Summary of Section E: Agricultural Development

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The Theory of Change for the Blue Gold Program (BGP) describes the three main sets of

interventions -infrastructure, institutional and agricultural development- as the core elements of Blue Gold's approach.

This section E focuses on BGP's agricultural development interventions which sought to enhance the commercialisation of agriculture. These interventions would work in synergy with the rehabilitation of infrastructure and the development of water management partnerships. By enhancing both the productivity and profitability of agriculture and fisheries, polder agricultural growth brings additional incomes and job opportunities.

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Original intentions and evolving approach[edit | edit source]

The Program Document for the Blue Gold Program presented different approaches with distinct responsibilities to improve agricultural production, separating value chain or business development from agricultural development. At the start of Blue Gold, Water Management Groups (WMGs) were required to register as cooperatives, which meant that requirements of the Department of Cooperatives (DoC) had to be met, which to some extent diverged attention from water management. With progressive insight, facilitated by the change in registration of WMGs under BWDB instead of DoC in 2014, the approach towards WMGs evolved, more emphasizing water management as the focus of functional WMGs. Another insight resulted in market orientation

becoming integrated as a crucial element in the curricula of Farmer Field Schools, which formed Blue Gold's main agricultural extension approach. Thus agricultural extension and development became integrated in a Value Chain Development approach involving various market system actors along with producer groups. As households are heterogeneous and benefit unequally from infrastructural and institutional water management interventions, the approach to enhance agricultural production was differentiated as well. The interventions promoting commercialisation of agriculture focused upon those households which see their future in farming, and more particularly in cropping, meaning they have access to land. The focus of this section E is on those households with access to land, either own land or leased land.

BGP's interventions on increasing homestead production focused on landless households. However, also in this intervention, more attention to market opportunities was given from 2018 onwards, including promotion of "farming as a business". This is described in chapter 25.

Content of agricultural extension in coastal zones[edit | edit source]

The relation between water resources management (WRM) and agricultural extension in the coastal zone is rather particular. WRM in the polders is primarily about drainage of hydrological units, which goes beyond the fields of an individual farmer and thus beyond his/her individual control. Farmers producing in a same hydrological unit are destined to synchronise their production to a great degree, especially in the monsoon season. During the dry season, farmers can more easily differentiate production from one another as they can irrigate individually from available fresh water resources.

Insight in water resources and the extent to which these can be managed across the year is a key boundary condition for agricultural extension, in order to define and advice on improved cropping systems benefiting from aligning the opportunities of WRM to the crops' needs. But extension should also weigh the farmers' commitment to water resources management. Extension can enhance the farmers' motivation to operate the WRM infrastructure by an improved understanding of crop requirements for drainage and/or irrigation.

Water resources management and agricultural extension affect each other at four levels: a) an understanding of the local water conditions to define production potential, be it agriculture or aquaculture; b) taking production to higher levels by infrastructure improvements enabling better water management; c) an enhancement of infrastructure operation in relation to crop requirements to optimise production; and d) enhancing the understanding that the benefits from risk reduction and production improvement outweigh the investments in maintenance, operation and modification of the water management infrastructure.

Lessons for agricultural extension in coastal zones[edit | edit source]

Differentiated extension approaches – better targeted attention to those with access to land, and to those with limited access to land. The latter are better served by homestead-focused approaches .

Working with producer groups – cooperation of farmers in groups is required to improve drainage, but working in groups also facilitates collective actions, such as joint input purchase.

Demand driven – leave out what farmers already know, focus on key technologies and skills, and be

locally adaptive.

Demonstrations - well defined demonstrations, providing links to other relevant issues through smaller sessions e.g. about the use of market information, improved technology, and the role of backward-forward actors. Thus no blanket approach trying to cover everything, but enabling discussion to identify and subsequently address farmers' practical problems.

Local resource network – lead farmers and Resource Farmers are ahead in their access to markets; they can help other farmers by facilitating market linkages. Since WMGs are established organisations, they should form part of the local resource networks through which farmers can access available resources and skills.

Sources of information – many information sources are available, but not really accessible to farmers, hence they need to become more 'farmer-friendly'.

Better use Horizontal Learning events – promote learning through events and exchanges where farmers can learn from each other within peer groups or communities.

Involving private sector actors and companies - for example, through actively linking farmers to market actors, demonstrations by companies, and/or training of input suppliers by the agro-input retailers network.

