

DETAILED AND FULL REPORT OF SWOT ANALYSIS – BANGALADESH

USAID Feed the Future Sustainable Intensification Innovation Lab Partnership Meetings with:

CIMMYT and partners, Dhaka, Bangladesh; 1 April, 2014

BARI, Dhaka, Bangladesh; 2 April, 2014

General Approach and Procedure

Introduction:

In Spring 2014, Feed the Future Program of USAID released a request for applications to establish an Innovation Lab for Sustainable Intensification (SIIL). In order to develop a successful proposal grounded in country-led and national priorities, Kansas State University (K-State) held three special events inviting potential partners to participate in an interactive meeting to assess Strengths, Weaknesses, Opportunities and Threats (SWOT) on various components of sustainable intensification (SI). The meetings were designed to seek input on identification of a geographical focus, existing knowledge, priorities, gaps, and the potential for partnerships. In addition, the K-State team was interested in identifying needs in geospatial and farming systems research, capacity building, gender, nutrition, appropriate scale mechanization and effective communication strategies for the local partners.

These participatory events produced volumes of useful information that serves as the foundation, focus, and rationale for the proposed SIIL. As indicated in the proposal, the selection of the of the geographical focus, countries, partners, and areas of inquiries were based on the country-defined priorities and with active engagement of the various stakeholders, value chain partners, government organizations, national agricultural research systems (NARS), international centers including Consultative Group on International Agricultural Research (CGIAR) centers, non-governmental agencies (NGOs) and private industry.

This report provides an overview of the facilitated sessions, the methodology, the SWOT analyses from each event, as well as participant documentation from the sessions. The report is organized by providing a summary table of the results from the combined SWOT analyses sessions that provide the evidence for the areas of inquiry that SIIL will concentrate, along with the individual results from each country. The results sections include the agenda from each event, the participant list, and the results from the meetings. Interestingly, despite the geographic difference of the regions the SI needs were very similar.

Methodology:

In order to seek input from a variety of participants in South Asia, meetings were held in two different locations. Two meetings were held in Dhaka, Bangladesh; one hosted by International Maize and Wheat Improvement Center (CIMMYT) – Bangladesh on 1st April, 2014, and the other hosted by Bangladesh Agricultural Research Institute (BARI) on 2nd April, 2014.

There 10 participants (1 female and 9 males) in the CIMMYT event, and 20 participants (1 female and 19 males) in the BARI event. Each agenda reflects the availability and needs from the host country, and therefore have slight variations in regard to time and sequence. The Tanzania event was scheduled for two days, the CIMMYT - Bangladesh event was ½ a day, and the BARI event was one full day. Each event covered similar topics as described above, and all three covered a SWOT analysis exercise. Participants were asked to brainstorm ideas and compile feedback on various aspects in regard to SI.

For clarification purposes, a SWOT analysis is a strategy commonly used in strategic program planning. It provides a simple framework for an entity to scan both the internal and external environment. The SWOT analysis provides information that is helpful in matching the entity's resources and capabilities to the environment in which it operates. It also acts as a filter to reduce the information generated through the exercise to a manageable number of key issues.

As the name implies, a SWOT analysis consists of four categories: strengths, weaknesses, opportunities, and threats. These categories can further be defined as either internal or external factors. Strengths and weaknesses are often internal to an entity. Opportunities and threats tend to be external factors, often beyond the control of the entity/organization, but that impact and/or influence operations. The following matrix presents the components of the SWOT analysis.

SWOT Matrix	Competitive Advantages	Institutional Challenges
Internal Factors	Strengths	Weaknesses
External Factors	Opportunities	Threats

A number of questions guide the SWOT analysis. Participants were asked to consider the following questions as they worked through the exercise:

Strengths:

- In regard to SI, what do we do well?
- What areas are vibrant and healthy, or distinctively positive?

Weaknesses:

- What do we do less well?
- What areas of “weakness” do we encounter?

Opportunities:

- What are the needs of the stakeholders, and what trends can we take advantage of?
- What is changing in the community or in society?

Threats:

- Are there new rules and regulations that place demands and limits on the stakeholders?
- What is changing in the community or country that will impact us?

During the SWOT exercise, each participant received sticky notes, three for each SWOT category. The participants were instructed to work individually and write down three strengths, weaknesses, opportunities, and threats on the sticky notes, representing each of the four SWOT quadrants. Once all the quadrants were complete, participants were asked to group like ideas and then label the “cluster.”

The participants reflected on the outcomes from their activities and agreed that the clusters were representative of the assets, opportunities, and challenges as it relates to sustainable intensification.

The facilitators at all three sessions reminded the participants that the purpose of the exercise was to generate ideas and feedback, not come to consensus on any particular item or issue. Rather, it was entirely conceivable that an issue could be identified in multiple categories (i.e., be both a strength and a weakness). As such, all ideas posted on the walls were documented and are included in the results section.

