



# CLIMATE-APT AGRICULTURE CROP INSURANCE: REACHING THE UNHEEDED MARGIN THROUGH INSURANCE

A case study on the success story of Green Delta of reaching the marginal farmers with an agri risk mitigating tool in a form of Crop Insurance and the way ahead towards bringing every farmer under the shade of insurance

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## List of Acronyms

- ❖ **GDIC:** Green Delta Insurance Company Limited
- ❖ **MoF:** Ministry of Finance
- ❖ **FID:** Financial Inclusion Division
- ❖ **MoA:** Ministry of Agriculture
- ❖ **IDRA:** Insurance Development and Regulatory Authority
- ❖ **GDIC:** Green Delta Insurance Company Limited
- ❖ **SBC:** Shadharan Bima Corporation
- ❖ **MRA:** Micro-Credit Regulatory Authority
- ❖ **BBS:** Bangladesh Bureau of Statistics
- ❖ **DAE:** Department of Agriculture Extension
- ❖ **BWDB:** Bangladesh Water Development Board
- ❖ **BHWDB:** Bangladesh Haor and Wetland Development Board
- ❖ **BMD:** Bangladesh Meteorological Department
- ❖ **SWF:** Sacred Welfare Foundation
- ❖ **FGD:** Focused Group Discussion
- ❖ **PPP:** Public Private Partnership
- ❖ **MFS:** Mobile Financial Services
- ❖ **SAR:** Synthetic Aperture Radar
- ❖ **AWS:** Automated Weather Station
- ❖ **ESDO:** Eco-Social Development Organization
- ❖ **GUK:** Gram Unnayan Karma
- ❖ **SDG:** Sustainable Development Goal

## Abstract

The agriculture sector is one of the most promising sectors and can flourish a lot more if it is taken care of properly. Since around 40% of the entire population is directly and around 70% of the population is indirectly dependent on this sector for earning their bread and butter and the contribution in GDP is 14.10% of this sector the performance of this sector has an overwhelming impact on major macroeconomic objectives, such as employment generation, poverty alleviation, human resources development, food security, etc. Bangladesh is also one of the most vulnerable countries when it comes to climate change (Climate Change Vulnerability Index). As the climate is getting warmer day by day, developing countries like Bangladesh are facing challenges time due to weather changes and seasonal variations. It is assumed that damage in agriculture due to uncertainty in weather changes in the past 40 years was equivalent to 12 billion dollars which constitutes 0.5-1% of our national GDP (yearly) on average. While there lies the immense potential- in agriculture through development and innovation of technology and provision of financial aid to the farmers, weather-related risks remain a vital concern. The uncertainty associated with weather and climate changes is enough to ruin all the efforts our farmers put up. Such disastrous events not only cause distress but also lead to farmers falling into the poverty trap. Green Delta Insurance Company Limited developed and deployed insurance products to address weather-related risks faced by both lenders and farmers in Bangladesh. It will also strengthen the technical and financial capability to administer the insurance products that will eventually help to remove the constraints of credit expansion to farmers with the vision to mitigate the weather-related risk faced by agri-lenders and individual farmers arising from drought, excess rainfall and other natural calamities. This insurance facility can be availed for a certain premium to insure them in case of financial risks and damages incurred to the production of crops and grains due to weather changes. Each client will be facilitated through customized or tailored products as per the weather index and historical weather data. Farmers who are engaged in agriculture with the support of Input Farm and Contact Farming aggregators are the potential customers. Weather Index-Based agriculture can be bundled with Agri input, Crop Clinic, Pesticides, Fertilizer, Seed, Irrigation Process, Agri Machineries, Financial

Institute/ NGO/ MFI/ Bank, or any other agriculture loan. The whole idea of Agriculture Insurance and Weather Index-Based Insurance is quite new to Bangladesh. And incorporating such high-end modern technology in this sort of product to eradicate risks to provide a financial backup to the farmers is also a novel and dynamic idea. Green Delta Insurance Company Limited has given these ideas a practical platform while achieving success through several milestones. But, to move forward while upholding the success rate, there are certain developments in infrastructure need to be done by the participation of Government and also the private sector to make it a countrywide practice. Through the spontaneous participation of the government, regulators, development agencies, Non-government organizations, private entities, and agriculture value chain stakeholders, index-based agriculture insurance can be replicated countrywide like the other developed countries. Index-Based Agriculture can be one of the most effective tools to mitigate the risks of the farmers arising from the natural adversities causing financial damages to the farmers while pushing them towards a constant loop of carrying the financial burden on their shoulders. The age-old practices also resulting in a lesser contribution of the Agriculture sector to the national GDP every year. Thus the economic development is getting hindered in every step where agriculture alone could have hoisted our flag with pride along with other developed countries in terms of economic advancement and internal financial strength. If the farmers are treasured and ensured of financial support, then the food security along with many other Sustainable Development Goals (SDGs) which are correlated to sustainable farming and efficient production. Ensuring a financial backup of the farmers can lead us to that future in no time and can strengthen the finance and economics of the country from the very core.

## About Green Delta Insurance Company Limited

Green Delta Insurance Company Limited (GDIC) is one of the leading private non-life insurance companies in Bangladesh. GDIC was incorporated in December 14, 1985 as a public limited company, under the Companies' Act 1913 and its operation started on 1st January 1986, with a paid up capital of BDT 30.00 million. Now, Green Delta Insurance Company Ltd. is amassed more than BDT 807 million with a credit rating of AAA and ST1 as the first Insurance Company in Bangladesh. Green Delta has achieved this AAA Credit Rating from Credit Rating Agency of Bangladesh (CRAB) for the 7<sup>th</sup> consecutive year in 2020. Green Delta is also the 1st Insurance Company in Bangladesh to have equity partnership with International Finance Corporation (IFC) of World Bank Group. Green Delta has 44 branches with a presence in the strategically important parts of the country. Green Delta Capital Ltd., Green Delta Securities Ltd., Professional Advancement Bangladesh Ltd. (PABL) and GD Assist Ltd. are 4 of the direct subsidiaries of Green Delta. Under the supervision of the parent company, these 4 subsidiaries are providing value added services along with our insurance services through an integrated one stop financial platform.

Green Delta's main products are:

- Fire Insurance,
- Marine Insurance,
- Marine Hull Insurance,
- Motor Insurance and
- Miscellaneous Insurances.

Green Delta has expanded its product line in the agriculture sector in the year 2013. Weather Index Based Agriculture Insurance is one of such products which will help the farmers to mitigate financial risks arising from adverse weather events during the whole cultivation process. Under Weather Index Based Agriculture Insurance, Green Delta covers multiple perils like; temperature fluctuation, improper humidity, excess rainfall, unseasonal rainfall, drought, contingent loss of earning etc. Recently, Green Delta has



modified its Weather Index Based products and developed a flood index based product while keeping relevant weather indices incorporated in it.

Besides Weather Index Based Agriculture Insurance Green Delta also provides Area Yield Index Based Agriculture Insurance to protect the crop farmers from financial damages arising from yield losses. Green Delta also launched Livestock Insurance in the year 2019, through bundling the insurance product with bank loans. This insurance product is catered to the partners and the end consumers with the help of a number of advanced technologies like; an NFC enabled tag to identify the cattle, a mobile application to ease process of keeping record, tracking, monitoring and initiating claim etc. In near future, this mobile app can be a one-stop solution for the cattle farmers for availing any relevant services regarding cattle farming.

Green Delta has started its journey to protect the farmers from the financial distresses arising from crop loss arising from adverse weather which can contribute in achieving a number of SGD goals through ensuring zero hunger and no poverty. These two direct goals ultimately helps to attain a number of other indirect goals, like good health and wellbeing, sustainable community, climate action and partnerships to achieve goals, that closely correlated to the outcome and effect of zero hunger and no poverty.

