expressed in the report are of the authors alone and do not necessarily reflect the views or positions of any entities they represent.

## Does WASH Infrastructures Conform to Nature Based Solutions (NbS): An exploration of FSTP at Shakhipur



# Prologue

The Sustainable Development Goal 6 (clean water and sanitation) illustrates the importance of water, sanitation, and hygiene (WASH) to provide and manage water and sanitation for all. In Bangladesh, adequate and accessible WASH facilities positively influence livelihoods, income security, and well-being, especially for the poor and marginalized communities. However, Bangladesh's geographic location makes the country vulnerable to the impacts of climate change due to consistent occurrences of floods, cyclones, and droughts, which hampers the WASH services for millions. The recent evolution of Nature-based Solutions (NbS) attribute to safeguard nature and simultaneously address societal challenges. NbS are gradually being recognized as a viable option to manage water availability, quality, and security during climatic hazards. This assessment aims to explore evidence and critically analyze whether existing WASH infrastructures are capable of meeting IUCN's global standards for NbS.

As NbS gains more recognition into policy dictates and is adopted by projects on the ground there is a pressing need for greater clarity and precision of what the concept entails and what is required for it to be deployed successfully. In the case of WaterAid, being a water, sanitation, and hygiene focused organization, has been successfully engaged with Government of Bangladesh and communities in providing safely managed WASH services that conserves water and provides safe sanitation practices that has the capability to contribute to the ecosystem through various feedback mechanisms.

This standard assessment, therefore, shall provide a systematic learning framework so that lessons learned can improve and evolve the potential NbS applications, leading to greater confidence in the subject matter amongst decision makers.

# Shakhipur and its WASH Challenges



Shakipur municipal city is in Shakipur Upazila, around 39 kilometers Northwest of Tangail and 77 kilometers Northwest of Bangladesh's capital, Dhaka. Shakipur was established as a Pourashava (municipality) in October 2000. The municipality is divided into 9 wards (BBS, 2011). Currently, the municipality has a total population of 30,028 people, with a density of 1,100/square kilo meter. (BBS, 2011). The communities in the municipality have access to toilets, however it a lack of a comprehensive sewerage system. Therefore, the whole sanitation system relies on onsite technologies such as pit latrines and septic tanks. Septic tanks are entirely lined (container type) and concrete build. They are often utilized in institutional, community, and public sanitation facilities , while most homeowners build fully lined tanks. Secondly, groundwater is the primary water source for most of the homeowners in Shakipur and the contamination of groundwater is a severe hazard to the entire community, which has resulted in the proliferation of water-borne diseases. For low-income families, vacutug<sup>1</sup> service is costly and inaccessible in isolated locations (at the periphery of the town, i.e., rural areas). Such issues coupled with inadequate waste management and treatment facilities became a challenge for the communities for a long time.



## The FSTP Co- compost Plant at Shakhipur, Tangail

Shakipur is a rapidly urbanising municipality in Bangladesh. Currently there is insufficient solid waste and faecal sludge management capacity resulting in a considerable amount of solid waste which has accumulated over time in and around the city. Onsite sanitation technologies mostly comprise of a septic tank and a variety of pit toilets. Shakipur does not have a dedicated sewerage system. Instead, when the pit or septic tank is full, professional sweepers are employed to empty them manually or mechanically, often meaning that in the past, the sludge ended up in in low-lying surface water bodes like small ponds, pits, or drains. Since 2016, some of this collected waste is used for co-composting.





# Shakipur Treatment Plant Quick Facts

## De-sludging period assumed: Since 2016

- **Sludge drying:** 10 x 9m<sup>2</sup> unplanted drying beds with a loading capacity of 5,000 litres per day of sludge at a loading depth of about 20cm. It takes three to five trips to fill one bed, where faecal sludge is kept for around 14 days to dry the sludge in the process of evaporation and solid-liquid separation by gravity percolation of leachate and refilled in cycles.
- **Liquid waste treatment:** Constructed wetland with hybrid flow followed by polishing pond.
- **Co-composting:** Aerobic decomposition of dried faecal sludge and organic solid waste. The organic solid waste, dried faecal sludge and sawdust are mixed at a bulk volume ratio of 3:1:1.
- **Current operations (annual):** Faecal sludge -12000 metric tonne/year.
- **Coverage:** Increased proportion of faecal sludge produced that is safely managed from 0% to 56 % safely managed since 2017.



