Synergizing Fertilizer Micro-dosing and Indigenous Vegetable Production to Enhance Food and Economic Security of West African Farmers
This Newsletter highlights the principles of two scaling up models: the Satellite Dissemination Approach (SDA) and the Innovation Platform (IP) that are being used by MicroVeg Project to expand the reach of agronomic and water management technologies, seed production and value addition technology. It discusses the challenges faced during scaling up activities and presents the report of activities at the IP by identifying the key issues, challenges and possible intervention to mitigate the challenges facing the actors and stakeholders. It highlights the gender and group dynamics to show level of commitment of the stakeholders at the IP and SDA levels. The activities on scaling up to schools, as well as the outcomes are also presented.

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MicroVeg project has a major component that deals with empowering secondary schools, through the Young Vegetables Scientist Club (YVSC) and training of teachers to take part in vegetables production business as a way of building future entrepreneurs and agricultural champions. We are therefore forming and nurturing young vegetable scientists clubs (YVSC), targeting 25000 individual members in secondary schools in Nigeria and Benin Republic. The effort is already yielding results because in several schools, we have established the YVSC with the support of government. The government’s support has given us legitimacy, thus making our integration into schools’ activities easy. Our project, as at December 2016 had trained a total of 218 teachers and 33,809 students on fertilizer micro-dosing and water management technology. Our Project is glad to present a few of the testimonies from the beneficiaries of our work. Mr Olawuyi Daniel, a 35 year old YVSC member from Atakumosa-Nigeria appreciated the quality of seeds supplied by MicroVeg, “Your seeds are of high quality. Customers patronize my group because of the good quality ugu and tete leaves. I am struggling to meet the demand. Thank you MicroVeg.” Based in Bembreke Ina-Benin Republic, the 19-year old Ayahounde Valere stated, “My impressions are very good regarding the young vegetable scientist clubs and the activities carried out under the Microveg-project. We have learnt good lessons from each of the activities and wish that the project be continued to make many more students and farmers to benefit.” The awareness creation program mounted by our project on radio has continued to impact positively on sales and consumption of indigenous vegetables as attested to by Mrs Oladimeji Felicia, a 50-year old teacher from Ilorin West, “It is not a joke, sales of Ugu vegetable have increased fantastically in our environment here. The radio programs have caused more people to be aware of health benefits of vegetables thus the demand for Ugu has become so high that we are struggling and looking for support to invest more in our farms to meet the market demand.” Sehounon Raissa a 20-year old female student College of Agriculture, Natitingou-Benin Republic appreciated the intervention of MicroVeg project, “I am a member of the young vegetable scientist club set up by the MicroVeg project in my school. We have set up demonstration units on the production of traditional leafy vegetables such as African basil, amaranth and african nightshade. We have received practical training on vegetable transplanting and fertilizer micro-dose application. Our knowledge has advanced and we now know that small amount of fertilizer could do wonders on vegetables in terms of higher yield and healthier crop.” The commandant of the Osun Youth Empowerment Scheme, Colonel Enibukun Oyewole commended the MicroVeg project for investing in empowering young entrepreneurs in vegetables value chain. In his words, “If all projects can be as dedicated and as committed as this project, we will soon approach a state of food security in Africa. The serious engagement of youths by this project and the visible economic benefits of vegetable production are pointers to the fact that we can reduce unemployment and poverty through local
MicroVeg’s Young Vegetable Scientists Club (YVSC) has been fully launched after securing approval to work with schools from relevant government agencies. The procedures followed by MicroVeg in establishing YVSC are:

- Approval secured from government to involve the schools in the project,
- Series of meetings with the school administration, following approval, to establish and finalize modalities for project operations.
- Production of YVSC training manual.
- Training of teachers on school-by-school basis.
- Training of students on vegetables production, fertilizer micro-dosing and irrigation.
- Donation of farming inputs to schools.
- Monitoring visits.
- Regular workshop involving teachers and students.
- School farm and revenue records.