Outreach and Cost of Commercialisation interventions[edit | edit source]

Blue Gold's household-based Phase I Baseline Survey of 2014 in eight polders found a considerable variation in access to land and reliance on farming across all households. The proportion of households with access to crop land and with basic assets to cultivate this land was between 45% and 65% of all the households in the various polders. On this basis Blue Gold estimated that 55% of the total 185.000 households in all 22 BGP polders (which amounts to just over 100.000 households) own or lease crop land and are directly affected by water management interventions for crop production. Blue Gold's main interventions to commercialize agricultural production were the implementation of 1,358 Farmer Field Schools on field crops, 67 large and 628 small demonstrations, and many Horizontal Learning events, including FFS-related Farmer Field Days, Demonstrations, Melas and Exchange visits.

The combined outreach for commercialization of agriculture, in terms of households reached directly through program interventions and indirectly through Horizontal Learning events, is calculated to be 78,257, based on various assumptions and adjustments for multiple participation as well as for applying the learnings. This means that nearly 80,000 households have been reached, while the potential target group was determined as about 100,000 households. In fact, Blue Gold reached 42% of the all households in the polders with the commercialisation interventions, which compares quite well with the 55% of the households which were estimated to have access to land and as such potentially able to benefit from BGP's water management and commercialisation interventions.

The total cost of the commercialisation programme amounted to Euro 1,410,000, which covered the actual cost of all individual programme interventions related to the commercialization of agriculture. The average cost of FFS interventions was 40 Euro for each household that was directly reached. Considering the additional households reached through Horizontal Learning, the average cost dropped to 17 Euro per household. In contrast, the less resource intensive Cropping Intensity (CII) demonstrations cost 11 Euro per participant, which is just over a quarter of the FFS costs per

directly reached household, and only 3 Euro per household directly and indirectly reached. The CII costs are lower per household than the FFS costs because there are less sessions in the CII approach, whereas the impact appeared similar to FFS.

Outcomes of Commercialisation interventions[edit | edit source]

The outcomes of commercialisation can be captured in three ways: changes in land use and crop types, increase in cropping intensity and increase of yields per unit land. The below findings are based on the 2019 WMG survey as presented in Blue Gold's Technical Report 26.

Changes in land use and crop types[edit | edit source]

Since the start of BGP there have been significant changes in land use and cropping. In Khulna the biggest expansion has been an increase in the area under fish ghers; the area of paddy went up with more boro paddy being grown in the rabi season. In Satkhira there has been an even bigger increase in area of fish ghers (the area has doubled), and there has also been an increase in boro paddy. There are virtually no fish ghers in Patuakhali and there was little change in the area of paddy, however, there was a significant increase in area of non-rice crops in the rabi season, primarily mung bean.

In all three zones together there were increases in the total area of both paddy and non-rice crops, but the increase in area under fish ghers was greater than the combined increase in paddy and non-rice crops.

In all areas there has been a move towards more productive types of paddy: most boro is now of the more productive hybrid type, whereas there was a switch from local aman and aus varieties to HYV varieties. In non-rice crops there was a shift towards more profitable crops, for example water melon; in Patuakhali mung bean replaced *keshari*, a local pulse crop.

Increase in cropping intensity[edit | edit source]

Overall cropping intensity has increased by 41 percentage points, from 187% before BGP to 228% in 2019, with a larger increase in Satkhira of 76 percentage points - largely due to expansion of fish ghers in polder 2. Increases in cropping intensity were reported for 80% of the surveyed WMGs and for all polders, apart from polder 28/2, which recorded a fall of 34 percentage points due to land being absorbed by urban expansion of Khulna city. In the Khulna polders that were also included in the 2018 survey, a further increase in cropping intensity was reported in 2019, but there was little change in cropping intensity in the Patuakhali polders between 2018 and 2019.

On average WMGs with a greater improvement in water management (i.e. more reduction in water management problems) also demonstrated a larger increase in cropping intensity and a bigger increase in area under high yielding and high value crops. However, there is considerable variability in this trend so the relationship is not strong.

Yield increase[edit | edit source]

There has been a substantial increase in the productivity of paddy. Apart from the significant switch to more productive HYV and hybrid varieties, average yields of each type of paddy have increased by around 10% to 25%. There is a more mixed picture regarding the yields of non-rice crops, with significant falls in yields of some of the key crops in 2019, including mung bean and sesame,

whereas the 2018 survey found an average increase of about 35% in mung bean yields. Farmers say that unpredictable weather conditions during the 2019 growing season, both excessive droughts and unexpected and heavy rainfall, adversely affected the yields of non-irrigated rabi crops. Some non-rice crops, however, demonstrated a good increase in yields as per 2019, such as sunflower and chilli.