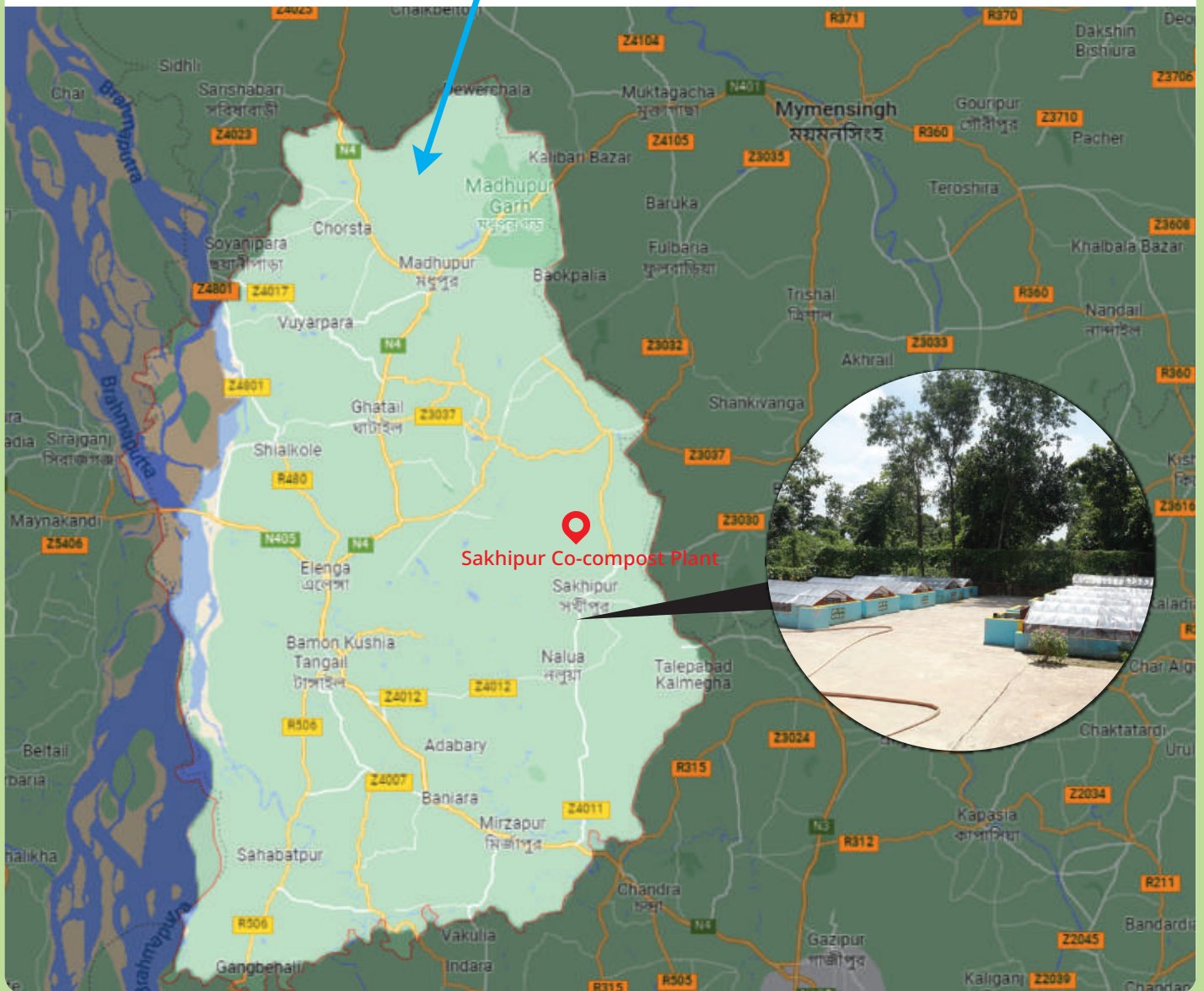








## Co-Compost Plant in Shakipur, Tangail





# Assessment of conformity to IUCN's NbS



This assessment has looked into the existing FSTP at Shakhipur as an example and has conducted a comprehensive analysis of existing information/data to understand whether the FSTP plant is conforming to the NbS standards set by IUCN. The assessment result has been presented in a color-coded mode for easy

understanding i.e., where existing information, examples and facts aligns with the IUCN guidelines were marked as green, parts which partially met IUCN's guidelines were marked as orange and parts which didn't meet the standards or were not applicable was marked as blue

## Criterion 1: NbS effectively address societal challenges

### IUCN guideline

The purpose of this criterion is to ensure that the Nature Based Solutions (NbS) is designed as a response to a societal challenge(s) that has been identified as a priority by those who are or will be directly affected by the challenge(s). All stakeholders, especially rights holders and beneficiaries of the NbS, must be involved in the decision-making process used for identifying the priority challenge(s) NbS are based on inclusive, transparent, and empowering governance processes (Criterion 5).

### Findings and Assessment

The 30,028 (BBS 2011) - inhabitants of the Shakhipur town in Tangail District had very poor sanitation. The problem was such that faecal sludge was either left in full pits and septic tanks, or emptied and discharged unsafely, causing environmental contamination and health concerns. The pourashava (municipality) has the overall responsibility for Faecal Sludge Management (FSM) services as well as solid waste management. Shakhipur being a small town, do not have the adequate human resources, budget, or incentives to deal with the issue. To address this challenge, WaterAid Bangladesh and Bangladesh Association for Social Advancement Foundation supported Shakhipur Municipality both technically and financially to analyze the situation; evaluate potential options; and establish a co-composting plant in 2015, which became operational in 2016. Although during the initial assessment for establishing the FSTP, NbS criteria was not specifically part of the assessment, but the issues of overall environment and how faecal sludge is impacting on the environment was part of doing the feasibility for the FSTP as was the impact on the population of Shakhipur.

# Indicators to meet NbS

Criteria Met

Criteria Partially Met

Criteria Not Met

## IUCN Indicators

## Findings and Assessment

### 1.1 The most pressing societal challenge(s) for rights-holders and beneficiaries are prioritised

**Guidance:** The NbS intervention must address clearly specified challenges that have significant and demonstrable impacts on society. Identification of the most pressing societal challenges is best informed by a transparent and inclusive consultation process (Criterion 5), as opinions may differ between external stakeholders and local populations and vice versa.

Criteria Met

The Shakipur co-composting plant was built to solve a growing societal crisis of unmanaged faecal sludge management that lead to health concern in that area.

A baseline study before establishing the plant provided detailed information on waste generation (faecal sludge, solid waste, and poultry litter) including volume and collection, disposal, and treatment options. A Shit Flow Diagram (SFD) developed by WaterAid Bangladesh showed that 0% of faecal sludge generated in Shakipur was safely managed.

The plant, with its green initiative was constructed with the intention to help the local municipal authorities and the 30,028 (BBS 2011) inhabitants. The final design was done with the consultation of the local municipal government and local beneficiaries through a participatory process (several workshops, FGDs and open discussion with citizens).

### 1.2 The societal challenge(s) addressed are clearly understood and documented

**Guidance:** Establishing a clear understanding and rationale of the challenges to be addressed, and ensuring these are documented, is important for future accountability and optimising those strategies to contribute to human well-being outcomes (1.3). An NbS often yields multiple societal benefits, such as job creation or increased flow of ecosystem services, and the societal challenges these additional benefits address should also be documented

Criteria Partially Met

Pre-intervention societal challenges was documented by WaterAid and post-interventions societal benefits are well documented, the assessment revealed the following:

The community's active engagement in the monthly meetings is likely to build a clear understanding of the challenges being addressed by the co-compost plant (waste management, food insecurity). The community is aware how the Vacutug carries 1000 litter of fecal sludge and processes it at the co-compost plant and helps in waste management. The compost is being used by the local farmers and their income has increased after using the co-compost fertilizer.



## IUCN Indicators

### 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked, and periodically assessed

**Guidance:** NbS must deliver tangible and substantive benefits to human well-being. Specific, measurable, attainable, realistic, and timely (SMART) targets should be used as appropriate, as they are important for accountability and informing adaptive management (Criterion 7)

## Findings and Assessment

WaterAid assesses the co-compost plant every 6 months where problems are highlighted and assessed along with the Municipal government.

The assessment indicates that each problem measuring criteria follows the SMART guideline, which caters to the well-being of both the beneficiaries and plant workers.

For instance, the community reported easily accessing fresh and nutritious vegetables and fruits which uses fertilizers from the plant. The beginning of intervention was presumably based on the community's wish to acknowledge the societal challenge through a transparent and inclusive process.

### Criteria Met



## Criterion 2: Design of NbS is informed by scale

### IUCN guideline

The purpose of this Criterion is to encourage NbS designs that recognise the complexity and uncertainty that occur in living dynamic land/seascapes. Scale applies not only to the biophysical or geographic perspective but also to the influence of economic systems, policy frameworks and the importance of cultural perspectives.

NbS design will be informed by what stakeholders know about the interactions between different aspects of a land/seascape using a three-scale framework that considers the parts within the land/seascape; the land/seascape itself; and the wider environment around the land/seascape. One example would be households within villages within a local authority area. Understanding the interactions which affect attributes like cultural values, laws, soils, forests and water are important in this regard, as they are relevant to the assessment of the risk of undesirable change, or the probability of creating desirable change. NbS design seeks to maintain the productive capacity of ecosystems as well as the production of benefits necessary for human well-being.