interventions.” The MicroVeg project is utilizing the principle of sustainability in its approach as attested to by Mr Adisso Achille a 50-year old school teacher at Bembreke-Ina-Benin Republic, “I facilitated the formation of YVSC in our school. The students are highly motivated because of the simplicity of the technologies of production and fertilizer micro-dosing technology. Our club started with some students who have now completed their studies and are now practicing vegetable, surely expanding the technologies in their professional life.” A 45-year old male teacher from Baptist High School, Ede—Nigeria, Olu Oyeleke who became a member of MicroVeg family in June 2016 said “I used to think indigenous vegetables were not economically relevant so I never considered growing them. After our school encountered MicroVeg in June 2016 and with MicroVeg’s persuasion, we reluctantly started planting these vegetables in our school garden. Now, our school has daily income and provide nutritious vegetables for public, just like magic. It is more than unbelievable.” The MicroVeg team is making positive impact in the area of changing the orientation of students by endearing them to agricultural business. Jane Omoyni, a 14-year old female member of the YVSC at Ibadan Grammar School, in smiles said, “Since I joined the vegetable club everyone calls me a farmer in class. I used to be shy to be called a farmer but now am very proud because when we harvest our vegetables, they all come to me begging for a share and I feel very happy about that.” Ahmed Hassan, a 16-year old male student of Goshen College, Ikorodu said, “At first when I joined the club, I just wanted to be a member to fulﬁll our extra curricular activity requirement, but after 6 months in this club, I have seen it as a serious business. I already see myself in 10 years as a big farmer working with better technologies and becoming a major provider of food for the population.”
The major drivers of MicroVeg indigenous vegetables project are the simplicity, affordability, profitability and farmers-friendliness of our agronomic and water management technologies, seed production and value addition technology. Therefore, MicroVeg Project, after fine-tuning these technologies, is now extending same to reach larger and significant number of actors including farmers, marketers, processors, consumers and input sellers in Nigeria and Benin Republic. In reaching out, we are using two major scaling up models: the Satellite Dissemination Approach (SDA) and the Innovation Platform (IP). Our major objective is to examine which of the two delivers most effectively performance in scaling up innovations and technology.

The SDA is a linear extension model where the research team disseminates a set of innovation through the extension system. Among the tools in SDA are the group training in technology extension, participatory research and development such as Farmers Field Schools (FFS), demonstration trials and community-based outreach through farmer collective action. Demonstration trials and exchange visits among actors were used extensively as major tools for effective dissemination during scaling up implementation.

The IP approach involves working with multiple actors for consensus building. The core role of IPs is to improve coordination and collaboration along the value chain, which is expected to result in more efficient and equitable linkages. The IP is based on the thesis that improved interactions, through dialogue along the value chain could help to forge linkages among stakeholders which could result in enhanced communication and information exchange to address common challenges.

In summary, the hypothesis behind the Innovation Platform Approach is that cooperation among stakeholders and actors enhance adoption and scaling up while Satellite Dissemination Approach relies on information and capacity building (training, demonstration, information) etc to reach the same goal.

In scaling up MicroVeg technologies, we focus on improvements in peoples’ lives through:

- Enhanced production of indigenous vegetables to generate more income and live better life, resulting in poverty reduction.
- Increased access to food and protein sources and generally diversified nutritious diet.
- Improvement in women’s access to and control over productive and farming resources, and
- Building capacity of a pool of young champions in vegetables production enterprise through the Young Vegetables Scientists Club (YVSC).
Our team followed the under-listed procedures to gain the confidence of the farmers and other stakeholders.

- Identification of vegetable farmers and farming communities.
- Series of visits to the farming communities and markets to create awareness of the project and request for their cooperation.
- Training of project technical and field staff on scaling up activities and necessary operations.
- Setting up of demonstration sites for SDA in collaboration with the farmers and communities.
- Identification of actors/stakeholders involved in vegetable value chain for IP (vegetables producers, seed sellers, farm input sellers, financial institutions, transporters, vegetables marketers, government ministries, processors and industries).