Bangladesh – CIMMYT and IRRI: Agenda

Feed the Future Sustainable Intensification Innovation Lab Jointly
Organized by Kansas State University (KSU) & CIMMYT Bangladesh
Venue: CIMMYT Dhaka Office Conference Room, Date: April 01, 2014

Program Outline

Objectives:

- Understand strength, weaknesses, and opportunities of sustainable intensification in Bangladesh.
- Discuss participation in the areas of geospatial consortium and appropriate scale mechanization

Time	Presentation/Topic	Facilitator/s
09:30	Welcome and an overview of CIMMYT's ongoing projects in Bangladesh	TP Tiwari (CIMMYT – Bangladesh)
09:40	Objectives of the meeting	Gary Pierzynski/Vara Prasad (Kansas State University)
09:50	CIMMYT focus on mechanization based conservation agriculture in relation to systems intensification in Bangladesh	Tim Krupnik (CIMMYT – Bangladesh)
10:10	Rice-Maize systems in Bangladesh and Nutrient Management Tool for Maize	Mahesh K Gathala (CIMMYT – Bangladesh)
10:40	IRRI's ongoing projects in relation to sustainable intensification in Bangladesh and IRRI experiences on remote sensing, geospatial analysis and farming systems modeling	IRRI Scientist/s (IRRI Bangladesh)
11:10	<i>Discussion/Coffee Break</i>	
11:30	Group discussion on strength, weaknesses, opportunities, and threats (SWOT) for working on sustainable intensification / use of geospatial tools / appropriate scale mechanization in Bangladesh.	Jan Middendorf (Kansas State University)
14:00	<i>Future plan and closing remarks</i>	KSU Team (Kansas State University)
14:15	<i>Lunch Break</i>	
15:00	<i>Informal discussions with other parties</i>	All

Bangladesh – CIMMYT and IRRI: List of Participants

**Feed the Future Sustainable Intensification Innovation Lab Jointly
Organized by Kansas State University (KSU) & CIMMYT Bangladesh
Venue: CIMMYT Dhaka Office Conference Room, Date: April 01, 2014**

FULL NAME	NAME OF INSTITUTION	JOB TITLE	PROFESSION
Dr. Makhan L Dutta	World Vision International - Asia Pacific Region	Regional Manager	Livestock Initiative for Transformation Project at Asia Pacific Region
Dr. Remedios (Ting) Gorgonio	World Vision International - Asia Pacific Region	Grants Development and Compliance Coordinator	Grants Development and Compliance Coordinator
Dr. Timothy Russell	Bangladesh Cereal Systems Initiative for South Asia (CSISA-BD)	Chief of Party - IRRI	Agriculture and natural resource project management, tropical agriculture
Dr. Timothy J Krupnik	International Maize and Wheat Improvement Center (CIMMYT) - Bangladesh	Cropping Systems Agronomist	Global Conservation Agriculture Program
Dr. Zia Ahmed	CIMMYT - Bangladesh	GIS & Remote Sensing Scientist (CSISA-MI)	GIS & Remote Sensing Scientist
Dr. Frederick John Rossi	CIMMYT - Bangladesh	Agricultural Economist	Agricultural Economist
Dr. Khondoker Mottaleb	CIMMYT - Bangladesh	Applied Socio-economist	Farm and nonfarm economics – Agricultural economics
Dr. Thakur Prasad Tiwari	CIMMYT - Bangladesh	Country Representative	Cropping Systems Agronomist
Dr. Mahesh Kumar Gathala	CIMMYT - Bangladesh	Cropping Systems Agronomist	Scientist
Prof. Vara Prasad Pagadala	Kansas State University (KSU)	Professor of Crop Physiology	Professor
Prof. Gary M. Pierzynski	Kansas State University (KSU)	Professor of Soil and Environmental	Professor and Department head
Dr. B. Jan Middendorf	KSU - Office of Educational Innovation and Evaluation (KSU-OEIE)	Director	Director of Evaluation Center

Bangladesh – Bangladesh Agricultural Research Institute (BARI): Agenda

**Feed the Future Sustainable Intensification Innovation Lab
Partnership Meeting with Kansas State University and
Bangladesh Agriculture Research Institute (BARI)
Dhaka, Bangladesh on 2, April, 2014**

Program Outline

9:30 – 9:40am	Welcome remarks
9:40 – 9:50am	Introduction of participants
9:50 – 10:00am	Program Overview and Plan of Action (Dr. Gary Pierzynski and Dr. Jan Middendorf, Kansas State University) <ul style="list-style-type: none"> a) Why are we here? b) What are you being asked to do? c) What will be the results from our time together?
10:00 – 10:15am	Overview of Sustainable Intensification Innovation Lab (Dr. P.V. Vara Prasad and Dr. Gary Pierzynski, Kansas State University)
10:15 – 11:00am	Discussion of Sustainable Intensification <ul style="list-style-type: none"> a) What does sustainable intensification mean to you and your organization?
11:00 – 11:30am	Coffee/Tea break
11:30 – 1:00pm	Sustainable Intensification SWOT Analysis (Moderated by Dr. Jan Middendorf) <ul style="list-style-type: none"> a) Identify <u>strengths</u> and <u>weaknesses</u> for sustainable intensification b) Identify <u>opportunities</u> and <u>barriers</u> for sustainable intensification
1:00 – 2:00pm	Lunch
2:00 – 3:00 pm	Further Analysis based on the Sustainable Intensification SWOT <ul style="list-style-type: none"> a) Strategies to address Gender b) Strategies to address Nutrition c) Adaption strategies to address Farming Systems d) Capacity Building
2:00 – 3:00pm	Mapping our way forward <ul style="list-style-type: none"> a) Identify geological areas where work is taking place b) Identify greatest need and impacts c) Identify adoption of technology practices: <ul style="list-style-type: none"> i. Which practices have been successful, where and why? ii. Which practices have been failures, where and why?
3:00 – 4:15pm	Brainstorming additional concepts: <ul style="list-style-type: none"> a) Communication Strategies b) Geospatial Expertise and Needs c) Appropriate Scale Mechanization
4:15 - 4:30pm	Closing Remarks and Adjourn