### Findings and Assessment

WaterAid partnering with Bangladesh Association for Social Advancement (BASA) Foundation intervened to solve the uncertainty around the living dynamics of the inhabitants of Shakipur and their waste management problems which was affecting the environment. WaterAid wanted to establish a platform that would help solve the sludge management problem and at the same time help the people with minimum income to be benefited in the process.

The initial design of the plant considered the environmental, social, and water impacts of the landscape. The commitment was ensured through the leasing of 0.3 acres of land for the co-composting plant by the Pourashava authority in the outskirts of the municipal area. As the Pourashava leased the land, no settlement issues were involved. The municipality also supplied a Vacutug to de-sludge pit latrines and septic tanks and transport the sludge safely to the FSTP.

Shakipur is not situated beside a seascape/waterbody however the greater Tangail district hugs the Jamuna river. To what scale this single infrastructure can complement the scaling guideline of Tangail cannot be explored, however the practices are well documented.

The choice of co-composting has been partly informed by the circular economy principle (given the needs and availability in Shakipur), partly by the expertise of WaterAid Bangladesh and BASA, and partly by a pragmatic consideration of what would motivate authorities. Yet it has disadvantages: such a plant is significantly more expensive to install and operate than, for instance, using drying beds and then burying / landfilling the dried sludge; the income from compost sale does not easily offset much of the operating costs<sup>3</sup> however since its inception the business modality has changed; The plant operation requires constant technical expertise and guidance to operate. However, in the context of Bangladesh (with a push for safely managed sanitation and lack of space), it represents a viable option.



# Indicators to meet NbS:

Criteria Met

Criteria Partially Met

Criteria Not Met

## IUCN Indicators

## Findings and Assessment

### 2.1 The design of the NbS recognises and responds to interactions between the economy, society, and ecosystems

**Guidance:** The success of an NbS will be determined not only by the quality of the technical intervention but, critically, how well the interactions between people, the economy and the ecosystem are understood and responded to. For the solutions to be durable and sustainable, the design of NbS requires a “systems” framing that acknowledges and addresses these types of interactions and builds them into the decision-making process

Criteria Met

The Shakhipur plant was built with the intention to help the 30,028 (BBS 2019) habitants of Shakhipur, Tangail. The co-compost plant was designed to create economic opportunities for the beneficiaries alongside restoring the degrading environment from the subsequent pollution. The product i.e., compost is being used by the farmers. The society is being positively impacted via the decreased environmental degradation and the plant is earning to keep the FSTP plant running albeit with financial support from WaterAid Bangladesh, which remains a challenge that need to be addressed.

### 2.2 The design of the NbS is integrated with other complementary interventions and seeks synergies across sectors

**Guidance:** NbS will seek to work with and compliment other types of interventions, such as engineering projects, information technology, financial instruments, etc. Such complementary actions will inherently require the identification of synergies across different sectors according to the specifics and context of each situation.

Criteria Partially Met

The initial planning was not done considering NbS design principles however it should be stated that the FSTP was design with the intention to work jointly with the municipal government, alongside comprehensive technical interventions, and financial mechanisms. For future designs, such approaches can be considered. It also needs to be mentioned that people i.e., the citizens of Shakhipur are the major drivers of the FSTP as without their involvement and support this infrastructure would not be operational.

## IUCN Indicators

### 2.3 The design of the NbS incorporates risk identification and risk management beyond the intervention site

**Guidance:** NbS has the potential to either positively or negatively impact, or be impacted by, stakeholders, interests, and ecosystems outside the immediate intervention area. For the solution to be durable and sustainable, such types of interactions both within and around the intervention area need to be understood and accounted for in the decision-making processes. Appropriate risk management options should be incorporated into the intervention design.

## Findings and Assessment

### Criteria Partially Met

The current design has multiple risk management practices in places such as detailed health and fire safety plans, leachate management and environmental compliance which is endorsed by Department of Environment and has been categorized as green under the environmental clearance certificate.

As the FSTP is situated in Shakhipur and has been supporting the management of fecal sludge and waste of the Shakhipur municipality and making compost from these ingredients which is being used by the farmers, who are from and around Shakhipur, the FSTP has some impact outside its immediate intervention area. The impact as according to people and farmers has been positive as farmers are getting increased yields and people are getting better produces.

However comprehensive environmental assessment to meet NbS criteria needs to be explored





## Criterion 3: NbS result in a net gain to biodiversity and ecosystem integrity

### IUCN guideline

NbS are derived as goods and services from ecosystems, therefore strongly depend on the health of an ecosystem. Biodiversity loss and ecosystem change can have significant impacts on the functioning and integrity of the system. Therefore, NbS design and implementation must avoid undermining the integrity of the system and instead, proactively seek to enhance the functionality and connectivity of the ecosystem. Doing so can also ensure the long-term resilience and durability of the NbS.

### Findings and Assessment

Shakipur's sanitation situation in 2015, before the plant entered service, was in a situation where sludge was either left in full pits and septic tanks, or emptied and discharged unsafely, causing environmental contamination and health concerns. The Shakipur plant's establishment was solely to reduce environmental contamination through safely managed waste disposal which includes both fecal sludge and household kitchen waste.

### Indicators to meet NbS:

Criteria Met

Criteria Partially Met

Criteria Not Met

### IUCN Indicators

#### 3.1 The NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss

**Guidance:** To develop a solution using nature, one must have a well-founded understanding of the current state of the ecosystems concerned. The baseline assessment needs to be broad enough to characterise ecological state, drivers for ecosystem loss and options for net improvements, making use of

### Findings and Assessment

Criteria Met

The baseline done during the initial phase of the establishing the FSTP had evidence of degradation of nature and environment resulting from the unsafe disposal of fecal sludge and household waste. The FSTP was established as a direct response to solving this problem of managing fecal sludge and household waste. However it has to be acknowledged that, the detail analysis of the impact on local ecosystem was not done as per the IUCN NbS indicators as this was not in their methodology.

The baseline study as stated did not capture the ecological state of the location or acknowledge the factors for ecosystem loss. Nonetheless, the intervention has utilized both local and scientific

## IUCN Indicators

both local knowledge and scientific understanding where possible.

### 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked, and periodically assessed

**Guidance:** In order to inform the design, monitoring, and assessment of an NbS, targets for enhancing key biodiversity values should be established. For each NbS, the type of target may differ; for example, the target could be the percentage of ecosystem area restored or the return of a keystone species

### 3.3 Monitoring includes periodic assessments of unintended adverse consequences on nature arising from the NbS

**Guidance:** Ecosystems are complex with interdependent components and processes. There will always be a level of uncertainty in how they will react to specific interventions or other external changes. Therefore, NbS should be designed and monitored to minimise and mitigate unanticipated risks that might undermine the ecological foundations of the solution itself.