The dissemination of indigenous vegetable technologies had reached 41 districts in Nigeria and 13 in Benin, directly involving 37,223 farmers (45% female) who have recruited an additional 93,526 farmers (~50% female) to participate in the demonstrations as indirect beneficiaries from the project (Table 1).

The demonstration farmers have commenced vegetable production during the dry season in November 2016. Farmers reported that the benefits of the field visits and trainings include:

1. Deeper knowledge of fertilizer management especially now that fertilizers are not affordable due to high prices caused by inflation. This micro-dosing technology is considered most valuable for cost saving.
2. Better understanding of vegetable field management including breaking of seed dormancy, appropriate seeding density, weed and pest management, irrigation water management and record keeping.

### Table 1: Number of direct beneficiaries and demonstration farmers at the SDA level (As of September 2016)

<table>
<thead>
<tr>
<th></th>
<th>Total number of farmers</th>
<th>Male</th>
<th>Female</th>
<th>% distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veg farmers (Direct beneficiaries)</td>
<td>37,223</td>
<td>20,473</td>
<td>16,750</td>
<td>55% male, 45% female</td>
</tr>
<tr>
<td>Demonstration farmers recruited</td>
<td>93,526</td>
<td>46,950</td>
<td>46,576</td>
<td>50.2% male, 49.8% female</td>
</tr>
<tr>
<td>Total</td>
<td>130,749</td>
<td>67,423</td>
<td>63,326</td>
<td>52% male, 48% female</td>
</tr>
</tbody>
</table>
The total number of actors on our IP cells as of September 2016 was 1514 (42% female) as shown in Table 2. The male gender had 100% dominance of the transportation business and 82% dominance of government agencies while the female gender is clearly dominant (81%) in vegetables marketing and vegetables processing (64%). It is clear that the female gender (42%) is competing favourably in vegetable production and in input marketing (43%).

At IPs, the 7 issues in Table 3 have been the major challenges affecting more women than men. It is noted that in the vegetable value chain, fewer male farmers (25-30%) had problems with transportation, marketing, access to land, access to loan, control of pests and diseases and access to fertilizer and inputs compared to 70-75% for the women farmers. While 40% of the male farmers had challenges with procurement of quality seeds, 60% female gender had same challenge. The scaling up activities have therefore been designed to provide more gender-specific intervention and support for the actors along the vegetable value chain.
Table 4: Issues raised at IP meetings and MicroVeg Intervention

<table>
<thead>
<tr>
<th>Key Issues raised by actors</th>
<th>MicroVeg Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungal diseases and pest infestation</td>
<td>Training on seed treatment for the control of fungal diseases and pests. Scaling up NiCanVeg biological control-neem plant extract to control pests.</td>
</tr>
<tr>
<td>Non-availability of fertilizer</td>
<td>Meeting with input dealers and Government agencies who supply fertilizers to meet farmers’ needs, integration into strategic innovation platforms. MicroVeg also donates fertilizer to farmers groups.</td>
</tr>
<tr>
<td>Market for produce</td>
<td>Setting up market structures for planned production to meet demand and reduce postharvest wastage, encouraging new generation of UIV marketers (value added for extended preservation time and export).</td>
</tr>
<tr>
<td>Non-availability of IV seeds</td>
<td>Supply farmers with high quality seeds and training them on how to produce seeds for sustainability, encouraging some farmers to specialize in quality seed production with IPs.</td>
</tr>
<tr>
<td>Non-availability of irrigation pumps</td>
<td>Supply farmers with irrigation pumps and necessary accessories, integration of providers into IPs</td>
</tr>
<tr>
<td>Non-availability of funds</td>
<td>Linkages with Microfinance banks. We facilitate agreement (and integration into IPs of microfinance banks) for better condition to access loans especially at lower interest rate and longer repayment period.</td>
</tr>
</tbody>
</table>

In order to work with communities, the Project carried out consistent visits to the identified farmers’ groups thereby creating awareness of the project and establishing required partnerships with all stakeholders in the vegetable value chain.