## 1. Introduction

### 1.1 Background of Agriculture in Bangladesh

Bangladesh has a region of around 14.3 million hectares of which about 59.8% of the land is cultivated. Farming assumes a predominant job in the development and steadiness of the economy of Bangladesh. Multiple quarters of the all-out populace in provincial zones infer their work from the agrarian division. Around 40% of the work power is as yet utilized in Agriculture.

During the ongoing decade, the general Gross Domestic Product (GDP) of Bangladesh has appeared an extensively expanding pattern. Be that as it may, the development in farming GDP somewhat declined, with normal development of about 3.4% from 1997 to

2014. And in 2018-19, the contribution of Agriculture in GDP stood at 14.10%. Agriculture is a significant motor of development of the economy, there is no other option however to build up the agribusiness segment for the lightening of destitution by achieving quickened financial development. Since the accomplishment of food security and age of business chances of the gigantic populace of the nation are legitimately connected to the advancement of agribusiness, there have been proceeded with endeavors by the Government for the general advancement of this part.

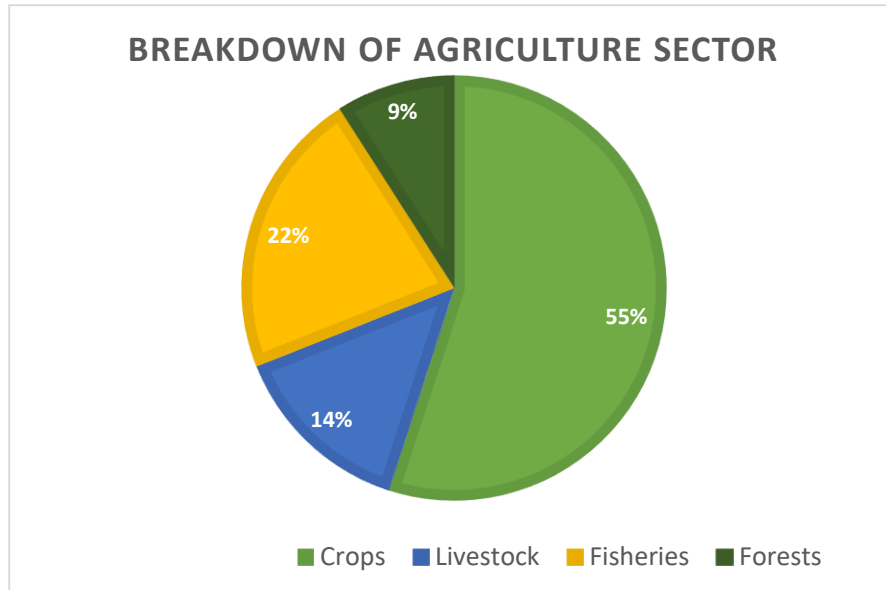
There is a persistent change in Bangladesh's economy as estimated by changes in the sectorial portions of Gross Domestic Product (GDP). This basic change unmistakably shows a quick development away from a horticulture commanded economy. A lot of GDP declined from 62 percent in 1975 to 19 percent in 2013, however, a lot of all-out business has not declined so a lot. The declining portion of horticulture in GDP ought not to be understood to mirror a lessening the job of farming in the general development of the economy or in neediness decrease.

Quite, the government has extended at a fast pace at this phase of financial change. A great part of the development in the administrations' division identifies with the advertising and preparing of farming items coming about because of fast commercialization and expansion in agribusiness. The agribusiness division is dynamic, changing with the request of the individuals, accessibility of innovation, what's more, the difference in the board rehearses. Along these lines, it requires customary modification with various arranging furthermore, advancement programs. The nation has a lot of potentials, yet it faces numerous difficulties counting helplessness to environmental change. For arranging and supportable improvement purposes, a demonstrative investigation of Bangladesh Agriculture is required so as to cultivate the development of this significant part orchestrating with the administration of regular assets and tending to the difficulties.

## 2. Market Fundamentals

The agribusiness area can be separated into four primary parts: crops, animals, fisheries, and woodlands. Of these, crops make up 55% of the segment with Aus/Amon/Boro rice

paddies, jute, potato, and wheat as significant yields. The nation is the second-biggest maker of jute (after India) and the world's biggest exporter of the fiber. The segment right now contributes 14.10% to GDP and utilizes 40% of the populace.



According to BBS, the land area statistics is as follows:

<b>Total Family</b>	<b>2,86,95,763</b>
<b>Total Farm Holding</b>	1,51,83,183
<b>Total Cultivable Land</b>	85,60,964.75 Hectare
<b>Single Cropped Area</b>	23,54,821.74 Hectare
<b>Double Cropped Area</b>	38,47,274.49 Hectare
<b>Triple Cropped Area</b>	17,15,430.38 Hectare
<b>Quadruple Cropped Area</b>	17,000 Hectare
<b>Net Cropped Area</b>	79,30,071.63 Hectare
<b>Total Cropped Area</b>	1,52,45,841.93 Hectare

Paddy (rice) is the most important staple food crop grown in Bangladesh grown by nearly all farmers. Livestock including dairy cattle, buffalo, goats and poultry play a very important role in Bangladeshi mixed-farming systems as a source of employment, assets,

cash income, and improved nutrition, particularly for landless households and female farmers.

Considering the growing demand of the agriculture loan, Bangladesh Bank has revised the policy for government banks and the commercial banks to set aside at least 2% of their total loans for the agriculture sector. This policy includes 6 government banks, 2 specialized banks, 39 commercial banks and 9 foreign banks. In the Financial Year 2017-18 year, BDT 21,393.55 crore has been disbursed as loan, in the agriculture sector, which has increased by 1.88% from the previous financial year of 2016-17.

NGOs also play a vital role in providing agri-loans. In FY 2017-18, BDT 8,243.29 crore has been disbursed among 2 crore 66 lac and 80 thousand people, which was BDT 6,144.07 crore in FY 2016-17.

Besides, boosting loan facilities for agriculture sector government also provides a considerable amount of subsidy to the farmers. In FY 2017-2018, the amount of subsidy was close to USD 10.71 million, which in turn amounts the ticket size of USD 160.15 (approx.) each farmer.

Domesticated animals establish a significant piece of the abundance of a nation, since notwithstanding draft force and cowhide; it gives fertilizer, meat, and milk to by far most of the individuals. It assumes a significant job in the farming creation circle. Data show that about 2.9% of national GDP is secured by the domesticated animal area, and its yearly pace of development is 5.5%. About 20% of the number of inhabitants in Bangladesh acquire their vocation through work-related with raising cows and poultry. The utilization of bovine compost as excrement and fuel and creature power for transportation make up a critical bit of the GDP. Furthermore, covers up and skins, bones, offal, plums, and so forth help in winning remote trade. Domesticated animal assets likewise assume a significant job in the food of landless individuals. In Bangladesh, 83.9 percent of all-out family units own domesticated animals (creatures or poultry or both). The domesticated animal populace in Bangladesh is as of now assessed to contain 25.7 million cattle, 0.83 million wild oxen, 14.8 million goats, 1.9 million sheep, 118.7 million

chicken, and 34.1 million ducks. The distribution of the domesticated animals' populace per section of land of cultivable land is 7.37. This thickness has been expanding each year in the nation. Massive venture likewise is done in poultry and fisheries area yet shockingly there is no assurance against these two divisions. Regardless of the high thickness of the animal's populace, the nation experiences an intense deficiency of domesticated animal items like milk, meat, and eggs. The yearly development paces of these items have altogether expanded as of late. On account of the immense interest of domesticated animal items, ranchers are so inspired by cows raising; thus numerous smaller scale and little business visionaries are engaged with hamburger stuffing, dairy creation, poultry meat, and egg creation and fisheries area.

## 2.1 Deterrents to be tended to by Government

Improved valuing strategy, alongside interests in mindfulness raising for adjusted manure application and advocacy of increasingly effective compost application procedures, can help protect soil quality, raise yield, lower expenses of creation, and spare the administration financial plan tremendous measures of cash.