Bangladesh – Bangladesh Agricultural Research Institute (BARI): List of Participants

Feed the Future Sustainable Intensification Innovation Lab Partnership with Kansas State University and
Bangladesh Agricultural Research Institute (BARI),
 Dhaka, Bangladesh, 2nd April, 2014

FULL NAME	NAME OF INSTITUTION	JOB TITLE	PROFESSION
M. K. Sultan, Ph.D.	Bangladesh Agricultural Research Institute (BARI)	Director - Research	Director
Md. Rafiqul Islam Mondal	BARI	Director - General	Director
Md. Muklesur Rahman	BARI	Director - Training	Director
G.M. Halim, Ph.D.	BARI - Horticultural Research Centre (HRC)	Chief Scientific Officer (CSO)	Vegetable Breeding
Ferdousi Islam (Ivy), PhD	BARI - Horticultural Research Centre (HRC)	Principle Scientific Officer (PSO)	Vegetable Production
Md. Saifullah, Ph.D.	BARI - Horticultural Research Centre (HRC)	Senior Scientific Officer (SSO)	Vegetable Breeding
Md. Shahadath Hossain	BARI - Horticultural Research Centre (HRC)	Senior Scientific Officer (SSO)	Oilseed Crops
Md. Manjurul Kadir, Ph.D.	BARI – RARS and PRC - Jamalpur	Principle Scientific Officer (PSO)	Oilseed Crops
Md. Mobarak Ali	BARI – RARS and PRC	Scientific Officer	Oilseed Crops
Md. Delowar Choudhury	BARI – On-Farm Research Division	Principle Scientific Officer (PSO)	Agronomy
Faruque Ahmed	BARI	Scientific Officer	Crop Modeling
Md. Golam Mahboob	BARI – Agricultural Statistics and ICT (ASICT)	Scientific Officer	GIS & Remote Sensing Lab.
Md. Shahiduzzaman	BARI	Scientific Officer	Soil Science
Narayan Chandra Basak	BARI	Scientific Officer	Farming Systems
Md. Alamgir Hossain	BARI – Agricultural Economics Division	Principle Scientific Officer (PSO)	Market Economics
Md. Kamrul Hasan	BARI	Scientific Officer	Socio-Economics
Md. Ersadul Hoque	BARI	Scientific Officer	Agric - Engineering
Md. Atiqur Rahman, Ph.D.	BARI - Horticultural Research Centre (HRC)	Senior Scientific Officer (SSO)	Post-harvest Technology
Md. Ashraf Uddin Ahmed	BARI – Plant Pathology Division	Senior Scientific Officer (SSO)	Plant Pathology
Md. Sahadat Hossain	BARI - RARS and Pulse Research Centre (PRC), Hill ARS, Khagrachari	Senior Officer (SO)	Entomology

Bangladesh – CIMMYT and IRRI: Report

DETAILED AND FULL REPORT OF SWOT ANALYSIS – CIMMYT and IRRI

I. Discussion of Sustainable Intensification

b) What does sustainable intensification mean to you and your organization?

- To me it means devising a technology or a system that will ensure that natural resources are respected, maximized for production with less disturbance on natural processes in soil, water and other natural endowments. / There is a great need to achieve food security amongst the population and therefore this is about making use of the natural resources that we have, to satisfy this need; greater diversity of food production is necessary.
- Sustainable refers to continuation increasingly; Intensification refers to expanding strong in all directions.
- Sustainable intensification meaning to me is that if it is related to a technology then the way it should be intensified should sustain among the stakeholders as for the objective of the technology intensification for their benefits by the technology.
- New tools and technological interventions which create opportunities for improving farm productivity, livelihoods and profitability without affecting natural resources through innovation platforms.
- System-viable for longer term, benefits to farmers and not more damages to the environment. / System which is environmentally friendly, economically viable benefits to farmers. / Stakeholders for longer term.
- Intensification of cropping system in order to improve the overall livelihoods of farmers which will be sustainable in the long run.
 - It means: more crop + more income = more profit
 - With... less valuable/scarc input, e.g., preserving soil nutrient crop residual, management and conservation tillage
 - less cons, less resources

II. Sustainable Intensification SWOT Analysis:

c) Identify Strengths, Weaknesses, Opportunities, and Threats for impact across the field, farm, household, community, landscape, and/or regional scales.