## Findings and Assessment

### Criteria Met

knowledge where possible. For instance, with current data available states that fecal sludge is being processed in a low-carbon mechanism (traps the methane through a natural process) and produces organic fertilizer by enforcing regenerative form of agriculture which is aiding to protect ecosystem (mainly keeping soil healthy).

### Criteria Partially Met

As of 2018, about 43% of the town's sludge was safely managed, with a target of 70% for 2020, and 100% by 2023. WaterAid aims to achieve this to minimize the environmental impacts the unsafe waste waste had on the environment.

It should also be noted that the constructed wetlands used to de-pollute the black water are safely discharging water back into the environment.

Through this processes WaterAid is ensuring landscapes and complimenting and restoring the biodiversity surrounding the Shakhipur FSTP area.

### Criteria Partially Met

The co-compost plant's monitoring system includes periodic assessments of unintended adverse consequences i.e., sludge leakages pre-treatment or post treatment.

One issue that has been identified as a red line falls under the "transport" section of the Shit Flow Chain: about 10% of the sludge is unsafely emptied and dumped by a few informal manual emptier. Despite the risk and illegality, this service is more expensive than mechanical emptying (up to Tk 1,500 vs Tk 1,000), but is preferred by residents living on narrow roads, or who do not want to go the municipality to ask for emptying.

Solid waste management is another hurdle as sorting organic waste represents a significant portion of the plant's operational expenditure. A small but increasing number households are segregating their waste at the source, and WaterAid's behavior change framework could be used to analyse ways to improve this.



## IUCN Indicators

### 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy

**Guidance:** Utilising NbS can provide an opportunity to enhance biodiversity conservation and ecosystem management efforts in ways that other types of intervention, in isolation (such as engineering), will not be able to achieve. If solutions are to be implemented close to natural ecosystems that are managed explicitly for conservation outcomes, the NbS should be designed to enable greater ecosystem connectivity. Furthermore, they could be designed to re-introduce lost components of an existing ecosystem, for example, by deliberately choosing formerly existing species of vegetation when restoring

## Findings and Assessment

The opportunity to convert fecal sludge into organic fertilizer is most likely aiding in increasing ecosystem integrity through wetland construction. The regenerative agricultural practice is also being promoted in the society as the yield is likely to be better. This is likely to provide a scope to improve biodiversity conservation and ecosystem management efforts. However, the available data states that it is unlikely that this co-compost is leading to enhanced ecosystem synergies.

Criteria Partially Met



## Criterion 4: NbS are economically viable

### IUCN guideline

The return on investment, the efficiency and effectiveness of the intervention, and equity in the distribution of benefits and costs are key determinants of success for an NbS. This Criterion requires that sufficient consideration is given to the economic viability of the intervention, both at the design stage and through monitoring the implementation.

For NbS to be sustainable, there must be strong consideration of the economic aspects as, most likely, long-term gains must be balanced against short-term costs, with short-term actions developed within the context of long-term (over generations) goals and plans.

If the economic feasibility is not adequately addressed, NbS run the risk of being short-term projects, where, after closing, the solution and benefits provided cease to exist, potentially leaving the landscape and communities worse off than before. Innovative and evidence-based tools for the valuation of nature, along with ideas for NbS contributions to markets and jobs, encourage creative (blended) financing of NbS, thereby increasing the likelihood of their long-term success.

### Findings and Assessment

To assess the return of investment, the efficiency and effectiveness of the Shakhipur intervention invested on circular economy that aimed to work with agriculture in opposition to traditional or linear waste management, which often aims to just dispose of waste safely.

The circular economy principles aim to create products from biological waste such as fertiliser, proteins, energy sources, etc. and recover nutrients and water. When using such an approach, a first step is to look at which products would be in demand locally, and which waste streams could be appropriate; and therefore work “backwards” in the sanitation chain, to identify what could make good end products. In the case of Shakipur, one issue identified was the cost and availability of fertiliser, and the decreasing quality of the topsoil experienced by farmers nearby because of overuse of chemical fertiliser. Another issue was the presence of poultry farming, with 20 tonnes of chicken litter produced daily in the municipal area. This motivated the Mayor of the municipality to look at solutions and ask BASA Foundation for possible ideas. The co-composting of faecal sludge and solid waste plant was originally developed to include poultry litter as a third waste stream. However, poultry litter was already reused for fish feed, so co-composting it would not have brought benefits. This led to a second vital partnership (besides the municipality): The Department of Agricultural Extension (DAE), which undertakes agricultural research. The DEA played a key role to reach out to farmers, hold workshops, identify potential test sites for compost, test and help certify the compost, and recommend it in training sessions. This has proved critical in a small town with strong agricultural links.



## Indicators to meet NbS:

Criteria  
Met

Criteria  
Partially  
Met

Criteria  
Not Met

### IUCN Indicators

### Findings and Assessment

#### 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented

**Guidance:** Identification and documentation of the main benefits derived, including their direct and indirect, financial, and nonfinancial elements are key components for assessing the economic feasibility of the intervention, over time. This information should be differentiated according to who receives the benefits and who bears the costs.

Criteria Met

A study of the town sanitation business model done in 2018 was showing that the income from compost sale and emptying / collection fees was covering around 35% of operational expenses, although this had increased to more than 75% till September 2019. For comparison, the plant required an investment of Tk 11.4 million<sup>4</sup>.

Demand for compost doesn't seem to be an issue because of the promotional activities among the farmers through DAE. Raising the price of Shakhi Compost is harder: the current price is Tk 18/kg; whereas chemical fertilisers cost around Tk 22-25 due to subsidies, and other organic fertilizers are not subsidized and are more expensive – a matter of ongoing advocacy.

#### 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies

**Guidance:** Investing heavily in upfront costs without considering the longer-term economic and financial sustainability can negatively impact the intervention's viability. A cost-effectiveness study not only enables an examination of the upfront and recurring costs against the anticipated longer-term benefits of the proposed intervention(s) over time but also allows key (or hidden) assumptions to be made explicit, tested and verified

Criteria Met

A cost effectiveness study was done to ensure benefits of the beneficiaries and farmers who would be part of the value chain process. There was no cost-effectiveness study to choose the technologies in terms of NbS.

## IUCN Indicators

## Findings and Assessment

### 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities

**Guidance:** A key attribute of an NbS is that it can address at least one societal challenge in a manner that is both economically viable and efficient. This means that the cost-effectiveness and affordability of the solution must be tested against viable alternatives. Alternative solutions may include a different nature-based solution (for example watershed catchment management rather than floodplain management), a different combination of conventional and nature-based solutions, or substitution of the nature-based solution entirely with a more conventional approach such as engineered infrastructure.

Criteria Met

FSTPs were a new concept when the Shakhipur FSTP was established. While building the FSTP all available technologies were reviewed and the most viable one was chosen for Shakhipur. The FSTP has addressed the societal challenge of safely managing fecal sludge and household waste.