Given the declining groundwater tables and water quality issues in Bangladesh, it will be amazingly hard to abuse groundwater assets reasonably without an expansion in Water Efficiency and it will be hard to fulfill even diminished need. A couple of areas have as of now passed the economical limits of groundwater use.

Agrarian development is subject to a wide-scale change to HYV seed, however, seed quality, in general, stays a significant issue. Different related speculations are expected to improve the arrangement of value seeds in satisfactory amounts. Further private-open associations for seed, promoting, what's more, expansion should be investigated.

Other than a couple of government ventures with a credit segment, open part credit organizations are portrayed by various obstructions to access by ranchers and particularly ladies. As aggregate interest for credit far exceeds its gracefully, private moneylenders command the credit showcase.

Helpless ranchers have the minimal decision. This requires significant change. In fulfilling the need for higher food creation, push ought to be given to wilderness research counting hereditary building, a decrease of development costs, fortifying of the technology-transfer linkage, and improvement of postharvest innovation.

Agrarian land in Bangladesh is contracting quickly. The choice left for expanding profitability is by limiting the yield hole. This could deliver 37.6 million tons of rice creation by the year 2021 from the current rice territory. To help the helpless angler's work from water bodies, and authorizing framework ought to be presented for the certified anglers. Different issues facing the improvement of open water fishery are overfishing, absence of legitimate execution of fisheries guidelines, absence of mindfulness improvement and noncooperation of the network, the strife of water employments, ecological contamination, and living space corruption.

At present, the shrimp part is confronting various issues that should be tended to. These include: land use clashes among the different client gatherings and organizations and protection from enormous scale constrained renting; social restriction to the ecological impacts of huge scope badge monoculture; absence of appropriate lake building plan and the executives; sicknesses; quality control and post collect innovation; insufficient framework and monetary offices; absence of specialized information and expertise; absence of assets data and resistance.

## 2.2 Constraints towards Sustainability

Environmental change constrained assorted variety, and lessening biosecurity remains the biggest danger to the area. Corrupting area, water assets, and unsafe agro-compound are additionally noteworthy issues compromising the part's manageability.

Environmental change is one of the greatest long haul dangers because of the impacts of floods, saline interruption, and dry seasons that it brings into a nation that is arranged adrift level. In a nation where agribusiness keeps on making a critical commitment a long ways past GDP, it is an issue that must be tended to through preventive estimates, for example, restoration of poisonous waters, reforestation, and the formation of a feasible

biological system supplementing cultivating activities, for example, those found in Africa's agro ecological endeavors to discover minimal effort strategies to build crop yield.

Bangladesh's geology is wealthy in biodiversity, which has been adjusted for quite a while. Nonetheless, because of deforestation and the impacts of environmental change, there has been a negative effect on the nation's regular scene. This incorporates poisonous waters from mechanical waste and other uneventful occasions (for example oil slick in Sundarbans, the biggest mangrove forest on the planet). Together these have added to decreasing decent variety in the environment, debilitating its common equalization and capacity to shield the nation from cataclysmic events.

Expanding the use of concoction composts, pesticides, and dumping of modern waste likewise acts to debilitate the manageability of horticulture as spillover from fields saturates waterways, moving defiled waters all through the nation. Altogether, these issues undermine the drawn-out manageability of horticulture, which can have irreversible and profoundly adverse consequences for the soundness of everybody too.

### 2.3 Effect of Climate Change in Agriculture

As the atmosphere is getting hotter day by day, creating nations like Bangladesh are confronting a difficult time because of climate changes and occasional adversities. As indicated by the Global Climate Risk Index 2019 report, Bangladesh is the seventh most influenced nation on the planet because of "Outrageous Weather Events" in the course of the most recent 20 years from 1998 - 2017. Bangladesh's atmosphere chance positioning was ninth in 2017 against 13 positions in 2016.

Other than irregular ascent in temperature, expanded of salt level in soil, ascend in normal precipitation, other regular cataclysms, for example, grievous flood, tornadoes in Bay of Bengal, saline interruption up to 100 km inland through streams during summer are the outstandingly disturbing occasions of late occasions.

Because of such climate changes harms of yields and the sufferings of ranchers are unbelievable. In the year 2017, because of over the top precipitation in March, April, July,

and August, 18% of the all-out harvest creation of rice was harmed alongside different yields. Accordingly, the administration financed a sum of 42 crores among 418,511 ranchers to relieve their misfortunes. In 2018, a 2.6 degree Celsius temperature was seen in Bangladesh, which was the most reduced temperature over the most recent 50 years. Because of this unusual fall of temperature, crops everywhere throughout the nation were vigorously harmed. It is accepted that harm in horticulture because of vulnerability in climate changes in recent years was proportionate to USD 12 billion which establishes 0.5-1% of our national GDP (yearly) on a normal.

While there lies gigantic potential in agribusiness through the turn of events and development of innovation and arrangement of monetary guide to the ranchers, climate-related dangers despite everything stay an indispensable concern. The vulnerability related to climate and atmosphere changes is sufficient to demolish all the endeavors our ranchers set up. Such shocking occasions cause trouble as well as lead to ranchers falling into neediness trap.

#### 2.4 Government Strategy to Mitigate Risks and Costs Related to Execution

Bangladesh's catastrophic event the management's framework has fundamentally improved after some time, particularly since the 1991 twister that asserted almost 140,000 lives. This has been the consequence of a progressive move from a response-based way to deal with a procedure that joins components of more noteworthy crisis readiness and hazard moderation. Bangladesh's Poverty Reduction Strategy Paper accommodates reinforcing fiasco the executives and hazard decrease, mainstreaming Disaster Risk Management into national approaches and formative procedures, and improving network limit with regards to debacle readiness and hazard decrease. Be that as it may, GOB depends intensely on outer help to fund post-debacle misfortunes.

Bangladesh has built up a National Plan for Disaster Management (NPDM) 2010-2015. The NPDM traces a model to direct catastrophe hazard decrease and crisis reaction the board endeavors, what's more, depends on three segments: (1) Defining and re-characterizing hazard conditions, (2) Managing the hazard condition, (3) Responding to the dangerous situations. Notwithstanding this arrangement, a few Standing Requests



have been received in 2010 is the structure to characterize the job and obligations of all stakeholders.

The institutional system for fiasco chance administration incorporates an assortment of partners both at the national and sub-national levels. The National Disaster board Council is multi-sectorial and between disciplinary, with open, private, and common society cooperation and gives strategic direction towards fiasco chance decrease and crisis reaction the executives in Bangladesh. The Ministry of Food and Disaster Management (MoFDM) through the Disaster Management Bureau (DMB), is answerable for organizing Bangladesh's national debacle the executives' plans and projects overall services, offices (counting NGOs), and segments. The Directorate of Relief and Rehabilitation (DRR) under MoFDM helps the Ministry of Food and Disaster Management on strategy plan and usage of projects/approaches. At the sub-national level, debacle the board exercises are composed essentially by the District Disaster Management Board (DDMC), the Upazilla Disaster Management Committee (UZDMC), and the Union Disaster board Committee (UDMC).

Government reaction to catastrophes is predominantly founded on the evaluation of necessities gathered through the "D structure". The MoA and MoF are mindful under their financial plans for giving influenced ranchers, anglers, and domesticated animal proprietors with post-fiasco medium-and long haul money related help after the significant regular tornado, flood, or dry season occasions, which are announced a catastrophe. Field expansion staff of these services are liable for evaluating harm to yields and domesticated animals, and pay installments are composed through the District organization framework. Alleviation help may either be in kind as seeds and bug sprays, poultry and domesticated animals, or money installments.