Polder Economic Growth Impact[edit | edit source]

The Blue Gold interventions contributed to growth of agricultural production through increases in yields, cropping intensity and diversification. Along with farm production, incomes and labour requirements have increased, the latter also providing more income to landless households depending on wage labour for their livelihoods. In turn, the increased incomes boosted the demand for goods and services as well as trader volumes, and resulted in more jobs and higher non-farm incomes.

Increase in farm income[edit | edit source]

The improved cropping patterns and increased yields resulted in increased farm income. Based on model crop budgets for the main crops, net incomes for each crop were calculated for the 'before project' and the 2019 situation, demonstrating a net income increase of 89%, with more increase coming from aquaculture than from crops; though the relative increase was higher for crops.

To assess the payback period, the overall increase in net farm income was compared with the total BGP costs, including TA. For almost all Khulna polders the payback period was less than two years, and for many even less than one year. For polder 2 in Satkhira the payback period was calculated as less than two years. For Patuakhali the payback periods per polder were in excess of 5 years, with the exception of 3 polders that had a payback period of 1 – 3 years.

Demand for labour and role of women[edit | edit source]

The expansion of cropping meant more farm work, both for family labour and for wage labourers. Because much of the available male labour has been absorbed in the non-farm sector, women are now hired more often. Women are undertaking an increasing amount of work in almost all farm operations, including transplanting and weeding paddy and preparation of fish ghers, replacing male labour.

Other benefits and impacts[edit | edit source]

For the households with access to land, the increased paddy production has greatly reduced or eliminated food insecurity, while high value and other rabi crops provide a cash income. Improvements in agriculture have meant an increased focus on this sector and more income for landless wage labourers. Apart from spending more on food, additional farm income is also spent on children's education, improved housing and sanitation, as well as on investments in farming – including land leases, livestock and high value crops. People are also saving more.

Qualitative outcomes of commercialization interventions[edit | edit source]

- New extension curricula take a cropping system perspective, consider water management conditions and include market orientation topics.
- Cost-effective extension methods, based on demonstrations and Horizontal Learning, are more

often undertaken by lead farmers and private extension agents.

- A growing number of farmers, men and women, consider farming as a business and use simplified gross margins, weigh up risks, and involve their spouses in joint decision making.
- Mobile phones provide a virtual access to markets, especially enhancing market linkage opportunities for women farmers.
- Positive and timely response by other market actors to new demands for goods, services and labour, resulting from alternative and/or more intensified cropping systems.
- Reduced transaction costs to both parties evolving from collective actions.
- Along with farm production, incomes and labour requirements have increased. In turn, increased labour demand increased wage incomes for landless households. And increased incomes from agriculture boost the demand for goods and services, increasing trader volumes, which results in more jobs and higher non-farm incomes.
- Cost benefit analyses show that overall returns to cropping system improvements justify large-scale infrastructure investment, and clearly justifies spending on maintenance as a production cost that results in more than enough income from selling the resulting additional produce.

See more[edit | edit source]

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Section E: Agricultural Development		
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Blue Gold Program

A defined set of temporary activities through which facilitators seek to effect change

An area of low-lying land surrounded by an earthen embankment to prevent flooding by river or seawater, with associated structures which are provided to either drain excess rainwater within the polder or to admit freshwater to be stored in a khal for subsequent use for irrigation.

Value chain - the set of activities that need to be performed in a specific production sector in order to deliver the end product to the consumer. Agricultural value chains typically include input supply, growing/production, processing and marketing/distribution.

Water Management Group - The basic organizational unit in Blue Gold representing local stakeholders from a hydrological or social unit (para/village). Through Blue Gold, 511 WMGs have been formed and registered. The average WMG covers an area of around 230 ha has 365 households or a population of just over 1,500.

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Department of Cooperatives

human intervention in the capture, conveyance, utilisation and drainage of surface and/or ground water in a certain area: a process of social interaction between stakeholders around the issue of water control.

Bangladesh Water Development Board, government agency which is responsible for surface water and groundwater management in Bangladesh, and lead implementing agency for the Blue Gold Program

Within BGP this refers to enhancing insights of especially FFS participants in how markets work, how to collect market information, facilitating linkages with market actors and increasing negotiation capacities

Farmer Field School - A group-based learning process through which farmers carry out experiential learning activities that help them to understand the ecology of their fields, based on simple experiments, regular field observations and group analysis. The knowledge gained from these activities enables participants to make their own locally specific decisions about crop management practices. This approach represents a radical departure from earlier agricultural extension programmes, in which farmers were expected to adopt generalized recommendations that are formulated by specialists from outside the community.