### 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments, and actions to support regulatory compliance

**Guidance:** The fact that NbS simultaneously offers multiple benefits to different stakeholders may place limits on some sources of financing, thereby undermining the interventions long-term viability. For example, private investors may not wish to bear the cost of delivering public goods or public authorities may be reluctant to cover costs for benefits that will accrue privately. This may require a resourcing package that integrates a range of financial mechanisms. Sources

Criteria Partially Met

The Shakipur plant follows a market mechanism that caters to waste providers, collectors, emptier to farmers. However, the cost varies or changes when operation and maintenance cost is considered. As WaterAid exits being the sole financial supported of the FSTP, the Municipal government might have to rely on alternative source of finance to maintain the plant and the entire value chain. This is something which must be investigated further.



## IUCN Indicators

of investment can include public sector grants, incentives and low interest loans, private-sector loans and equity, blended public-private partnerships as well as philanthropic and voluntary contributions or combinations of the above, reflecting an equitable distribution of both the risks and returns.

Criteria Partially Met

## Findings and Assessment



## Criterion 5: NbS are based on inclusive, transparent and empowering governance processes

### IUCN guideline

This criterion requires that NbS acknowledge, involve and respond to the concerns of a variety of stakeholders, especially rights holders. Good governance arrangements are proven to not only reduce an intervention's sustainability risks, but also to enhance its social 'license to operate'. Conversely inadequate governance provision for otherwise well-intended actions can adversely affect the legitimacy of benefit and cost sharing arrangements. At a minimum, NbS must adhere to and align with the prevailing legal and regulatory provisions, being clear on where legal responsibilities and liabilities lie. However, as often is the case with natural resources, basic compliance will need to be complemented with ancillary mechanisms that actively engage and empower local communities and other affected stakeholders

### Findings and Assessment

Before the assessment and establishment of the FSTP, WaterAid worked diligently with the local municipal government and BASA Foundation to establish a transparent mechanism that included all relevant stakeholders starting from the farmers, plant workers, representation of the municipal government in the decisions making process to understand the sustainable risks. WaterAid has persisted for 5 years through assessment and to understand the positive and negative impacts. WaterAid still monitors the plant activities to ensure due diligence.

### Indicators to meet NbS:

Criteria Met

Criteria Partially Met

Criteria Not Met

### IUCN Indicators

**5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention is initiated**

Criteria Met

### Findings and Assessment

There was no defined mechanism that answered problems surrounding NbS i.e., FSTP, however a proper feedback mechanism was established that served as grievance solution method before, during and after the plant was established.



## IUCN Indicators

**Guidance:** Feedback and grievance resolution mechanisms can include formal, legal or informal non-legal complaint systems that operate according to a clear set of procedures, roles and rules for receiving complaints and providing a remedy. Effective grievance resolution mechanisms are characterised by their acceptance and legitimacy among affected stakeholders, transparency, accessibility, and adherence to rights-based approaches. They should operate in a predictable and equitable manner, and be based on engagement and dialogue

### 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free, Prior and Informed Consent (FPIC)

**Guidance:** In order that governance arrangements function effectively, all affected stakeholders need to be equipped with the right information at the right time and the inputs they provide need to be meaningfully addressed. In doing so, a conscious effort is required to ensure that traditionally excluded groups are actively brought into the process in a manner that upholds their dignity and encourages their participation. This is particularly the case when an NbS intervention operates or impacts on the lands and territories of indigenous peoples, where their right to self-determine interventions and outcomes should follow established FPIC protocols.

## Findings and Assessment

### Criteria Met

WaterAid Bangladesh and BASA Foundation had developed excellent knowledge of the town over the years: its socio-economic and physical conditions, but also the political and financial matters were thoroughly assessed. This has allowed a fruitful engagement to take place with relevant stakeholders. WaterAid Bangladesh also took a slow and steady approach to develop this project “organically” over more than 5 years: developing relationships and waiting for good political moments; identifying solutions; obtaining land and building an access road. These kinds of activities require flexible funding (usually unrestricted funds), and WaterAid’s value of courage.

### Criteria Met

The plant has two females and three males’ staff and have consciously endeavored to engage female staff. As the land for FSTP is leased by the municipality from a local landowner, thus there are no issues with land. Before the FSTP was built the landowner of the surrounding area was informed and they did not have any objection to the establishment of FSTP beside their land.

The fertilizer from the co-compost is being used by farmers and most likely also by indigenous peoples of the area to grow their own vegetables and fruits. The oversight mechanism of the operation of the co-compost plant is with the local government institution (i.e., Municipality) and its nature has to be transparent and accountable to its constituency.

## IUCN Indicators

### 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention

**Guidance:** Stakeholder mapping and analysis identifies those who may be directly and indirectly, positively or negatively, affected by the NbS. This allows the intervention to afford opportunities to affected stakeholders to engage with and participate in the design and implementation, advocate clearly to uphold their own rights and interests, and where necessary, prevent further marginalisation

### 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders

**Guidance:** It is important that transparent and accessible documentation records key steps in NbS decision-making procedures. This helps enhance accountability and provides a strong basis for recourse in the case of any disputes or disagreements. Specific attention should be paid to noting which stakeholders were involved in decision-making and the role they played. This is particularly important where extreme inequity persists so that processes can be adapted to encourage meaningful and effective participation.

## Findings and Assessment

### Criteria Met

The baseline for the FSTP had found the number of households in Shakhipur and the potential beneficiaries of the FSTP i.e., households from which the faecal sludge will be collected for treatment. As this infrastructure was established and built with the involvement of Shakhipur municipality, they had discussed the issue within their sphere of influence. The indirect beneficiaries i.e., the farmers were not identified as such during the establishment of the FSTP but were consulted/informed via the Department of Agriculture Extension after the compost were made to test the product.

However, this initiative gave local people the ownership for the management of the plant focusing on circular economy. This NbS intervention also engage the farmers, and households and future will probably benefit from upholding their own rights and interests, and halt further marginalization.

### Criteria Met

There are two levels of this indicator.

First, the decision-making process of the operation and maintenance of the co-compost plant lies with WaterAid Bangladesh, BASA Foundation and Shakhipur Municipality, as this was discussed and clearly established during the field visit and there is a documented guideline for the Operation and Maintenance (O&M). There is also an informal process of getting feedback from the end users (farmers) of the final product (Compost) on how the compost is being useful in contributing to better yields.

Second, the currently there is no established guideline for involving the citizen whom the co-compost plant serves in the overall management and decision process.

This can be improved to better assist in tracking accountability and be a key tool to resolve any disputes or disagreements.

## IUCN Indicators

**5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decisionmaking of the stakeholders in the affected jurisdictions**

**Guidance:** Ecosystems do not follow political and administrative borders. Where appropriate, transboundary cooperation agreements between relevant authorities underpin NbS planning and implementation across frontiers to help ensure coherency and consistency of approach and desired outcomes.