Fiascos in Bangladesh place a noteworthy weight on Government spending plan and outer help. In the result of Cyclone Sidr, recuperation and reproduction needs were evaluated at 1.3 billion USD or 28% of Government expenditures<sup>17</sup>. Every year on normal since 2000, the Government of Bangladesh and outer givers have spent over US\$300 million for cataclysmic events.

Over a similar period, worldwide benefactor post-fiasco help has arrived at the midpoint of US\$ 46 million every year ascending to US\$ 306 million in the result of Cyclone Sidr in 2007. Tropical Cyclones and floods are the significant reason for giver post-catastrophe consumptions, representing 40% and 38% of benefactor consumption.

Post-fiasco Government costs additionally incorporate help to PKSF, the microfinance pinnacle establishment made and financed by Government of Bangladesh, which gives delicate credits to powerless families after catastrophes. PKSF has given delicate term advances to remaking and recovery through different projects, for example, the Disaster Management Fund since 1998, the Southwest Flood Damage Rehabilitation Undertaking (SFDRP) after the 2000 flood, the 'Exceptional Assistance for Housing' (SAHOS) and the Rehabilitation of SIDR influenced Coastal Fishery, Small Business and Livestock Enterprises (RESCUE) in 2007.

These assets have been utilized for house fixing purposes, remaking/fixing of toilets and acquisition of beneficial resources, crisis food and medication. Post-calamity Government costs additionally incorporate waivers of head and enthusiasm after characteristic catastrophes.

### 3. Insurance as a Scope of Mitigating Risks in Agriculture

Agriculture Insurance is a worldwide popular solution for coping with such challenges arising from climate changes. Developed countries where agriculture insurance is an obvious tool to mitigate such risks, developing countries are also implementing agriculture insurance to provide a financial safeguard to their farmers believing that protecting farmers can have huge impact on the whole economy.

For Bangladesh, agriculture insurance can be an effective solution to reduce the vulnerability of the farmers due to the changing climate. Despite of having huge scopes for development there hasn't been any significant successful initiative until recently for introducing agriculture insurance to the farmers. The market consists of around 70 million farmers who are consistently facing challenges to keep pace with unpredictable weather.

USD 500 million of premium can support this huge number of farmers of Bangladesh for all kind of adverse weather events round the year.

### 3.1 Account of Agriculture Insurance in Bangladesh

#### 3.1.1 National Crop Insurance Initiative

Agricultural crop insurance was 1st introduced into Bangladesh on a pilot basis in 1977 by the national insurance company, Sadharan Bima Corporation (SBC). SBC offered an individual- grower multiple peril crop insurance, MPCl, product. SBC subsequently introduced livestock mortality insurance in 1981 and then aquaculture insurance (in the mid-1990s). However, on account of poor underwriting results and lack of demand, SBC had terminated these programs by the turn of the century. There has been no account of commercial agricultural insurance from the private sector prior to 2014.

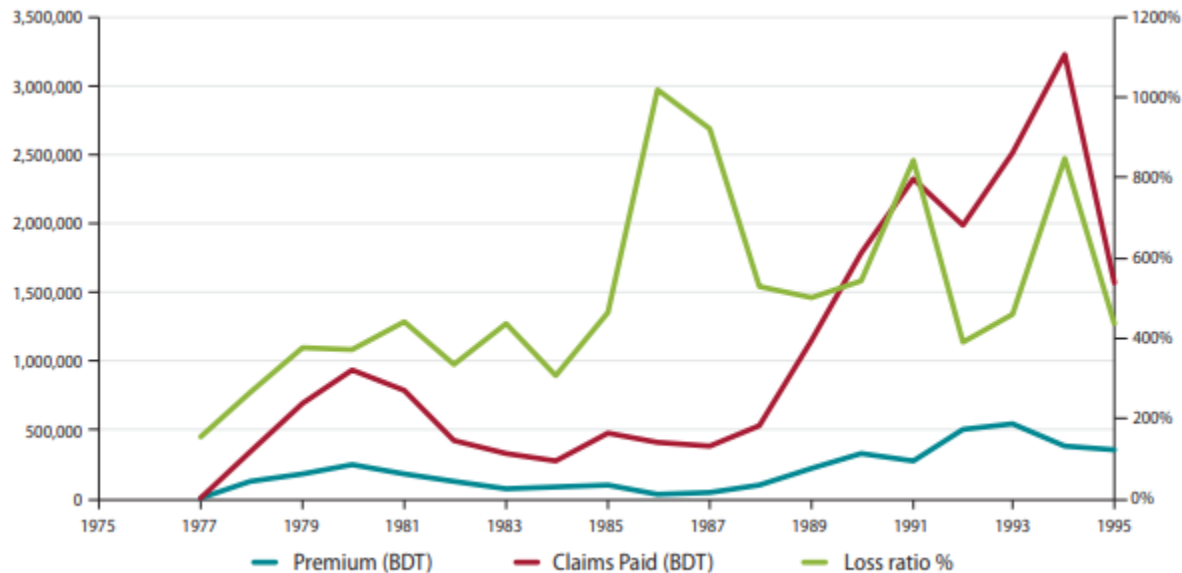
SBC crop insurance: Starting in 1977, SBC introduced a conventional individual-grower multiple-peril crop insurance (MPCl) yield-shortfall policy that provided coverage against a wide range of climatic perils, including the potentially catastrophic climatic perils of floods, droughts, and winds and biological perils of pests and diseases. The program was launched on a pilot basis to individual farmers who were members of cooperatives with linkage to public sector crop credit albeit on a voluntary basis

Insured crops included rice (Aman, Boro, and Aus), wheat, sugar cane, and jute. The sum insured was set at 80 percent of the past three-year average yield for each crop on each farm (as declared by the farmer) and valued at the government intervention price for the crop, or in other words a revenue-based valuation. Premium rates were calculated on an actuarial basis, but as these were deemed to be unaffordable for poor farmers, actual premium rates were capped at between 3 percent for wheat and jute and Boro paddy, 4% for Aus paddy and a maximum of 5 percent for Aman paddy and sugar cane. These single premium rates for each crop operated throughout all districts and regions of the country. Loss assessment was mostly based on “eye estimation” techniques, which is very unscientific and barely accurate. The amount of indemnity payable was adjusted according to the stage of growth of the crop and amount invested in the crop at the time

of loss ranging from 20% for early season sowing losses up to 100% of the sum insured for losses immediately pre harvest.

From 1977 to 1995, the individual grower MPCl program was insured exclusively by SBC, which retained 100 percent of the losses without any external reinsurance protection, and there was no premium subsidy or other financial support from the government.

SBC’s budget for the crop insurance program was very limited and it never achieved scale or sustainability. The annual average MPCl policy sales were only 989 insured farmers with insured area of 1,252 Acres, and the maximum sales in 1980 were again only 1,969 policies and 3,246 ha insured area. Over the 19 years (1977 to 1995) the crop insurance program experienced very poor underwriting results with a long term average loss ratio of 499 percent: in no year were paid premiums adequate to cover the value of incurred crop losses.



Source: SBC results reported in World Bank 2010

Figure 1: Premium, Claims and Loss Ratio of SBC's Agriculture Insurance

On account of the very poor financial performance the SBC Crop Insurance Program was terminated by government in 1995. Some of the key reasons which led to the failure of the SBC MPCl program appear to have been (i) low demand for the voluntary program and problems of adverse selection and moral hazard, (ii) technical drawbacks of the policy

design including the setting of insured yield coverage levels too high and the capping of premium rates at well below the actuarially required levels, (iii) operational issues including poor control over loss assessment and loss assessment procedures and high administrative costs, and (iv) lack of financial and other support to the program from the Government to effectively market and promote the program, to conduct farmer education and awareness programs and to implement effective control over loss assessment.

### 3.1.2 National Livestock (Cattle) Insurance

In 1980, SBC launched a pilot project for cattle for livestock naming it as Livestock Insurance, using a traditional individual animal indemnity-based cover. The policy was linked to cattle loans financed by BKB and other State Commercial Banks.

