

Requirement to demand: Promoting Organic Fertilizer in Bangladesh, exploring required Knowledge support for major stakeholders in relation to creating a viable business model for OF production and marketing at scale

Introduction: Bangladesh has increased its rice production, perceived as staple food tripled from 1970s. To achieve this challenge it has to pay lot where major in environmental effect on its limited natural resources like soil, water in one side and other sides are on lives both plants and animals. Ultimately a linear growth of development with sacrificing diversity and sustainability resultant to overall human and ecological disruption.

Since 1970s with rising of High Yield Varieties related inorganic input utilization has also not only increased with equal ration but superseded. In each year Bangladesh requires around 4 million tons chemical fertilizers mainly four categories e.g. Urea, Muriate of Potash (MP), Triple Super Phosphate (TSP) and Di-ammonium Phosphate (DAP). Following figure (Figure 3) shows increased trends of chemical fertilizer used in per hectare crops area.

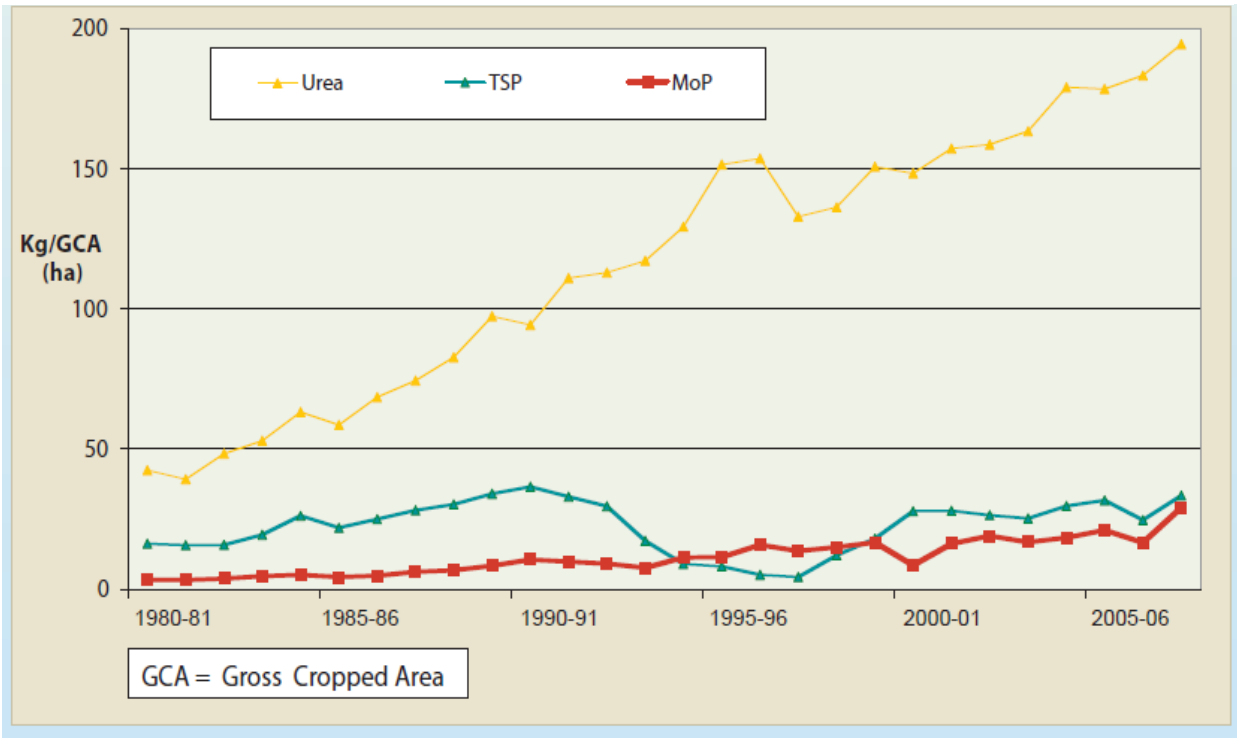
Research revealed that crops production has been declining from the rate when green revolution started and even it has fall in 8-10 % from 20% (FAO2004). Expert opined that country is now on the edge of its maximum fertility as land for irrigation reached its peak, crop intensity became double and at the same time soil fertility has been declining. A standard soil should have minimum 3.5% organic matters but most areas it is in between 1- 1.7% (4.14 mh) and in some areas (1.09 mc) it is less than 1% (SRDI, 2012). Therefore 5.23 mc in total land area is lower level of Organic matters from it minimum requirement (See Map 1).