## Findings and Assessment

Not applicable

Criteria Not Met





## Criterion 6: NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits

### IUCN guideline

Trade-offs in land and natural resource management is inevitable. Ecosystems provide a wealth of different benefits and not everyone values each of them in the same way. While tradeoffs cannot be avoided, they can be effectively and equitably managed. This Criterion requires that NbS proponents acknowledge these tradeoffs and follow a fair, transparent and inclusive process to balance and manage them over both time and geographic space. This involves a credible assessment, full disclosure, and agreement among the most affected stakeholders on how the trade-offs should be addressed. Fair and transparent negotiation of trade-offs and compensation among potentially affected parties for any damages or trade-offs to local opportunities and livelihoods provides the basis for successful long-term NbS outcomes. Critically, it is important to recognise that tradeoffs have social and ecological limits beyond which point certain values or benefits can be lost in perpetuity. This means that safeguards will be necessary to ensure, inter alia, that the integrity of ecosystems and the long-term stabilising properties of ecosystem services are not exceeded.

### Findings and Assessment

As mentioned in criteria 5, WaterAid alongside BASA Foundation has created a transparent mechanism to address and acknowledge equitable access to all stakeholders and understand tradeoffs.

Ascertaining the trade-off of the FSTP in a simplistic manner would be – to establish the FSTP or not and using the land on which the FSTP is built for another use i.e., agriculture. The benefit of having a FSTP established in Shakhipur and on the land outweighs the benefits of cultivating crops of that particular plot of land. This is because of the overall benefits of establishing the FSTP has decreased the environmental, health and financial sufferings of the people of Shakhipur and has contributed to a better environmental sanitation situation in Shakhipur.

As not all households are being served by the FSTP i.e., Vacutugs cannot reach the households which are in narrow lanes, thus not all people are getting the benefit of FSTP. So, the trade-off here is for covering most of the people in Shakhipur with FSTP service as against not covering a small number of households. Here also the benefits of covering most of the households far outweighs the benefits of not covering a small portion of the households fecal sludge and household waste.

Shakipur Another trade-off is the continuation of unsafe emptying of pits and septic tanks by some of the households where mechanical emptying is not possible which amount to around 10% of the sludge.

# Indicators to meet NbS:

Criteria Met

Criteria Partially Met

Criteria Not Met

## IUCN Indicators

## Findings and Assessment

### 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions

**Guidance:** All trade-offs are accompanied with an associated set of costs and benefits which may be subject to change over the entire NbS lifecycle. A key function of NbS safeguards is to ensure that necessary trade-offs do not negatively impact the most disadvantaged elements of society or, equally, that they are denied access to the intervention's benefits. It is therefore important that the costs and benefits of trade-off arrangements are fully understood, widely shared among affected stakeholders, and periodically revisited (6.3)

Criteria Partially Met

The primary goal of the co-compost plant was the management of fecal sludge management and the product of the plant is compost. There are three streams of benefit – one at the municipal citizen level as the town is kept clean and the second stream is the benefits that the farmers get from the compost itself. The other benefits are that there are livelihood opportunities for the people who work at the co-compost plant. The third stream is the benefits that the farmers are getting from the use of the compost as fertilizer at the lower cost and the resultant increase in yield of crop as stated by them.

The authorities have not done calculations since it is not likely that the associated trade-offs were totally accompanied by a group of costs and benefits which will alter over the NbS's operation. Additionally, the available gathered data does not explicitly show that trade-offs do not negatively impact the most disadvantaged community/people.

### 6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders, are acknowledged and respected

**Guidance:** The legal and customary rights to access, use and control management over land and natural resources, particularly of vulnerable and marginalised groups, needs to be respected and upheld. Rights, use and responsibilities of stakeholder groups in relation to the NbS should

Criteria Partially Met

As that land is leased by the municipality and being used with all legal rights associated with leasing of the land in Bangladesh, the responsibilities are clear to the stakeholders of the FSTP.

## IUCN Indicators

## Findings and Assessment

be analysed and assessed, using appropriate tools and by building upon the outcomes of stakeholder analysis or mapping (5.3). This is particularly important when dealing with Indigenous communities, where Free, Prior and Informed Consent (FPIC) must be used (5.2).

Criteria Partially Met

**6.3 The established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilize the entire NbS.**

**Guidance:** Where risk is unavoidable, safeguards must be in place and periodically reviewed to anticipate and avoid adverse consequences of interventions, especially considering that inequity in trade-offs may change over time and that not all stakeholders may be equally affected. Therefore, NbS design and strategy needs to be explicit about whose benefits and whose costs will be addressed, including when and how this will be reviewed. Safeguards may be put in place for biodiversity (e.g. setting aside a certain area for protection or limiting the timing of fishing) and for people (e.g. procedural – grievance mechanisms, consultation obligations, right to appeal or substantive – contracts, legal and regulatory provisions).

Criteria Met

As mentioned in criteria 5, there is an established grievance mechanism with appropriate safeguarding mechanism which is monitored by WaterAid.

However, the current plant does not fall under the governance of commons mechanism, since it was a publicly owned land.

The plant land does not cover the intervention-scale to consider biodiversity impacts. However, when comparing pre-intervention state and post intervention there is a decrease in pollution, water contamination and sludge management that might have positively impacted the environment.



## Criterion 7: NbS are managed adaptively, based on evidence

### IUCN guideline

This Criterion requires that NbS implementation plans include provisions to enable adaptive management as a response to uncertainty and as an option to effectively harness ecosystem resilience. A degree of uncertainty is inherent when managing most ecosystems due to their complex, dynamic and self-organising nature. This also means that ecosystems have greater resilience which confers a wider range of options to respond to unanticipated social, economic or climate events. The foundation of adaptive management is the evidence-base provided by regular monitoring and evaluation, drawing on scientific understanding as well as indigenous, traditional and local knowledge. By proactively adopting an adaptive management approach, the NbS can continue to be relevant through the lifecycle of the intervention and the risk of redundancy and stranded investments minimised.

### Findings and Assessment

The area of Shakhipur municipality – as ecosystem, where faecal sludge and waste was contaminating the environment has been addressed through the establishment of the FSTP. The management of the FSTP is based on the faecal sludge and household waste being generated and how that is being brought to the FSTP and processed to making the end product – Compost. This has to be inherently adaptive as the quantity and quality of the input materials are variables that dictates the amount output materials – compost are produced.

This adaptive management of the FSTP is only possible for the regular monitoring of the input – output process at the plant and taking necessary actions/measures to adjust the process. This has been possible for the clear understanding of the process – based on evidence, knowledge, and science.