The policy insured against accidental mortality and diseases in cattle, but excluded epizootic or Class A epidemic diseases, catastrophes, poisoning and starvation of animals and theft. The sum insured was based on the value of the loan and the policy carried a flat premium rate for all insured's that varied over time from a low of 3.0 percent to a high of 5.0 percent. In common with the crop insurance program, SBC did not receive any form of financial support from GOB and the livestock insurance program was not reinsured.

Over the 24 years of operation of the livestock insurance program (1981 to 2008) the SBC livestock insurance program also failed to achieve commercial scale. SBC issued a total of 1,026 livestock insurance policies with a total of 7,591 head of cattle insured, representing an average of only 45 livestock policies and 330 insured cattle per year and generated an average annual premium of slightly below BDT 239,000 (about US\$3,500). Over the same period the program generated underwriting profitability with an annual average loss ratio of 56%. However, in 2002, the worst year the loss ratio was as high as 1200 which demonstrates the catastrophe loss potential on a small livestock insurance program. By the early-2000s SBC had effectively ceased underwriting the livestock insurance program.

### 3.1.3 National Shrimp Insurance Initiative

Shrimp production in Bangladesh is concentrated in the southern coastal region and is highly exposed to floods, tropical cyclones and tidal surges, and diseases of shrimp. The SBC shrimp policy was introduced in the 1990s as a named-peril cover restricted to floods, cyclones and tidal surges, and diseases were specifically excluded. The policy covered both loss of fish stock (shrimp and prawns) and loss or damage to the shrimp farm installations, buildings, ponds, and feedstock on site but ultimately failed to attain commercial scale after 24 years of operation.

### 3.2 Agriculture Insurance: Initiatives of Private Sector

Following the termination of the SBC agricultural crop insurance program in 1995 on account of very poor underwriting results no public or private insurance company in Bangladesh was willing to underwrite this class of business for nearly two decades. Several agricultural (mainly crop) insurance initiatives were carried out between 2005 and 2013 in Bangladesh.

A national commission led by SBC into alternatives to the former indemnity-based MPCl crop insurance program including the option with ADB of developing Weather Index-Based Crop Insurance, WIBCI;

Two crop insurance studies conducted by the North South University, NSU.

Oxfam UK's research starting in 2009 into flood index insurance for poor households living in flood prone chat areas of Bangladesh.

A major 2008-09 World Bank technical study which identified potential opportunities for crop hail insurance in hail prone areas, area yield index insurance, AYII for paddy and major cereals, rainfall deficit WII cover in drought prone areas and possible opening for livestock and aquaculture insurance (World Bank 2010); (v) starting in 2011 IFPRI has conducted research, in collaboration with PKSF, in Bogura district to introduce index based insurance, IBI, against rainfall deficit (drought) in Aman rice and as a starting point to this work IFPRI conducted an experimental insurance demand-elicitation exercise with more than 300 farmers in Bogura and Manikganj which found that because farmers are

subject to a variety of risks they do not focus on one type of insurance product only, but evenly split their endowment between life insurance, disability insurance and crop insurance.

Since 2013, IFC has been working closely with Green Delta Insurance Company to design the first commercial insurance company WIBCI product for Bangladesh. They have been working together to introduce Weather Index-Based Crop Insurance, for selected perils starting with rainfall for selected crops (IFC 2014). In 2018, Green Delta Insurance Company has commercially launched Weather Index Based Agriculture Insurance and expanded its service limit for any crop anywhere in Bangladesh. The focus of IFC's work is on partnering with interested insurance companies and in developing their internal capabilities to design, rate and underwrite crop insurance products and programs. As a starting point, in 2014, IFC has contracted Skymet weather services, India's first private sector meteorological and weather forecasting entity and also a specialist in the design and rating of WIBCI products to develop a historical gridded rainfall database in order to address the constraints with the current rainfall and temperature data available from the Bangladesh Meteorological Department. The gridded data will be used subsequently for weather index insurance product design and pricing as well as loss estimation. As part of this work, Skymet is working closely with BMD to design a rainfall gridded index for all of Bangladesh.

WBG will provide technical support across the entire value chain including designing and developing the product, training underwriters within Green Delta who will be responsible for pricing and contract design, facilitating access to reinsurance, developing a retail/distribution strategy, providing support to partner financial institutions primarily Banks (incl. development banks) and MFIs in agriculture credit risk tools to help mitigate the risk of lending to agriculture/farm sector among others.

Recently, several integrated plans and activities have been going on for a while now, at the direction of Honorable Prime Minister Sheikh Hasina of the Government of the People's Republic of Bangladesh under the supervision of the Financial Institutions Division of the Ministry of Finance to stand by the farmers who are at risk of financial loss in flood-prone Haor areas. To transform these plans into reality, with the extensive

support from Insurance Development and Regulatory Authority of Bangladesh (IDRA), Green Delta Insurance Company Limited and its distribution channel partner OXFAM Bangladesh and local associate Sancred Welfare Foundation (SWF) have insured 316 Farmers of Tahirpur, Sunamganj area under Index-Based Crop Insurance as a pilot basis. Sadharan Bima Corporation has also piloted a project in the Mithamoin Haor area to complement the pilot initiative and as per direction from the authorities. After almost a month of running this pilot, monitoring-updating-analyzing satellite and ground-level data, Green Delta paid a claim of BDT 150,000 to 316 Boro Rice farmers, which GDIC considers as their success of this pilot phase. As the pandemic, COVID-19 begins to spread in March, the claim assessment, initiation, and settlement have been done completely through digital platforms and means. Associated stakeholders suggest to replicate the pilot and carry out the success throughout the country while implementing Index-Based Crop Insurance in naturally vulnerable and most exposed areas of Bangladesh to strengthen the financial stability of farmers and increase the contribution of agriculture in the economy and national income. To implement Index-Based Crop Insurance across the country the government needs to develop several high-end technology and infrastructure to support them. Satellite remote sensing, real-time data provider weather stations, digitalization of transaction methods, utilizing local authorities as structural distribution channels, etc. are the most important initiatives that need to be undertaken besides building stronger collaborations between respective departments and ministries of the government to get the most out this project.

## 4. Agriculture Insurance as Green Delta's Offering

### 4.1 Weather Index Based Crop Insurance

Green Delta Insurance Company Limited, jointly with International Finance Corporation (IFC) of The World Bank Group, launched Weather Index Based Agriculture Insurance to mitigate risks of the farmers as a pilot project back in 2015. Later in 2018, after 3 years of successful piloting in different geographical areas of Bangladesh, Green Delta commercially launched Weather Index Based Agriculture Insurance ensuring the access to the product for any season, anywhere across Bangladesh.



Currently, the Weather Index Based Agriculture Insurance of Green Delta covers the following perils:

- Excess Rainfall
- Drought
- Unseasonal Rainfall
- Cold Waves
- Heat Waves
- Humidity
- Inadequate Sunshine Hour
- Loss of Income

This insurance service mainly aims to serve marginal farmers cultivating multiple crops round the year. Each client at each location is facilitated through customized or tailored products as per the weather index and historical weather data. The range of our services exceeds the marginal farmer base in many ways. Besides farmers, Retailers, Input Farms, Crop Clinic, Agri Machineries, Contract Farming, Seed Companies, Fertilizer Companies, Irrigation Companies, Microfinance Institutes, Banks and Non-Government Organization (NGOs) also get direct or indirect benefit from providing insurance to the farmers.

Green Delta now is now expanding its product line towards flood index, while keeping a good touch of weather index in it to cater more accurate services to the clients. Besides Weather Index Based Agriculture Insurance, in 2019, Green Delta also launched Livestock Insurance as a new product line.