Present situation of organic sources in soil

Before invasion of Green Revolution peasant of Bangladesh have had plenty of sources to provide organic matters for cultivable land. They had mainly two crops season Kharif and Rabi. During Rabi crop season they used to have leguminous group like different beans, dhoiancha and jute plants. A large part of land was inundated for long time by monsoon rainfall so that it had replenishment of having enough biomass like water hyacinth. Besides every households had a good number of cattle for traditional plowing so that huge cow dung produced in everyday and these were used for cultivation along with other household uses.

In changing situation agriculture in Bangladesh has shifted from natural dependency to input supply and irrigation dependency where a large part of alluvial land is now under irrigation scheme, paddy is major crop and tractor has been replaced in cattle to plow. So if we depend on existing epistemology then we have to say there are narrowed sources of scope to provide organic matter in to soil. Besides, these natural residual does not go directly totally in to soil rather a large amount are used for alternative source of fuel for cooking as abandoned land for trees and plants have also lost for cultivation and

Figure 1: Trends in per hectare use of different fertilisers in Bangladesh: 1980/81-2006/07 (Kg/Gross Cropped Hectare)



building houses for growing population.

However there is a huge requirement for organic matters for replenishment of organic deficiency yet it is a green field for investment. Currently the major source of organic matters are agriculture and kitchen residual, cow dung and poultry excreta, water hyacinth and from some private companies in limited scale commercial production. It has been identified that till 29 companies have got license from Department of Agriculture Extension, of Government of Bangladesh to produce and marketing organic fertilizer in Bangladesh. An estimated amount of both plant and non plant sources would be around 200 thousand Metric Tons.

Current Status of Organic Fertilizer

Source - Amount

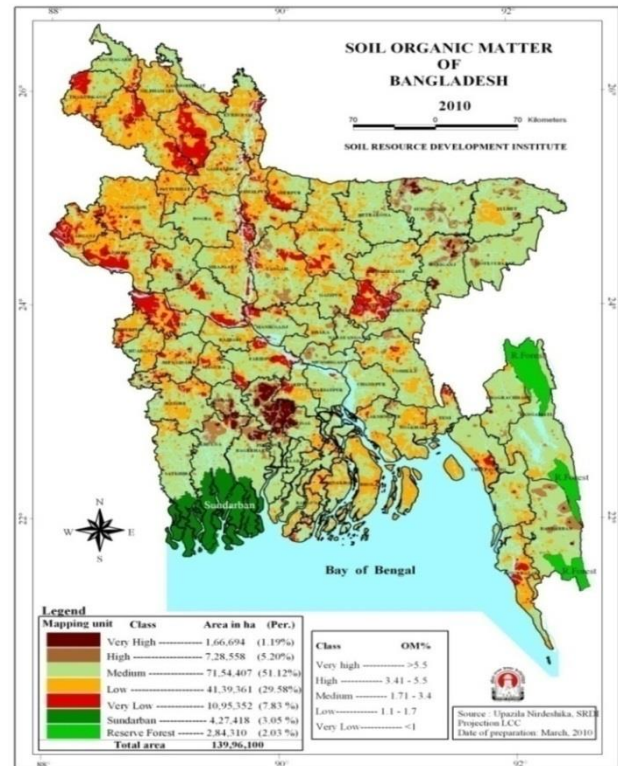
Farmers- 160,000 MT

Waste Concern -5,000 MT

5 other PVT companies-(2.5×5)=12500 MT

5 other small companies- (1.5 ×5)= 7500 MT

Rest of the companies - 10,000



Map: 1 Status of Organic Fertilizer in Soil
Very low (<1%) OF areas- 1.09 Million Hectare;
Low- (1-1.7%) 4.14 MH land in total

Present demand curve:

Farmers are well acquainted about organic fertilizer but its required amount for soil. . They used a Bengali term 'Joibo Sar'. They knew both plant and indigenous sources of such fertilizer. There was group discussion with a farmers club. It has been revealed that majority of them thought there would not need to use chemical fertilizer if they cultivate with organic fertilizer. Some of them opined that they would use Chemical fertilizer accompanied with organic matters. They explained how organic fertilizer helped in soil and plants

- Organic keeps soil soft and smooth
- It contains water so that plants get water easily and less irrigation is required for cultivation

However farmers were favorable for using organic fertilizer but they actually did not know their soil status and required organic matter of their respective soil. They never tested their soil. Couple of them mentioned that if there was used 10 kg chemical fertilizer then it would be accompanied with 15 kg organic matters. Another perception is the ratio of Inorganic and inorganic should be 5:1. Therefore if annual inorganic fertilizer is used 4.5 million MT then organic fertilizer is required around 1 million MT.

Is demand side static? In discussing with different stakeholders it has been revealed that the demand side has chance if there is shortage or inadequate supply of chemical fertilizer. All the stakeholders whom we consulted replied that (Producers, Dealers, Policy implementers and end users as farmers) in the year 2010 there were high demand of compost and organic fertilizers among the farmers and

dealers as there was price hike of chemical fertilizers in the global market so bulk amount of import were declined from government. So the then government also came forward to farmers with its all sources of field administration to make people aware about how to make compost manure at home. Along with homemade compost a limited number of organic fertilizer industries made a good profit with supplement to meeting the demand gaps of input market. That environment has also encouraged some new generation of investors to come in the green market! It is universally perceived that organic fertilizer has achieved extra value among the green producers in Bangladesh. A major market of organic fertilizer is vegetable producers. Green producers believed that "*organic fertilizer contribute to safe intrinsic taste of vegetables*". Producers of organic fertilizer reported that other crops where organic fertilizer has high demand are betel leaf, potato, flowers and aromatic fine rice.

Distribution Channel of Organic Fertilizer: Producers of this market could not achieve to penetrate the mainstream fertilizer distribution channel in Bangladesh. Mainstream fertilizer and pesticides dealers and retailers are predominantly sales chemical fertilizer and used get a lucrative profit and incentives with high demand side of chemical fertilizer. Those dealers and retailers are reluctant to sales organic fertilizer. They opined that farmers did not want to use organic fertilizer because they perceived it worked slowly in increased productivity and high prices compare to chemical fertilizer. Policy makers and field level policy implementers also made some allegations against of organic fertilizer producers. "They alleged grossly that in the name of organic fertilizers there had only soil in some products so farmers had frustrated after using it". As very lower level of demand from market intermediary like dealer and retailers therefore organic fertilizer producers showed own creativity to develop an alternative market of their production where they used get positive supports from some NGOs, nursery owners, small entrepreneurs, farmers club and extension agents of Department of Agriculture Extension (DAE).

During the effort of private and public sector favorable support and interest in investment in non cereal products like vegetable production has increased five times with country has positioned first place in increasing land under vegetables production and third in raised production globally. In the last year income has also raised 34% by exporting vegetables. Particularly this market are some Mediterranean countries like Soudi Arabia, katar, Oman where consumers are Bangladeshi and some south Asian migrants. Producers yet to entrance to super shops of European and North American market due to lack of adequate infrastructure, due diligence of those market and standardization of Organic certification. Globally organic farming market value has increased US\$ 25 billion in 2003. There are 90 developing countries including 15 classified as Least Developed Countries (LDCs) are being benefited from global organic market where as Bangladesh even yet could not attract its domestic market (The Daily prothom Alo, 14 November 2014; M. Nazimuddin and et.al, 2010, BARI).

Challenges for increasing demand and supply side of organic fertilizer :

Fertilizer market is predominantly high subsidized by the government where chemical fertilizer has gained a monopoly status. A data shows that government subsidy has rose more than 0.7% of its GDP.(

GDN, Briefing Paper No. 8,2012). From this unequal position it is too hard to raise the current ratio of production and market share by the small and medium entrepreneurs. Besides, there are also exist an ambiguity and wrong perception among the policy makers, hard to make profit by the dealers as almost lower level of demand from end users, high prices for high production cost, knowledge gaps among the end users and reluctant of extension agents to make people aware to reduce knowledge gaps for creating enabling environment among the end users. Though there are some favorable policies for practicing and production of organic fertilizer from both commercially and at home by farmers themselves but yet it has very lacked in implementation of those policies in the ground. In the existing National Agriculture Policy and New Agriculture Extension Policy (NAP 1999 and NAEP 1996) and other sectoral policies are very favourable for production and extensive use of organic fertilizer which is eco-friendly and sustainable for agriculture and development. See detail in the Table 01 (Table 03). Here are the major challenges of production and marketing of organic fertilizer in Bangladesh.