Strengths:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Additional income from one more high value added crop: direct impact on the likelihood of the farm holds. This will encourage people to adopt this technology. RAPID ADOPTION. • Available information knowledge • BARI Ag Extension System • BD has long years of farming system research • Cheap labor, women labor • Collaboration between NGO and Interest • Congenial weather land condition • County nutrition policy | <ul style="list-style-type: none"> • Diversification of cropping pattern • Diversity of natural resources • Farming land size is increasing - farmers are more interested in agricultural • FS & Nutrition: Maize cultivation for poultry and fish feed → greater protein in diets • High value crops • Homestead cultivation is common (veg, fruits, pond fish, etc.) that contributes to family nutrition (North and Southern region) • Huge manpower (cheap labor) to utilize; manpower |
|--|---|

- Innovative ideas
- NGO
- Partnership
- Poor farmers opportunities
- Population
- Rapid adoption
- Small scale mechanization
- Social innovation: key strength is the social innovation potential and initiative of most

Weaknesses:

- Climate related risks might generate threat to adoption or technology
- Ideas and execution differences
- Information not consolidated to be used by others meaningfully
- Infrastructure
- Lack of a strong overall body to coordinate research and rural development efforts. Poor communication across donors, projects, etc.
- Lack of easy access to the high tech or improved farming technology to the farmers
- Lack of literacy
- Lack of monitoring and evaluation
- Land fragmentation → very small and scattered plot sizes and scattered → low/no economics of scale

farmers. Adoption is usually rather quick where the advantages of an intervention can be shown. This makes much of Bangladesh “ripe” for creative durable change in crops and crop management, though it is made complex and difficult at a farming systems level

- Technology available
- Wealthy people would like to invest
- Weather
- Less effective farming technology dissemination to poor Low salaries
- Many NGOs and manpower
- Partnership can be risky if not handled carefully
- Poor ag marketing
- Poor and illiterate farmers
- Poor infrastructure
- Poor policy
- Research documents prepared in languages other than Bangla
- Sharing of FSR findings with common people is limited
- Slow tech transfer process
- Small farming holding
- Women involvement in FSR is limited

Opportunities:

- “Value chains” ag products
- Collaboration between research institutes and community groups
- Diversification and intensification
- Diversification of crops
- Farmers are innovative and adopt technology easily
- Farmers are ready to adopt profitable technology/good practice/suggestion
- Farmers are very innovative to new ideas if it is profitable
- FS & Nutrition: Intercropping vegetables with maize
- Hard working farm community
- Huge potential for rapid adoption and uptake of management approaches/techs;

Bangladesh is a classic Boserupian test case for intensification

- Induced innovation is already there; scarcity or resources.
- Information review and consolidation
- Introduction of climate resilient varieties/breads/species
- Mechanization for multiple use
- More strategic and aligned deployment of R&D processes
- More support to technology adoption by famers
- System research
- Testing nutrition gardening models available with BARI
- Year-round crop production and intervention of nutritional crop; sp. veg.

Threats:

- Adverse government involvement in ag sector (e.g., BADC); lack of policy reform
- Biotic and abiotic stresses
- Considerable climate uncertainty
- Cultural and religious bindings limiting women participation
- Depleting natural resources base-like ground water
- Donors accepting their purpose - expectations
- Environment stress like- saline, drought and sometimes water log
- Increasing migration

- Insufficient support to fundamental/adaptive research
- Insufficient support towards innovative efforts
- Lack of cold storage
- Lack of market and variability
- Land are splitting day by day; cultivated land decreasing
- Land fragmentation
- Localized crisis of over production
- Low investment capacity of famers
- Natural calamities
- Natural calamities frequency

- Natural hazards
- Policies not supportive to adoption (budgets, plans)
- Post-harvest losses
- Rapid urbanization and decreasing agricultural land
- Social constraints
- Unpredictable weather events

III. Clusters/Concepts* Categorized by Participants: *Clusters are organized in alphabetical order and the following letters indicate: (S) Strength, (W) Weakness, (O) Opportunity, (T) Threat/Barrier.

BIOTIC STRESSES

- Crops and animal diseases (T)
- Disease Outbreak, i.e., Rift Valley fever/ Corn lethal necrosis (T)
- Diseases, e.g. Malaria to human resources (T)
- Outbreak of diseases and pests (T)
- Outbreak of insect pests and diseases in crops (T)
- Population growth vs. environment and food (coping and capacities) (T)
- Terminal diseases such as HIV/AIDS and T.B. (T)
- Trans-boundary crop and livestock diseases (T)

COLLABORATION AND PARTNERSHIPS

- Collaboration between NGO and Interest (S)
- Collaboration between research institutes and community groups (O)
- Donors accepting their purpose - expectations (T)
- Lack of a strong overall body to coordinate research and rural development efforts. Poor communication across donors, projects, etc. (W)
- More strategic and aligned deployment of R&D processes (O)
- NGO (S)
- Partnership (S)
- Partnership can be risky if not handled carefully (W)

DIVERSIFICATION

- Diversification and intensification (O)
- Diversification of cropping pattern (S)
- Diversification of crops (O)
- Diversity of natural resources (S)
- FS & Nutrition: Intercropping vegetables with maize (O)
- Homestead cultivation is common (veg, fruits, pond fish, etc.) that contributes to family nutrition (North and Southern region) (S)
- System research (O)
- Year-round crop production and intervention of nutritional crop, sp. veg. (O)