This insurance product has a chain effect on a number of SDG goals while ensuring financial support in the form of claims in case of natural adversity to the farmers who are considered the core generator of economic sustainability. Strengthening the farmers financially, will ultimately result in reduced poverty and zero hunger. And these two direct goals can contribute in achieving other goals like; Good health and Wellbeing, Sustainable Communities, Economic growth, climate action etc. GDIC strongly believes

that empowering the farmers can result in sustainable economic growth and ensure food security for the whole nation.

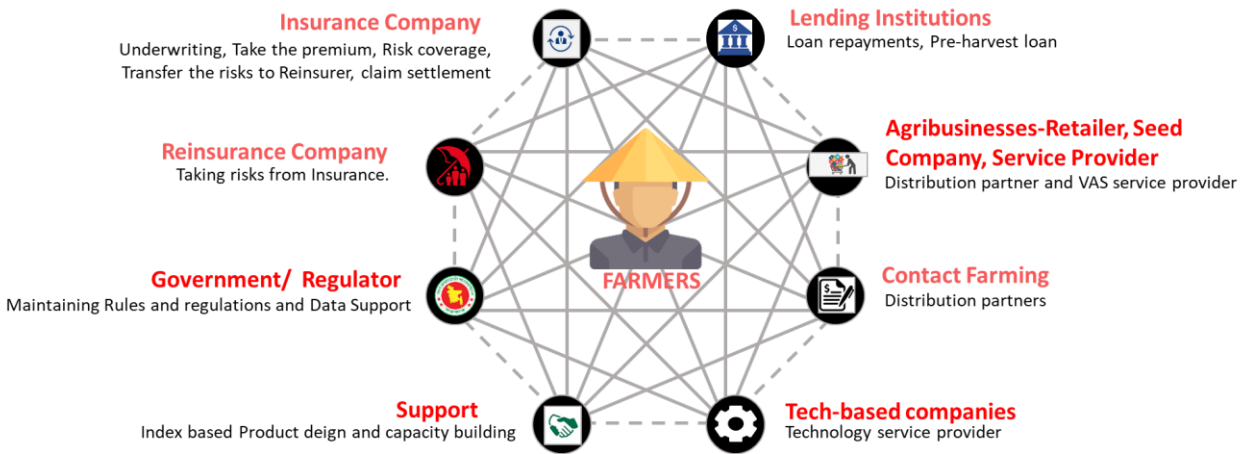
#### 4.2 Livestock Insurance of GDIC

Livestock insurance is one of several risk mitigation strategies that have been designed to reduce the variability of farm income. Livestock insurance can be defined as a financial instrument used by insurance companies to buy potential risks from farmers in return of premiums. This type of specialty insurance protects farmers from economical loss from the death of animals resulting from various defined perils including disease, heat stress, theft, machinery breakdown, fire, flood and any kind of natural calamity. The livestock insurance protects the insured farmers in case of death of cattle(s) due to diseases, accidents and pregnancy or calving problem. If farmers take loan from commercial banks and cover the credit under an insurance policy, then insurance company will be liable to claim on sum insured amount to banks and financial institutions in case of death of cattle. This insurance will provide a form of livelihood protection for the farmers and also promotes responsible livestock rearing and good practice by the livestock owners. Near-Field-Communication NFC Chip will identify through collar tagging or outer side of the body tagging will be accepted by the farmers.

This part of Agriculture Insurance can also be a great contribution towards empowering farm owners and encouraging them to engage more in such activities to add greater value to the agriculture value chain. Strengthening the farm owners financially, easing their process of availing and paying loans taken from banks and providing the financial support in case of their loss regarding the cattle can accelerate the economic growth through minimizing the loophole of being trapped in burden continuous loan and loss for the farms. This can ultimately contribute in achieving SDG goals by reducing poverty, ensuring adequate supply for per head protein consumption requirement, being self-dependent in terms of generating income, and also contributing in economy in a sustainable manner.

## 5. Design and Model: Arrangements towards the Success

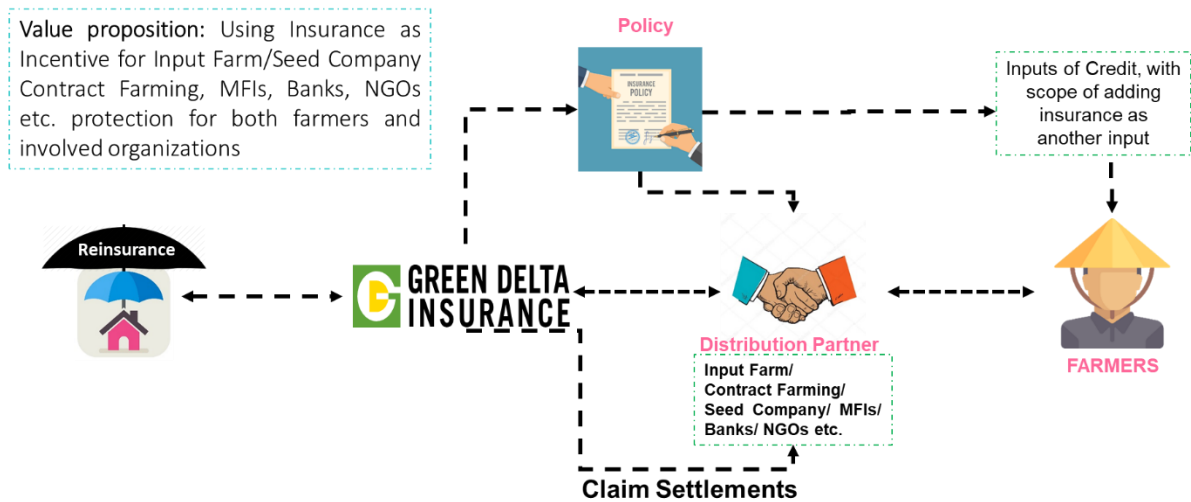
### 5.1 Ecosystem of Weather Index Based Agriculture Insurance of Green Delta



The eco-system of Crop Insurance product includes multiple stakeholder who has designated roles to make this initiative work. Besides the insurance companies, who will provide insurance services, financial institutions like MFIs, NGOs and banks can link the farmers with the insurance company through various credit facilities. The agri-businesses like: retailers, seed companies, input farms, contact farming companies etc. also work as linking agents and distribution partners.

The tech-based companies play role to provide technology based Value Added Services. Different support farms provides weather data and other data related services. Government and regulatory agencies maintains rules and regulations and financial regulations. And reinsurance companies provide reinsurance support to the insurance companies.

## 5.2 Business Model for Weather Index Based Agriculture Insurance



**PREMIUM** — Pre-financed by Distribution Channels

The business model, in broad sense, works through a bunch of distribution channel who links a bunch of farmers to Green Delta. Green Delta then issues policies for the farmers through distribution channel. And if there is any claim the amount is also paid to the farmers through the distribution channel. In the backend, the reinsurer gives risk sharing support to Green Delta.