1. Implementing Policies: Lack of implementation of existing favorable policy and policies- Small town and big cities have a very lacked in sustainable management of human and kitchen waste but if any entrepreneurs become interested to invest in producing compost from city waste they do not share financially to that business venture. It has been revealed that production cost of organic fertilizer increased mainly for caring of waste from primary disposal source to plant and segregating of different wastes. Besides, if the major raw material is human faecal then production cost would be higher due to long duration of making cake from sludge and its lower amount of quantity as end product. Therefore policy should be revisited considering waste to organic fertilizer producers as urban service partners so a standard amount of cost sharing scheme should be provided directly to investors. This can be learnt from other developed countries where they have such best practices.
2. Policy for support not control: An investor has to pay long time and resources for setting own laboratory, obtaining standardization certificate, product testing from market and finally license from DAE, minimum two years and in some cases it takes more. Therefore if any financial institution willingness to invest they will lose their interest to foresee the hurdles of getting back their investment. Therefore policy may revisited to have an one stop services, relaxation of having compulsory lab facility with a farm so that a large investment for having a lab could reduce the primary investment burden
3. Strategic plan to increase organic matters in the lowest organic matters coverage areas: DAE should have a mid term strategic plan to increase organic level of soil with immediate priority to very low coverage areas. This can be done by purchasing organic fertilizer from native producers by giving them an annual target to supply their product along with chemical fertilizer. Similar distribution channel can be used for purchasing organic fertilizer at sources and government can sales it to dealers at subsidized price.
4. Raising Knowledge of end users: Increasing knowledge for all stakeholders are pivotal for increasing demand side of organic fertilizer in Bangladesh. It has been revealed that there are lacked of understanding the importance of soil formulation and necessity of using organic

fertilizer, understanding the technicalities as know how of this epistemology by the national policy makers and finally among end users why to use, how to use it and long term results of it.

A Knowledge communication matrix has been illustrated based on the recommendations provided by research participants of three streams e.g. Policy makers and implementers and end users. See in the Table 01 to Table 02

Table: 01 Knowledge Matrix for Policy Makers and its implementers

Sl.	Stakeholder	Knowledge Issue	Channel
	Policy maker and implementer	Deficiency of organic matters in soil, cause and consequences of it and way forward	A Video Clipping of high level authentic research findings in a simple diagrammatic presentation with human voices and real situation, A Policy briefing/ note, round table, workshop, dialogue, lobby meeting and subsequently with tactfully utilization of Text and Voice message, other social media like you tube, slide share etc.

Table: 02 Knowledge Matrix for dealers, retailers and end users

Sl.	Stakeholders	Knowledge issues	Recommended channel
	Fertilizer dealers, retailers, food consumers and direct users	<ol style="list-style-type: none"> 1. How organic fertilizer works in soil 2. Its outstanding effectiveness in increasing soil fertility with high productivity 3. Cost effectiveness with high valued crops production for native 	<p>One to one communication/ Direct Communication: Workshops with fertilizer dealers, Meeting with Farmers Club through extension agents, Popular theater, Pat song etc.</p> <p>Audio and Visual communication: Poster, Sticker, TVC through television channel and local</p>

		<p>and foreign consumers</p> <ol style="list-style-type: none"> 4. Organic fertilizer keeps intrinsic taste of crops 5. Save soil, Save farmers and ensure food security 6. It's a wrong that it works slowly rather it works differently which can not be complimentary of chemical fertilizer 7. Importance to soil fertility taste and use recommended dose of balanced fertilizer which can reduce cost, save soil and increase productivity with income(<i>Matai jachai Korey dibi 'sar', Kombey khoroch barbey fosoler shombar</i>) 	<p>level dish facility Community radio programs</p> <p>ICT and digital means:</p> <p>Call Centre, IVR and text message support in Bengali language during the Robi crops season ; Provide video and simplified version of text as knowledge contents at digital centre (Gyaner Hat/ Union Information and Service Centre) so that Extension Agents and some advance farmers can be benefited</p>
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Table: 03 Matrix of Organic Fertilizer Promoting Policies in Bangladesh