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assumed in this report to operate up to 0.5 acres (0.2 ha)

Water Resource Management

the adjustment of gates in water management infrastructure to control hydraulic conditions (water levels and discharges) in a water management system.

actions taken to prevent or repair the deterioration of water management infrastructure and to keep the physical components of a water management system in such a state that they can serve their intended function.

Collective action - by a producer group is one way to partially overcome constraints such as in weak markets, where inputs and services essential to production innovations, are generally scarce, costly to access and/or to obtain. Collective action is working in group instead of individually in order to gain economic or social benefit. Through collective action, farmers can address constraints in their market linkages, organise their activities jointly and use their collective bargaining power to reduce input costs through bulk purchase, or to obtain services from buyers such as farm-level collection of produce

Resource Farmers (RF) are members of Farmer Field Schools (FFSs). They are selected from the FFS groups to lead other members in organizing different useful collective actions and to maintain networks on behalf of the members. These RFs are given additional capacity building training to enhance their knowlege on simple record keeping and business skills.

Generally refers to how many and/or in which way people are able to buy or sell, and reach, a reliable supplier or buyer in a market

Also known as 'business linkages'. Linkages refer to the trading relationships between and among producers, input providers and traders, and other enterprises in a supply chain or value chain. We refer to Backward linkages on the input side and Forward linkages on the output side of the producer.

Learning from peers; and in the context of Blue Gold, farmer-to-farmer learning in which a host WMG invites representatives from visiting WMGs to witness an event - such as the harvesting of a new variety of rice - to pass on the knowledge and lessons gained from their experience

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practices. This approach represents a radical departure from earlier agricultural extension programmes, in which farmers were expected to adopt generalized recommendations that are formulated by specialists from outside the community.

Farmer Field Day - Exchange events organized at the end of each Farmer Field School to share the FFS learnings with other community members

A process through which stakeholders influence and share control over development initiatives and the decisions and resources which affect them.

Cropping Intensity Initiative: Year-long demonstrations with farmers on increasing cropping intensity related to improved water management, also involving market actors, and by organising demand driven sessions and workshops

Cropping intensity - The number of crop harvest per unit land per year. The average cropping intensity (CI) is calculated as the total area of all crops per year divided by the area of cultivable land. In its CI calculations BGP treats fish ghers as another crop; the DAE method excludes fish ghers in its CI calculations. Hence the CI calculated by BGP is higher than as calculated by DAE.

Water Management Group - The basic organizational unit in Blue Gold representing local stakeholders from a hydrological or social unit (para/village). Through Blue Gold, 511 WMGs have been formed and registered. The average WMG covers an area of around 230 ha has 365 households or a population of just over 1,500.

An area enclosed by low embankments to store either freshwater or brackish water for the production of fish, shrimps or prawns.

A rice crop planted under irrigation during the dry season from December to March and harvested between April and June. Local boro varieties are more tolerant of cool temperatures and are usually planted in areas which are subject to early flooding. Improved varieties, less tolerant of cool conditions, are usually transplanted from February onwards. All varieties are insensitive to daylength.

The dry season (typically mid-October to mid-March) with low or minimal rainfall, high evapotranspiration rates, low temperatures and clear skies with bright sunshine. Crops grown are boro, pulses, sunflower, sesame and mungbean.

a rice crop usually planted in March/April under dryland conditions, but in areas liable to deep flooding. Also known as deepwater rice. Harvested from October to December. All varieties are highly sensitive to daylength.

a rice crop planted in March/April under dryland conditions. Matures during pre-monsoonal showers and is harvested in June/July. Insensitive to daylength.

High Yielding Variety - Introduced varieties developed through formal breeding programs. HYVs have a higher yield potential than local varieties but require correspondingly high inputs of fertiliser and irrigation to achieve high yields.

Local pulse crop

A livelihood is a way of making a living. It comprises capabilities, skills, assets (including material and social resources), and activities that households put together to produce food, meet basic needs, earn income, or establish a means of living in any other way.

Technical Assistance

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Variants

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Blue Gold Program Wiki

The wiki version of the Lessons Learnt Report of the Blue Gold program, documents the experiences of a technical assistance (TA) team working in a development project implemented by the Bangladesh Water Development Board (BWDB) and the Department of Agricultural Extension (DAE) over an eight+ year period from March 2013 to December 2021. The wiki lessons learnt report (LLR) is intended to complement the BWDB and DAE project completion reports (PCRs), with the aim of recording lessons learnt for use in the design and implementation of future interventions in the coastal zone.