## 5.3 Partnership Spectrum of GDIC

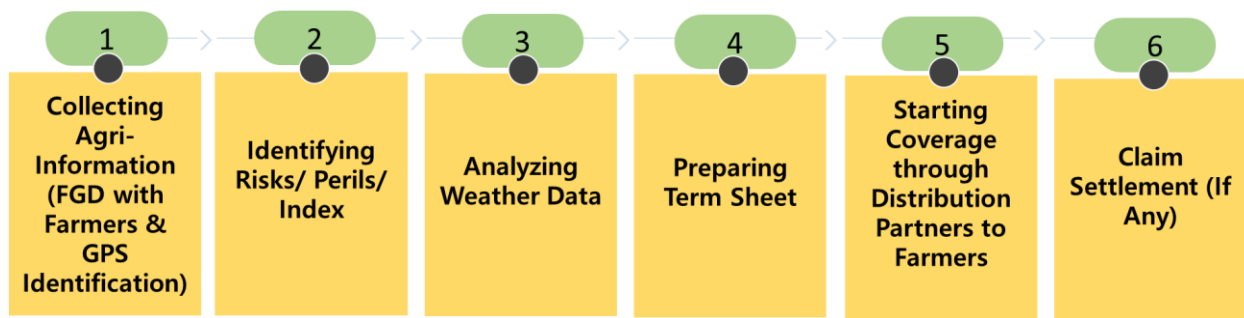
Starting from 2015, Green Delta has developed collaboration with different key role players in the market. The partnership was developed among multiple type of service providers in the agriculture value chain. The dominant partners were from the blow category:

	Input Farms	Contract Farming	Seed Company	MFIs	Banks	Donors & NGOs
Crops	Tomato, Cucumber, Bitter Gourd	Industrial Potato, Cassava	Hybrid Rice Seed	Potato, Boro Rice, Aman Rice	Livestock Insurance	Contingent Loss of Earning (Flood)
Example	Renaissance Enterprise	Sylvan Agriculture Limited	Supreme Seed	ESDO, GUK, Sancred	BRAC Bank	OXFAM Bangladesh,

		(PRAN-RFL Group), Eastern Trade, Seba Ltd.		Welfare Foundation		SKS Foundation,
<b>Location</b>	Bagerhat, Shariyatpur	Tangail, Shariyatpur	Mymensingh Muktagacha Modhupur	Nilphamari Dinajpur, Bogura	Keraniganj, Dhaka	Gaibandha, Rangpur

Besides these non-government organizations, GDIC has recently accomplished a pilot project successfully collaborating with FID under direct observation of Ministry of Finance. Due this collaboration, there has been a wide range of scope created to build partnership with government institutes, agencies and companies for facilitating Agriculture Insurance nationwide.

#### 5.4 Process for Weather Index Based Agriculture Insurance Policy Development and Provision



At first, agriculture and crop related data are collected from the farmers through FGDs. Within this process, data like; farmers' personal information, crops seasons, GPS of the location, risks or perils faced during the cultivation process are collected through Focused Group Discussion (FGDs).

After collecting these data, perils and risks are identified from the weather perspective. Later the historical weather data is collected of that specific location and the data is analyzed for determining the trigger points for certain perils.

After ensuring the perils and risks the term sheet is prepared, where the premium rate for each farmer is determined.

After confirming the number and details of the farmers, the policy is issued and the coverage starts after getting the payment for the policy.

During the coverage period, daily weather data is monitored and compared with the term sheet to track the claim. And if there is any claim, then the farmers are paid the claim amount in the end of the coverage period.

### 5.5 Field Based Activities held to Increase Crop Insurance Customer Base

Since Green Delta works with marginal farmers of remote locations, most of our awareness and promotional activities are field based to better connect with our end customers and develop stronger distribution network. Our field activities are mainly as following:

- Focused Group Discussion (FGDs)
- Awareness Programs
- Yard Meetings
- Workshops
- Awareness and Claim Settlement Programs

From 2015 to 2020 (till June) we have conducted the following activities:

Events	Number of Events	Farmers Reached
Awareness & Claim Payment Programs	11	2,477
Focused Group Discussion (FGDs)	142	1,689
Workshop & Training	14	610
Yard Meeting	79	3,860
<b>Total Events Organized</b>	<b>246</b>	<b>8,636</b>

And through direct policy, Green Delta has covered around **32,000 farmers**.

And these numbers are much more valuable when it comes to the calculation of impact. We can certainly say with pride that we have touched close to 141,500 lives through our Weather Index Based Agriculture Insurance only.

## 5.6 Value Added Services (VASs)

Besides insurance policies bundled with different products or credits, the registered farmers get SMS alert services through their mobile operator which provide weather forecasts of the certain area and crop specific tips and advices. In case of any emergency, the registered farmers can call to a toll free helpline number, dedicated for attending to them during any crisis. The process is such that, the call will be disconnected automatically once they make the call and they will be called back immediately. Then they can make their queries regarding any problem related to their crops and they will be served accordingly as per their emergencies.

## 6. Analyzing the Success Factors

There were certain factors that helped us to come this far and attain success in every step since the very beginning. The highlights factors were;

### 6.1 Customer Centricity

Since this product is designed and developed based on the local agriculture, weather, and field based data the product is adaptive to every location across the whole country. Also, before designing the product, on-hand experience of the farmers and their mentionable losses in previous years are also taken into account. Thus the products before heavily customized for each location, crop and also the weather adversity of unique locations. This customized products help us to serve exactly the customer needs. And for being this customer centric our products are quite popular and seemed to have increased demand lately.

### 6.2 Usage of Technology

GDIC is relentlessly trying to digitalize the whole process of designing, developing, implementing, and settling of claim through incorporating advance technologies and common platforms. Recent outbreak of the pandemic has also pushed us a little further in this process. Except for the recent changes, advanced technologies were already incorporated throughout the whole process; from designing and developing the product,

monitoring daily weather data, monitoring claims and currently GDIC is approaching towards contactless claim settlement through MFSs. In future, we are looking forward to collaborate with more technological advancements and digitalize the whole process through E-platform, offerings through mobile apps, purchase and delivery of insurance product online, monitoring claims and also settlement through one stop solution.

### 6.3 Value Added Services (VAS)

With the right subscription of the agriculture insurance product, GDIC provides a number of value added services to the customers which seems to be very useful of the end users and evidently increased the demand of our products and made it popular among them. Through our market observation, we have found that these value added services are increasing the demand of our products and also the customer loyalty, even they don't receive a claim in one season. Weather forecasts, crop advisory data and calamity alerts are very handy for the farmers who cultivate in a remote area and lacks the proper arrangement to receive these information on time that can help them to cultivate more efficiently. Also they can avail, customer care services where they can call a toll free number to discuss any sort of agriculture related problem or for any such query.

### 6.4 Integrated Collaboration

There is an integrated collaboration that works behind the successful partnership among GDIC, its distribution partners and the end customers. Through our market observation it was evident that, since the distribution partners are engaging their field staffs for marketing of the insurance product and also to hold constant communication between the customers and GDIC as well, it is very easy and effective way to gain trust and reach out to more people through each distinctive partnership.

## 7. SWOT Analysis of the Initiative

Strength	Weaknesses
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<ul style="list-style-type: none"> <li>Automated claim settlement process (farmers need not to intimate GDIC, GDIC need not to visit the field)</li> <li>In the country's history we have designed 40+ Weather Index Based Crop Insurance Product for Various Type of crops including several cash crops first time in Bangladesh</li> <li>GDIC is the pioneer in giving claims on Crop for unseasonal rainfall and cold wave first time in Bangladesh</li> <li>Development of various distribution network input farm, aggregators, Seed Company etc.</li> <li>Historical only data grid in the country over 38+ years of data</li> <li>Ability to design WIB products for any crop, any season across Bangladesh</li> </ul>	<ul style="list-style-type: none"> <li>A one stop e-platform can circulate motion in the whole procedure. We are lacking a tech based one stop solution for the farmers which will make us a 360 degree service provider.</li> <li>Lack of a mobile app to support the e-platform.</li> <li>Lacking partnership with more numbers of efficient distributors to help us gain better grip over market.</li> <li>Lack of designated regulations for Agriculture insurance hinders the growth of the business.</li> <li>Readiness of untapped market depends on how the market was nourished</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>Since it is the leading organization, tapping new market will give us the first mover advantages.</li> <li>The potential market is of around 7 crore farmers from whom the industry can earn 420 Billion.</li> <li>Including more efficient range of value added services (VAS) will help to increase the outreach.</li> <li>Cooperation from the government in forms of subsidy in the premium can help to have better growth.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of Insurance awareness among farmers.</li> <li>The unsuccessful pilots of other players in the industry actually deteriorates the impression the business.</li> <li>Unwillingness and lack of cooperation of regulatory authorities hinders the growth of the project.</li> <li>Lack of sufficient funding.</li> <li>Efficient and skilled manpower in the industry is slowing the growth of the business.</li> </ul>

## 8. Tales of our Journey So Far

### Year 1: 2015

Starting the equity partnership with IFC from 2014, GDIC has developed 1<sup>st</sup> Weather Data Grid for Bangladesh and established partnership with Skymet Weather Services, which is a private Indian company that provides weather forecast and solutions and also works for government projects i.e. PMBFY.