ENVIRONMENTAL

- Biotic and abiotic stresses (T)
- Climate related risks might generate threat to adoption or technology (W)
- Congenial weather land condition (S)
- Considerable climate uncertainty (T)

- Depleting natural resources base-like ground water (T)
- Environment stress like- saline, drought and sometimes water log (T)
- Introduction of climate resilient varieties/breads/species (O)
- Natural calamities (T)
- Natural calamities frequency (T)
- Natural hazards (T)
- Unpredictable weather events (T)
- Weather (S)

FARM SIZE

- Farming land size is increasing - farmers are more interested in agricultural (S)
- Land are splitting day by day; cultivated land decreasing (T)
- Land fragmentation → very small and scattered plot sizes and scattered → low/no economics of scale (W)
- Land fragmentation (T)
- Localized crisis of over production (T)
- Small farming holding (W)

INVESTMENT - LOCAL

- Induced innovation is already there; scarcity or resources. (O)
- Wealthy people would like to invest (S)

LABOR MARKET

- Cheap labor, women labor (S)
- Hard working farm community (O)
- Many NGOs and manpower (W)
- Population (S)

MARKET ACCESS

- Farmers are ready to adopt profitable technology/good practice/suggestion (O)
- FS & Nutrition: Maize cultivation for poultry and fish feed → greater protein in diets (S)
- High value crops (S)
- Huge manpower (cheap labor) to utilize; manpower (S)
- “Value chains” ag products (O)

MECHANIZATION

- Infrastructure (W)
- Lack of cold storage (T)
- Lack of easy access to the high tech or improved farming technology to the farmers (W)
- Lack of market and variability (T)
- Less effective farming technology dissemination to poor (W)
- Low investment capacity of famers (T)
- Mechanization for multiple use (O)
- Poor ag marketing (W)
- Poor infrastructure (W)
- Post-harvest losses (T)
- Slow tech transfer process (W)
- Small scale mechanization (S)

POLICY

- Adverse government involvement in ag sector (e.g., BADC); lack of policy reform (T)
- County nutrition policy (S)
- Insufficient support to fundamental/adaptive research (T)
- Insufficient support towards innovative efforts (T)
- Low salaries (W)
- More support to technology adoption by famers (O)
- Policies not supportive to adoption (budgets, plans) (T)
- Poor policy (W)
- Research documents prepared in languages other than Bangla (W)
- Sharing of FSR findings with common people is limited (W)

RESEARCH

- Available information knowledge (S)
- BARI Ag Extension System (S)
- BD has long years of farming system research (S)
- Information not consolidated to be used by others meaningfully (W)
- Information review and consolidation (O)
- Lack of monitoring and evaluation (W)
- Technology available (S)
- Testing nutrition gardening models available with BARI (O)

SOCIAL CULTURAL

- Additional income from one more high value added crop: direct impact on the likelihood of the farm holds. This will encourage people to adopt this technology. RAPID ADOPTION. (S)
- Cultural and religious bindings limiting women participation (T)
- Farmers are innovative and adopt technology easily (O)
- Farmers are very innovative to new ideas if it is profitable (O)
- Huge potential for rapid adoption and uptake of management approaches/techs; Bangladesh is a classic Boserupian test case for intensification (O)
- Ideas and execution differences (W)
- Increasing migration (T)
- Innovative ideas (S)
- Lack of literacy (W)
- Poor and illiterate farmers (W)
- Poor farmers opportunities (S)
- Rapid adoption (S)
- Rapid urbanization and decreasing agricultural land (T)
- Social constraints (T)
- Social innovation: key strength is the social innovation potential and initiative of most farmers. Adoption is usually rather quick where the advantages of an intervention can be shown. This makes much of Bangladesh “ripe” for creative durable change in crops and crop management, though it is made complex and difficult at a farming systems level (S)
- Women involvement in FSR is limited (W)

Bangladesh – BARI (Bangladesh Agricultural Research Institute)

DETAILED AND FULL REPORT OF SWOT ANALYSIS - BARI

**Feed the Future Sustainable Intensification Innovation Lab
Partnership Meeting with Kansas State University & Bangladesh Agriculture Research Institute (BARI)
Dhaka, Bangladesh; 2 April, 2014**

I. Defining Sustainable Intensification

c) What does sustainable intensification mean to you and your organization?

Group 1.

For Homestead Production System:

- Ensure quality seed & source of seed
- Improved production technology
- Emphasis on organic farming
- All micro production unit should be used
- Utilization of whole family labor

Intensification:

- Fulfilling and food demand
- Follow BARI develop year found vegetables model
- Update nutrition uptake system
- Upgrade social condition
- Develop social relationship
- Post harvest processing
 - cooking
- Nutrition

Group 2.

Sustainable Intensification:

- Intensive use of resources for long term optimum economic benefit

Consideration:

- i. Technology
- ii. Local experiences
- iii. Ecology
- iv. Natural process and resources
- v. Judicial choice
- vi. Social value
- vii. Judicial management

Group 3.

Sustainability:

- Higher productivity
- Higher profitability/ income
- Market demand
- Social acceptability
- Environmental friendly
- Favorable government policy

Intensification:

- Increase productivity per unit area and time
- Ensuring food & nutritional security
- Ensuring the maximum utilization of resources
- Ensuring income generation and improve livelihood
- Gender equity

Group 4.