Sl.	Sectoral Policy	Major goal and policy thrusts	Implementing Agency/ Ministry
1	Fertilizer (Management) Act, 2006	Fixed up the physical and chemical standards of organic fertilizers (Appendix: 1), has increased the moisture content to maximum of 20%. In this notification the are also imposed some conditions for production and standardization	Department of Agriculture Extension
2	National Agriculture Policy 2013	1. Balanced fertilizer is encouraged with combating climate change effect and sustainable eco system 2. The Government will encourage the farmers to use of organic manure, compost and bio-fertilizers.	Ministry of Agriculture
3	National Agriculture Extension Policy	Measures will be taken to update agricultural extension, training and motivational work at the farmers' level so that the farmers can adopt suitable cropping patterns to maintain the natural balance of soil nutrients	Department of Agriculture Extension
4	"Fertilizer (Management) Regulation, 2007" under the Fertilizer (Management) Act 2006 by a Gazette Notification (SRO No. 92-law/2007) in May 2007.	1. Regulatory frameworks for commercial production, procurement, import, distribution, storage and marketing of organic and inorganic fertilizers and fertilizer materials as 2. Penalties and punishment for illegal activities and violation of the rules and regulations in import, distribution, storage, and	Field Services of , Department of Agriculture Extension

		marketing of fertilizers and fertilizer materials	
5	Refinancing Scheme for Renewable Energy and Green Financing under Corporate Social Responsibility Policy	In this policy under the GBCSRD circular No. 2 in July 2013 allocation has been increased for financing in green economy including production of organic fertilizer as outcome slurry of byproduct of biogas plant with highest 10% interest rate	Bangladesh Bank and other statutory banks and financial institutions
6	Sustainable and Renewable Energy Development Act 2012 and Energy Efficiency & Conservation Rules	Regulatory and coordination guidelines for stakeholders of production, conservation and others for efficient energy management with given authority to Sustainable and Renewable Energy Development Act	Ministry of Power, Energy and Mineral Resources
7	National 3 R strategy for Waste Management 2010	This strategy is for reduce , reuse and Recycle of Waste in the section of 5.2 and section 6 encourage waste cleaner production and eco design practices; it has entailed strategies for private and public financing in the 3R	Ministry of Environment and Forest
8	e-Krishi Vision 2015	Agriculture diversification with emphasizing on organic farming and exporting of non cereal crops	Access to Information, Prime Minister Office, GoB
9	National Land Use Policy	Minimizing loss of cropland, stopping, indiscriminate use of land, preparing guidelines for land use for different regions, rationalizing land acquisition, and synchronization of land use with natural environment.	Ministry of Land
10	Environment Policy 1992 and implementation program	Protection of environment, identification and control of pollution, sustainable use of natural resources	Ministry of Forest and Environment

11	National Adaptation Plan of Action, Climate Change Trust Fund and Climate Change Resilient Fund	Mainstreaming adaptation to climate change into policies and programmes in different sectors (focusing on disaster management, water, agriculture, health and industry).	Ministry of Environment and Forest
12	National Food Policy 2004 and Food Safety Act 2014	Ensuring dependable food security system, adequate and stable supply of safe and nutritious food at affordable prices, controlling and punishment of indiscriminate use of harmful chemical for paste and preservation	Ministry of Food
13	Agriculture and Rural development Section PRSP 2005 and current Perspective Plan of Bangladesh from 2010 to 2021	1. In the Strategies for Food Security, Agriculture and Rural Development Section highly recommended for motivate farmers for balanced dose of recommend fertilizer and Extensive use and production of Organic Fertilizer and proper utilization of soil guide and soil testing facility to enhance soil fertility 2. Diversification to high value non-cereal crops, (i.e. fruits & vegetable) development of non-crop enterprises (i.e. livestock, fishery, poultry)	Planning Commission, Ministry of Planning