### Year 2: 2016

In this year, approximately 10 weather index based crop insurance products and Area yield index based insurance products were designed for a variety of crops. A number of partnerships were also built for the sake of proper distribution of the products following the global trend.

This year 200 farmers received claims for unseasonal heavy rainfall, who were enrolled under the pilot project done in Bagerhat, Khulna.

### Year 3: 2017

In the year 2017, GDIC launched major pilot projects across the agri-value chain while insuring variety of crops including cash crops like Potato, Hybrid Rice seed, Cucumber, bitter gourd, Tomato etc. This year crop insurance portfolio covered 3,500 farmers and settled claims of 1,000 farmers who were residing in the coastal belt of Bangladesh.

### Year 4: 2018

In the year 2018, GDIC had completed its successful plot project in 10 locations of the country. In these locations, around 10,000 farmers were covered under this portfolio. New perils were also taken under consideration while designing and developing insurance product like: Humidity, Sun Shine hour etc.

This year, for the 1<sup>st</sup> time in Bangladesh, GDIC paid claims to 2,000 farmers for low temperature who were cultivating vegetables.

## Year 5: 2019

In the year 2019, GDIC extended its partner spectrum even more and entered into the north region of the country. By this year, all the hard works of previous years were showing through the increased demand of customers. Also, partnership with agent banking, NGOs, development organizations like Syngenta Foundation had created a wide range scope for reaching the last mile customers. This year GDIC covered around 15,000 customers and paid claims to around 8,000 farmers who were cultivating Rice and Potato in the north belt of the country.

This year is also very significant for the history of Agriculture Insurance of Bangladesh as there were significant collaboration among Government, ministries, agencies, institutes, departments, boards, private companies and non-government organizations (NGOs) which resulted in the successful execution of the pilot project in Haor area in 2020.

## Year 6: 2020

Though the journey has been going pretty well until this year as the unstoppable growth and success was a bit deemed due to the outbreak of the pandemic COVID-19 across the country in early 2020. Yet during this pandemic we have successfully run the pilot project in Tahirpur, Sunamganj. This pilot was collaborated with FID and 316 Boro farmers were under the coverage of Index based Agriculture Insurance.

## 9. Strategies followed to attain the Success

### 9.1 Competitive Strategies

- Utilizing first mover advantages to hold maximum market share.
- Providing commercially viable (minimum cost) products to the marginal farmers.
- Developing niche products as per each market segment demand.

## 9.2 Business Strategies

- Developing agriculture insurance for all the farmers for any season, anywhere across Bangladesh.
- Developing stronger distribution network which includes every possible stakeholder.
- Integrating technology in the whole model for ensuring maximum reach and easy access.

## 9.3 Functional Strategies

- Developing skilled workforce to execute the operations smoothly.
- Developing efficient physical and virtual infrastructure to reduce processing time of the operational functions.
- Developing greater customer base to retain sustainable and stable revenue structure.

## 9.4 Operational Strategies

- Developing and deploying effective distribution channel and skilled agents.
- Developing field level workforce to have better interaction with the customer base in different zones of Bangladesh.
- Deploying skilled field level agents to ensure easy access to information and services.

## 10. Way Ahead & The Engagement of Authorities

Green Delta is aiming to introduce major innovations and changes to its own infrastructure to ensure easy access to services. The future plans of Green Delta will incorporate innovations and technology altogether to develop effective and efficient business models. Green Delta is planning to;

### 10.1 Public Private Partnership

Government can explore ways to improve the interaction between government and the private sector. The private sector can effectively assist in implementation of government programs, for which Government can leverage the agriculture extension services for education campaigns and redress for consumer grievances.

### 10.2 Including as a part of Government Agriculture Policy

Government should take the strategic lead for financial inclusion and insurance for rural and agricultural communities. They should ensure that insurance is included in the national agricultural policy as a part of a broader strategy that creates capacities and incentives for agricultural risk management. In addition to accounting for the risks that farmers face, it is important to consider other adaptation measures and strategies for income generation and production stabilization, as well as roles played by others in the agriculture value chain.

### 10.3 Government as a Driving Force of Market Development

Governments can drive market development of agricultural insurance by assisting nascent programs to move from pilots to maturity. Government can act as independent and credible facilitator can enable market-based solutions by:

- Building quality data grid (weather data or cultivation related relevant data) and making it available for Insurance companies: Accurate, affordable and accessible data is needed for developing relevant and scalable products.
- Distribution support: There is a need to develop the capacity of extension workers to understand and promote crop insurance programs.
- Providing subsidies for cost reduction: In addition to premium subsidies, governments can fund infrastructure (weather stations for example) development or create customer awareness and educate farmers on enrolment, premium payments and claims processes.

- Reinsurance arrangement: Government own insurance company can act as a reinsurer.

#### 10.4 Infrastructure and Incorporation of Technology

Innovative applications of technology is a must. New technologies will be used in developing products, to assess the loss, monitor weather, create forecasts etc. use of mobile apps to provide early alerts, collect premium and distribute claims as well as enroll and generating statistical reports will be needed to run such initiative.

Installation of Automatic Weather Stations (AWSs) to invalidate the challenge of data scarcity and to get ground level data, which is more accurate, for better product development and monitoring.

Develop an E-platform which will be an all-rounder solution for Weather Index Based Agriculture Insurance. This platform will collect weather data from local stations and satellites, determine product prices based on location, crops and perils, prepare term sheets, monitor claims and deliver notifications to designated parties regarding weather, coverage, crop advisory, alerts, payments and claims. Develop a mobile app for accessing the E-platform from remote locations

Digital platform, remote sensing imagery from satellites mainly SAR i.e. cloud penetrating satellite particularly useful during the cropping seasons etc. needed to be used to generate information on the rice crop, such as planted area, seasonality, cropping intensity and damaged area due to flood or drought. Information on crop growth from such imagery can also be used in crop growth simulation models to estimate yield.

#### 10.5 Endeavors of Green Delta that needs to be taken

Establish zonal offices in different strategically important locations of Bangladesh to be closer to the end consumers and accelerate communication speed between customers and Green Delta.

Create a skilled fully operational team to acquire, monitor, maintain, store and analyze weather or satellite data which are a vital input while designing Index-Based products across the country which includes a wider range of locations, multiple perils, and different

weather patterns. For the same reason as diversity of location and weather patterns, professional knowledge is needed to design Index-Based Agriculture Insurance products suitable for the whole country.

To monitor field activities, collect data from the field, and to conduct awareness activities personnel with sufficient knowledge of this profession and products are needed to convey the right message among the customers and the aggregators.

IT experts, Technological experts are also needed to create the E-platform, mobile app, or any coordination between digital platforms when the replication will move forward towards more advancements.

## 11. Conclusion

Green Delta aims to reach the doorsteps of all the farmers of Bangladesh providing the financial security whether it is crops or livestock. Green Delta is also aiming to build stronger network and better infrastructure to provide the solution with better efficiency and faster, so that the farmers of Bangladesh can enable insurance services sitting in any corner of the country. Agriculture Crop Insurance is one of the best ways to ensure sustainable production of food supply, thus contributing in achieving SDG goal of Zero hunger. This insurance service also helps to strengthen the financial conditions of the farmers, thus contributes in achieving No Poverty and helps to create Sustainable Community. There are a number of other effects that has a chain reaction in the economy as well as the financial strength of individuals which will eventually contribute in achieving other goals of SDGs.





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