1. Continuous use of a suitable technology to get maximum benefit without disturbing the environment for the improvement of livelihood of end users.
2. Stabilizing the output of a developed technology ensuring the friendly use of environment for the betterment of human kinds.

Group 5.

- Sustainable intensification means to increase production, nutrition, women participation leading to income generation using modern technologies and natural resources.

II. Sustainable Intensification SWOT Analysis:

d) Identify Strengths, Weaknesses, Opportunities, and Threats for impact across the field, farm, household, community, landscape, and/or regional scales.

Strengths:

- | | |
|--|---|
| • Adapted technology | • High young > 30 population |
| • Agriculture/research organization | • Huge number of hard-working manpower |
| • Appropriate technology | • Human resource |
| • Available a good number of technologies | • ICT sector is booming |
| • Crop grown around the year | • Improvement of farmer's system |
| • Develop technologies to cope with climate change | • Increase of farmer's knowledge |
| • Domestic market | • Indigenous knowledge |
| • Expertise of BARI with diversified discipline | • Large number of cheap labors |
| • Farmers training on pest and diseases | • Large research network with skilled manpower |
| • Favorable cropping season | • Local machinery |
| • Favorable environment | • Manpower |
| • Favorable government policy for the farmers | • Organic farming |
| • Favorable weather | • Policy |
| • Genetic resources | • Safe food |
| • Good agriculture extension network | • Suitable land for crop production |
| • Good land resources | • Trained manpower |
| • Good number of BARI technologies | • Use of modern agriculture engineering tools or implements |
| • Good seed | • Value chain |
| • Good soil | • Women participation on GAP (Good Ag Practices) |
| • Good working environment | • Women rights |
| • Hard working farmer | |
| • Hard working farmers | |

Weaknesses:

- Communication
- Continuous degradation of soil fertility
- Degradation of natural resources
- Good quality machinery
- Huge postharvest loss due to improper management
- Illiteracy
- Lack of appropriate technologies
- Lack of awareness
- Lack of extension workers
- Lack of good seed
- Lack of knowledge about value addition
- Lack of knowledge on post-harvest processing
- Lack of motivation program
- Lack of organic matter in soil
- Lack of quality seed
- Lack of quality seed supply
- Lack of recognition/compensation for scientists
- Lack of resources
- Lack of trained scientists in simulation modeling
- Lack proper marketing system
- Land degradation
- Less storage facility
- Market price
- Middle man between farmers and city market
- Natural calamities
- Natural calamity due to climate change
- No crop insurance for the grower
- No ensured market for the products
- Poor and illiterate farmers
- Poor purchasing capacity of farmers
- Seasonal fluctuation
- Small/marginal farm size
- Water scarcity
- Weak linkage between Research-Extension-Farmers
- Weak marketing facility

Opportunities:

- Cheap labor and adaptable farmers
- Collaborative research work with other countries
- Develop capacity (lab) in RS-GIS and simulation modeling
- Development of management packages
- Domestic market channel
- Fertile land
- For more maize production, poultry farming
- Good technologies
- Higher education/training may be given in partnership with local university/institutes
- Increase research facilities
- Indigenous knowledge

- KSU/USAID may provide/sponsor training in simulation modeling
- More demonstration and training on appropriate technologies
- Natural resources
- New technology
- Population (more people, more work)
- Populations
- Postharvest loss can be minimized by practicing proper management
- Proper utilization of existing manpower in Research and Extension Department
- Provide training to the farmers
- Relationship between scientists and extension personnel
- Skill scientist contribute lot
- Skilled manpower of research institute
- Social work
- Storage facilities of fresh produces
- Strengthen the dissemination of improved technology to farmers
- Technology exchange
- Technology to address climate change
- Use of BARI developed technology
- Use of rural youth for dissemination
- Utilization of natural resources of hilly areas
- Utilization of saline area
- Utilization of underutilized area
- Women participation in homestead production

Threats:

- Biotic and abiotic factors
- Climate change
- Climate change
- Climate change
- Corruption
- Credit piracy (recognition)
- Government policy
- Ground water table is going lower down
- Illiteracy of farmers
- Illiterate farmers
- Instability of price
- Lack of foreign assistance
- Lack of improved technologies
- Lack of linkage of research and extension
- Lack of sufficient funds
- Natural calamities
- Natural calamities
- Natural calamities
- Need good governance
- No appropriate government policies and political unrest
- No sufficient fund for research and extension
- Political affair
- Political instability
- Political unrest

- Poor farmers
- Poor marketing systems
- Poor transportation system
- Religious barrier
- Social barrier for women
- Social barriers
- Social inertia for change
- Soil fertility depletion
- Unpredictable weather
- Unpredictable weather/climate
- Unstable political condition
- Water scarcity

III. Clusters/Concepts* Categorized by Participants:

*Clusters are organized in alphabetical order and the following letters indicate: (S) Strength, (W) Weakness, (O) Opportunity, (T) Threat/Barrier.