A NbS strategy may be developed as the FSTP has the following current mechanisms

- Monitoring and Evaluation (M&E) plan
- Scientific understanding
- Uses local knowledge proactively
- Has active life cycle assessment

## Indicators to meet NbS:

Criteria  
Met

Criteria  
Partially  
Met

Criteria  
Not Met

### IUCN Indicators

### Findings and Assessment

#### 7.1 A NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention

**Guidance:** An NbS strategy, at its most basic, includes the reasoning behind the NbS, a precise articulation of the intended outcomes and clear understanding of how these should be achieved through the actions taken. It should be informed by the prevailing economic, social and ecological conditions, and clearly state the assumptions as to whether and how they are expected to change.

Criteria Not Met

NbS strategy has not been established till now.

#### 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle

**Guidance:** A monitoring and evaluation plan is a key requirement to understand whether the NbS strategy effectively delivers the intended outcomes and, thereby addressing the societal challenge; and, whether risks or unexpected impacts mean a change in strategy or action is required. Where NbS have synergies with other interventions or approaches, these should be included in the monitoring and evaluation (M&E) plan. Observed and sustained deviations from the key elements of the NBS strategy (7.1) should trigger an adaptive management response (7.3).

Criteria Met

The system is monitored by the multiple actors such as BASA Foundation, WaterAid, and local community. There are monthly meetings for discussion. The system has monitoring calendar for its several operation stages to make sure the nature-based solution is effective.

## IUCN Indicators

### 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle

**Guidance:** Learning based on evidence should drive NbS management. Furthermore, iterative learning is essential in informing adaptive management actions, in order to respond to the factors influencing NbS interventions. For this Criterion, indicators 7.1 and 7.2 provide a continuous feedback loop to learn and adapt the NbS intervention. Ideally, iterative learning is institutionalised so that it carries on even after the NbS intervention ceases.

## Findings and Assessment

The FSTP is a learning hub for others as well as the management team is learning from other similar establishments situated across the country.

Criteria Partially Met





## Criterion 8: NbS are sustainable and mainstreamed within an appropriate jurisdictional context

### IUCN guideline

This Criterion requires that NbS interventions are designed and managed with a view to long-term sustainability and that they take account of, work with and align with sectoral, national and other policy frameworks. There are various approaches to mainstreaming NbS; however, all rely on strategic communications and outreach. Audiences to consider include individuals (e.g. the public, academics), institutions (e.g. national government, start-ups, businesses, and organisations) and global networks (e.g. Sustainable Development Goals, Paris Agreement)

### Findings and Assessment

The FSTP has been established with the view that this will serve Shakhipur municipality in the long run and also expand its capacity as needed when the municipality areas extends, or its population increases. Sustainability in terms of financial, institutional, social, technical has been considered when the FSTP was developed. As the municipality gets to understand and experience the benefits of the FSTP it is expected that the municipality will invest necessary resources for the sustainability of the FSTP. Already the financial sustainability in the form of a 'business – model' is being discussed among the stakeholders.

The FSTP has already received the attention of the policy makers and the plant has been included in the 8th Five Year Plan of Bangladesh as a replicable model for FSTP and is an example to others as a learning hub and is being regularly visited by concerned officials, practitioners, and other municipalities to learn from the experience of Shakhipur municipality.

### Indicators to meet NbS:

Criteria Met

Criteria Partially Met

Criteria Not Met

### IUCN Indicators

#### 8.1 The NbS design, implementation and lessons learnt are shared to trigger transformative change

**Guidance:** Transformative change can be characterised by scaling up (policy or programmatic

### Findings and Assessment

Criteria Not Met

Even though the FSTP was not designed as a NbS intervention, the lessons from the implementation of the FSTP is being shared with others regularly and also the plant is being visited by stakeholders to see and learn. This FSTP is supporting the change in mind of other municipalities and policy makers which has been exemplified in the 8th Five Year Plan of Bangladesh as a replicable model.

## IUCN Indicators

## Findings and Assessment

mainstreaming), scaling out (expansion at the geographical or sectoral level) or replication of the NbS. Consequently, it is important that the process of design and implementation captures, documents and makes available lessons learnt to individuals and stakeholders interested in replicating the process. This includes decision makers, investors and other NbS users from the public and private sectors.

Criteria Not Met

### 8.2 The NbS informs and enhances facilitating policy and regulation frameworks to support its uptake and mainstreaming

**Guidance:** The implementation of NbS is subject to a range of pre-existing policies, laws, and sectoral regulations, some of which may not be consistent or mutually reinforcing. In some situations, inconsistent policies and regulations may limit the effective rollout of NBS or, worse, contribute to the loss of important ecosystem functions over time. In such situations, it is important to a) be aware of policy, regulatory and legal limitations, and b) work with local and/or national decision makers as well as other key stakeholders, to highlight such obstacles and identify effective responses or other enabling solutions

Criteria Met

As the FSTP has been shown as a replicable model in the 8th Five Year Plan, it has been supporting the WASH sector actors in understanding the process of how faecal sludge and household waste can be managed in a municipal setting.

As Bangladesh has developed Institutional Regulatory Framework for Faecal Sludge Management (IRF-FSM) for municipalities, the FSTPs in the country are supporting the implementation of that framework.

## IUCN Indicators

**8.3 Where relevant, the NbS contributes to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)**

**Guidance:** NbS can make significant contributions to national economic, social and conservation targets and help achieve national commitments to international processes on climate change, human rights, human development, and biodiversity. Making these linkages explicit, documenting, and communicating them, help further reinforce the profile and role of NbS nationally, secure broad-based and durable political commitment as well as societal support, thereby enhancing the long-term sustainability of the intervention.

## Findings and Assessment

The FSTP had been established as a direct contribution to improve human wellbeing of the people of Shakhipur municipality – safely managing the faecal sludge and household waste which was contaminating the environment of the entire ecosystem of Shakhipur municipality. The FSTP also contributes to establishing safely managed sanitation service which has been declared as a human right by UN.

Criteria Partially Met





সখি কম্পোস্ট  
স্বাস্থ্যকর  
স্বাস্থ্যকর, টাঙ্গাইল

সখি কম্পোস্ট  
স্বাস্থ্যকর  
স্বাস্থ্যকর, টাঙ্গাইল

০১৫৩৫০-৫৪  
১৫৩৫০০ ১৫৩৫০০  
স্বাস্থ্যকর  
১৫৩৫০০ ১৫৩৫০০  
১৫৩৫০০ ১৫৩৫০০  
১৫৩৫০০ ১৫৩৫০০



# Conclusion



There are 75.4 million people don't have a decent toilet and 45% of the population in Bangladesh still do not have access to improved or at least basic sanitation (WHO/UNICEF Joint Monitoring Programme (JMP) Report 2021) and despite improvements over the past decades in Bangladesh, the unsafe management of fecal waste and wastewater continues to present a major risk to public health and the environment (UN, 2016). The change in paradigm to instill low-cost sanitation solutions and that nature can provide a sustainable solution and valuable services has recently become popular (Willock et al 2021)<sup>5</sup>. However, it can be difficult for practitioners new to the topic, to understand under what conditions NbS might be applicable and how best to combine traditional infrastructure, for example a faecal sludge treatment plant, with a NbS.

Globally there is increasing scientific evidence that treatment systems with designs inspired by nature are highly efficient treatment technologies (United Nations 2015)<sup>6</sup>. Goal 6 of the 2030 Agenda for Sustainable Development recognizes the importance of ensuring the availability and sustainable management of sanitation (Ibid). The evidence of NbS and faecal sludge management or waste water treatment with cost-effective design already exists as penned in the publication titled "Nature Based Solutions for Wastewater Treatment 2021 (Cross et al 2021)<sup>7</sup>. With proper utilization and research, practitioners in Bangladesh can also develop the potential to promote NbS-FSM as a good practice and a practical solution for the future.

The FSTP plant at Sakhipur, Tangail demonstrates how such combination of local technical innovation, teamwork between community, local governments, and a balance of natural solutions may result in the improvement of properly managed sanitation. **The compost plan aligns well multiple NbS criteria and indicators such as addressing societal challenges, enhancing environmental integrity, and ensuring appropriate design scale etc.** Additional benefits include creating economic stimulus in the locality through local agricultural yield, use of locally sourced materials and low energy demand.

## Our Assessment Summary

Of the 8 criteria and 27 sub-criteria stated by IUCN our assessment showed

Criteria  
Met

Criteria  
Partially  
Met

Criteria  
Not Met

14 Sub-Criteria	green
10 Sub-Criteria	orange
3 Sub-Criteria	Blue

The solutions are also relatively simple to install and maintain, with adequate training and low capital and operating costs. The

success of the plant was highlighted in the 8th FYP of Bangladesh as an effective faecal management technology. **Nonetheless, there are operational and social challenges for potential uptake such as large land area requirements, social stigma surrounding human waste management and ensuring effective monitoring and evaluation systems that enable iterative learning and adaptive management of this potential NbS.**

## Guidance for the future

The Shakipur co-compost plant **was not initially designed to be a nature-based solution** however the criteria and sub-criteria outlined by *IUCN Global Standard for Nature Based Solution*<sup>8</sup> showed potential to be modified as such. While the idea of ecosystem services has evolved in

the 90s with various school o thoughts i.e *The ecosystem service concept views nature from an anthropocentric viewpoint, providing a framework to acknowledge, categorize, and, in some cases, quantify and monetize them*, some have sided with a more utilitarian view that nature *only exists to service humans*, Others argue against using the ecosystem service concept to value nature, *instead stating that we should preserve and protect nature strictly "for its own sake," for its "intrinsic value* (Willcock et al 2021), however, WaterAid's approach to understanding nature-based solution was strictly, globally accepted viewpoint and to highlight how understanding of ecosystem services will help sustainability decision making in the long-run. Having stated that this report will help guide future decision makers and practitioners to better design co-compost plants that compliment ecosystem services.

## Where it worked out

### Criterion

### Replicable for the wider scale

**Criterion 1:  
NbS effectively address societal challenges**

Meeting two of three of sub-criteria, our co-compost widely addresses societal challenges. The places where we can improve can be achieved through collaborative awareness building and greater advocacy (sub-criteria 1.2)

**Criterion 2:  
Design of NbS is informed by scale**

While it is clear how one intervention can have a ripple effect on the land, WaterAid was successfully able to ensure negative impacts are well mitigated. We have left working spaces on the design as orange to ensure our work can improve in the future (sub-criteria 2.2 and 2.3).

**Criterion 4:  
NbS are economically viable**

Criterion 4 in our assessment was the most successful. Our co-compost plant's return on investment, consideration of economic viability at the design stage during and post implementation is sufficient and sustainable in the long run. This model can be replicated.

**Criterion 5:  
NbS are based on inclusive, transparent and empowering governance processes**

Criterion 5 our co-compost successfully acknowledges, involves, and responds to the concerns of a variety of stakeholders, especially rights holders.



## Where it can improve

Criterion	Improvement required for the wider scale
<b>Criterion 3:</b> <b>NbS result in a net gain to biodiversity and ecosystem integrity</b>	Although the plant is currently helping improve environmental challenges and helped reduced environmental impacts, the extent of biodiversity loss and ecosystem change as defined by the guideline is not truly measured. We hope through further evaluation and environmental impact assessment the positive feedback of such plants can help measure this criterion fully.
<b>Criterion 6:</b> <b>NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits</b>	The trade-offs creating such plants are well established and identified by WaterAid, however the management methods implement by WaterAid are modest and can improve in the future with joint collaboration of biodiversity and conservation experts.
<b>Criterion 7:</b> <b>NbS are managed adaptively, based on evidence</b>	As mentioned earlier the plant was not originally designed as a nature-based solution infrastructure. Although our assessment showed that the plant meets one criterion (7.2) of the current indicator set out by IUCN however we feel with improved policy and strategy framework this can be further improved.
<b>Criterion 7:</b> <b>NbS are sustainable and mainstreamed within an appropriate jurisdictional context</b>	As mentioned for criterion 7, the policy frameworks and strategies that exists in Bangladesh needs to ensure combination of NbS and faecal sludge management. This criterion needs to be explored further.

## Endnote

- <sup>1</sup> Vacutug is a portable machine that collect fecal sludge from septic tanks and pit latrines and transport them to a sewage disposal site.
- <sup>2</sup> Faecal sludge management Landscape in South Asia: <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/faecal-sludge-management-landscape-in-south-asia-case-studies.pdf>
- <sup>3</sup> Pg 8 Small town sanitation learning series: <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/small-town-sanitation-learning-series-sakhipur-bangladesh.pdf>
- <sup>4</sup> PG 8: <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/small-town-sanitation-learning-series-sakhipur-bangladesh.pdf>
- <sup>5</sup> Willcock, S., Parker, A., Wilson, C., Brewer, T., Bundhoo, D., Cooper, S., ... & Hutchings, P. (2021). Nature provides valuable sanitation services. *One Earth*, 4(2), 192-201.
- <sup>6</sup> United Nations (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. RES/70/1 Adopted by the General Assembly.
- <sup>7</sup> Cross, K., Tondera, K., Rizzo, A., Andrews, L., Pucher, B., Istenič, D., ... & McDonald, R. (2021). Nature-based Solutions for Wastewater Treatment. IWA Publishing.
- <sup>8</sup> IUCN Global Standard for NbS: <https://portals.iucn.org/library/sites/library/files/documents/2020-020-En.pdf>

**Contact us:**

[wateraid.org](http://wateraid.org)

[wateraidbangladesh@wateraid.org](mailto:wateraidbangladesh@wateraid.org)

**Photography:**

WaterAid/Drik/Habibul Haque  
(page 1, 4, 19, 23 & 29)

Wateraid/Al-Emran  
(cover and page 9, 12, 15 & 33)

**Design:**

Najnin Jahan Khan/Drik