CAPACITY BUILDING:

- Collaborative research work with other countries (O)
- Develop capacity (lab) in RS-GIS and simulation modeling (O)
- Higher education/training may be given in partnership with local university/institutes (O)
- Increase research facilities (O)
- KSU/USAID may provide/sponsor training in simulation modeling (O)
- Lack of trained scientists in simulation modeling (W)
- Provide training to the farmers (O)
- Skill scientist contribute lot (O)
- Skilled manpower of research institute (O)
- Trained manpower (S)

FUNDING:

- Lack of foreign assistance (T)
- Lack of sufficient funds (T)
- No sufficient fund for research and extension (T)

GOVERNMENT POLICY:

- Corruption (T)
- Credit piracy (recognition) (T)
- Favorable government policy for the farmers (S)
- Good agriculture extension network (S)
- Government policy (T)
- Lack of linkage of research and extension (T)
- Lack of recognition/compensation for scientists (W)
- Large research network with skilled manpower (S)
- Need good governance (T)
- No appropriate government policies and political unrest (T)
- No crop insurance for the grower (W)
- Policy (S)
- Political affair (T)
- Political instability (T)
- Political unrest (T)
- Relationship between scientists and extension personnel (O)
- Unstable political condition (T)

HUMAN RESOURCES:

- Agriculture/research organization (S)
- Cheap labor and adaptable farmers (O)
- Expertise of BARI with diversified discipline (S)

- Hard working farmer (S)
- Hard working farmers (S)
- High young > 30 population (S)
- Huge number of hard-working manpower - Atiq (S)
- Human resource (S)
- Indigenous knowledge (O)
- Indigenous knowledge (S)
- Lack of extension workers (W)
- Lack of resources (W)
- Large number of cheap labors (S)
- Manpower (S)

KNOWLEDGE AND EDUCATION:

- Appropriate technology (S)
- Illiteracy (W)
- Illiteracy of farmers (T)
- Illiterate farmers (T)
- Increase of farmer's knowledge (S)
- Lack of appropriate technologies (W)
- Lack of awareness (W)
- Lack of knowledge about value addition (W)

MARKETING:

- Communication (W)
- Domestic market (S)
- Domestic market channel (O)
- Instability of price (T)
- Lack proper marketing system (W)
- Market price (W)

NATURAL CALAMITIES:

- Biotic and abiotic factors (T)
- Climate change (T)
- Climate change (T)
- Climate change (T)
- Natural calamities (T)
- Natural calamities (T)

NATURAL RESOURCES:

- Continuous degradation of soil fertility (W)
- Crop grown around the year (S)
- Degradation of natural resources (W)
- Favorable cropping season (S)
- Favorable environment (S)
- Favorable weather (S)
- Fertile land (O)

- Population (more people, more work) (O)
- Populations (O)
- Proper utilization of existing manpower in Research and Extension Department (O)
- Social barrier for women (T)
- Social work (O)
- Use of rural youth for dissemination (O)
- Women participation in homestead production (O)
- Women participation on GAP (Good Ag Practices) (S)
- Women rights (S)

- Lack of knowledge on post-harvest processing (W)
- Lack of motivation program (W)
- Poor and illiterate farmers (W)
- Poor farmers (T)
- Poor purchasing capacity of farmers (W)
- Weak linkage between Research-Extension-Farmers (W)

- Middle man between farmers and city market (W)
- No ensured market for the products (W)
- Poor marketing systems (T)
- Poor transportation system (T)
- Value chain (S)
- Weak marketing facility (W)

- Natural calamities (T)
- Natural calamities (W)
- Natural calamity due to climate change (W)
- Seasonal fluctuation (W)
- Unpredictable weather (T)
- Unpredictable weather/climate (T)

- For more maize production, poultry farming (O)
- Genetic resources (S)
- Good land resources (S)
- Good seed (S)
- Good soil (S)
- Ground water table is going lower down (T)

- Lack of good seed (W)
- Lack of improved technologies (T)
- Lack of organic matter in soil (W)
- Lack of quality seed (W)
- Lack of quality seed supply (W)
- Land degradation (W)

SOCIAL ISSUES:

- Good working environment (S)
- Religious barrier (T)
- Social barriers (T)
- Social inertia for change (T)

TECHNOLOGY:

- Adapted technology (S)
- Available a good number of technologies (S)
- Develop technologies to cope with climate change (S)
- Development of management packages (O)
- Farmers training on pest and diseases (S)
- Good number of BARI technologies (S)
- Good quality machinery (W)
- Good technologies (O)
- ICT sector is booming (S)
- Improvement of farmer's system (S)
- Local machinery (S)
- More demonstration and training on appropriate technologies (O)
- New technology (O)
- Safe food (S)
- Strengthen the dissemination of improved technology to farmers (O)
- Suitable land for crop production (S)
- Technology exchange (O)
- Technology to address climate change (O)
- Use of BARI developed technology (O)
- Use of modern agriculture engineering tools or implements (S)
- Utilization of natural resources of hilly areas (O)
- Utilization of saline area (O)
- Utilization of underutilized area (O)

- Natural resources (O)
- Organic farming (S)
- Small/marginal farm size (W)
- Soil fertility depletion (T)
- Water scarcity (T)
- Water scarcity (W)

STORAGE AND POST-HARVEST:

- Huge postharvest loss due to improper management (W)
- Less storage facility (W)
- Postharvest loss can be minimized by practicing proper management (O)
- Storage facilities of fresh produces (O)

Sustainable Intensification (brainstorming)

- Benefit stakeholders (technology)
- Continuation of increasing... in all direction
- Respecting natural resources while maximizing production
- Technology adoption (large scale), considering economic and environment
- ↑ productivity of farming system; environmental friendly, intensified special area
- Purposeful manipulation of ecological processes
- ↑ land productivity
 - Economical viable, e.g. intercropping, input use efficiency ...
- Improvement livelihoods, maximize profits using less input
- Environmentally friendly, economically viable and benefits farmers
- Tools and technologies which create opportunities for farm productivity and profitability
- Holistic approach – systems approach (Environment: natural resources...)

IV. Further Analysis based on the Sustainable Intensification SWOT: Strategies to address Gender; Strategies to address Nutrition, Adaption strategies to address Farming Systems, and Capacity Building

Effective Strategies to address “Gender”

- Gender participation in developed technology
- Human resources development
- Adaptation of new technologies (climate change)
- Gender participation in post-harvest management (seeds & food processing)
- Women participation in nutrition update
- Women empowered through IGA (Income Generated Activities)
- Develop women farmers club
- Women participate in a CIG (Common Interest Group)
- Development of gender (women) friendly technologies, e.g. poultry, ducks, milk, home gardening, post harvest, composting, banana slicing, onion slicing
- Equal opportunities and wages
- Participation of women in home gardening
- Recognition of women in development works
- Involvement of women in post harvest activities
- Women involvement in small scale entrepreneurship development
- Favorable working environment for women
- Women education should be increased

Effective Strategies to address “Nutrition”

- Homestead gardening
- Cultivation of fruits and vegetables in hilly areas
- Utilization of fallow lands with fruit and vegetables
- Change of food habit
- Inclusion of pulses/oil crops in CP
- Fortification of crops; e.g., gold rice, tomatoes

- Use mass media for nutrition campaign
- Cultivation of high protein containing crops, e.g., OPM, groundnut
- Vitamin and mineral rich vegetable and fruit cultivation all over the country
- Awareness building training on nutrition
- Nutrition update through post harvest processing and handling
- Nutrition enrich through pulses
- Development of food package with balanced nutrition for school children

Adaption strategies to address Farming Systems:

- Site specific nutrient management
- Crop and zoning
- Agroforestry
- Livestock/Poultry/Fisheries
- Introduction of legumes crops in the C.P.
- Multiple cropping with short duration vegetables and field crops
- Fodder crop for livestock
- Development of location specific intensive cropping pattern
- Pattern based resource, conserving management practices (crop specific input recommended and use of residual fertilizer)
- Validation and adoption of developed technologies
- Development and promotion of appropriate farm machinery
- Develop integrated farming system approaches for livelihood (Agriculture, fish, and livestock)
- Establish agroforestry system
- Development homestead production system
- Improvement of cropping system
 - Introduction of fruit varieties
 - Improved management practices

Capacity Needs and Expertise:

- # Network building (physical and human)
- # Exchange of expertise
- # e-Agriculture; e.g., dissemination of information, 3G access for mobile, Apps for cell phones, GIS, databases.
- Skilled manpower (Short-term/Medium-term training)
- Strengthening of Lab facilities
- Recycling of waste products
- Mobile networking
- # of skill development of scientists (e.g., PhDs, MS, Postdocs, short-term trainings)
- # of Trainings for farmers (e.g., technology dissemination)
- # Infrastructure development, e.g., Lab, facilities
- Operational fund for capacity building activities
- Training of extension of NGO's personnel (short-term training on development technology)
- Skilled development for IGA
- Exchange views and ideas among stakeholders

V. Brainstorming additional concepts: Communication Strategies and Geospatial Expertise

Effective Communication Strategies

Government Organizations (Extension):

- Seminars, workshops, training
- Review workshops, (Regional, Divisional, Central)
 - Technologies
- All other communication media (booklets, reports, hand-outs in local languages)
- Website
- Only one local language “Bangla”

Women:

- NGO’s; women groups; “woman-to-woman”
- Government groups (e.g., ICM, IPM)
- Family training (all members)
- Clubs (ICM – gender balance...)
- All medias (cell phones, newspapers)
- Booklets, flyers

Small holder farmers:

- Extension workers/services
- Farmer Field Days
- BARI Technology Village (BTV)
- Motivational training (between farmers group-go-to-farmers) – topic and specific (multiple groups)
- Mass media – Radio; TV
- Mobile phone; newspaper (SMS)
- Websites

Geospatial Expertise and Needs:

- Geospatial expert scientist are needed
- Higher studies for scientists
- Training on geospatial technology
- Modern laboratory with geospatial equipment
- Funds for research are needed

- Crop modeling development
- Select crop zoning
- Considering land type
- Selection of technology
- Need geospatial expertise
- Development of general conception on the topic (awareness) among stakeholders
- Development of geospatial database
- Access and sharing mechanism of geospatial data
- Crop modeling
- Development of pest and disease modeling
- Soil mapping
- E-Agriculture
- Weather forecasting for agriculture (We have weather data, e.g. rainfall, radio, T.V., but you have to purchase it.)