The Project took advantage of the traditional institutions (Kings and Chiefs, political and youth leaders and religious leaders) to reach the communities. Community meetings were held at all locations to provide information about...
MicroVeg and mode of technology dissemination and project implementation. As a result, we achieved the following:

- The engagement of traditional leaders who have authority over lands provides viable forum for negotiation to secure better access to more land for women farmers.
- We succeeded in introducing the concept of gender responsiveness to the communities and groups, especially in the area of meeting organization and leadership.
- We are restructuring the markets to balance the vegetable demand and supply dynamics and thus, regulating the supply of vegetables and ensuring availability.
- Inclusion of government agencies is helping to exploit the opportunities of export market potential for the benefit of our farmers. For example in Nigeria and Benin, farmers groups and entreprises are being trained by the National Export Promotion Council (NEPC), and the Direction de l'Alimentation et de Nutrition Appliquée (DANA) on quality standards for export.
- Farmers have access to direct sources of farm inputs which has now resulted in lower costs of production, hence enhanced profit.

Engagement of Micro Finance Banks has resulted in better negotiation for lower interest rate and longer payback period, and offering of loans with minimum collateral.

Challenges to scaling up through IP:

There are several lessons learnt in the process of setting up and launching the IP both in Nigeria and Benin. These lessons came up as challenges which the Project surmounted through strategic use of the principles of social interaction which include persuasion, pleading, dialogue, meetings etc. Some of the challenges are:

- General apathy of stakeholders because the concept of IP was new to farmers and other actors, and there was fear of failure.
- Conflict of interest among the stakeholders with regard to leadership and group action.
- Resistance to change because most actors were only conversant with cooperative system which is narrow in perspective.
- Poor willingness in the area of investment of personal time by the different actors to propel the common goal. The concept of IP requires a sacrifice of time at conception and growth stages.
Challenges in scaling up through YVSC

- Teachers strike resulting in long term closure of schools in Southwest, Nigeria
- Delay caused by bureaucracy at the Ministry of Education in granting approval to kick-start YVSC
- Low motivation of teachers due to non-payment of salaries as a result of poor economy
- Poor security on school farms leading to theft of mature vegetables
- Menace of nomadic cattle rearers who often graze the vegetables farms.

Table 5: Distribution of schools and number of students and teachers Trained by MicroVeg (As of September 2016).

<table>
<thead>
<tr>
<th>Nigeria</th>
<th>Number of clubs in schools</th>
<th>Male</th>
<th>Female</th>
<th>Students reached</th>
<th>Money realized from sales of harvested vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oyo</td>
<td>28</td>
<td>18</td>
<td>10</td>
<td>3200</td>
<td>N30,000 (CAD133)</td>
</tr>
<tr>
<td>Ondo</td>
<td>27</td>
<td>8</td>
<td>19</td>
<td>2800</td>
<td>N10,000 (CAD44)</td>
</tr>
<tr>
<td>Ekiti</td>
<td>32</td>
<td>11</td>
<td>21</td>
<td>4800</td>
<td>N20,000 (CAD89)</td>
</tr>
<tr>
<td>Osun</td>
<td>40</td>
<td>12</td>
<td>28</td>
<td>3950</td>
<td>N10,000 (CAD44)</td>
</tr>
<tr>
<td>Kwara</td>
<td>27</td>
<td>14</td>
<td>13</td>
<td>2500</td>
<td>N10,000 (CAD44)</td>
</tr>
<tr>
<td>Lagos</td>
<td>15</td>
<td>6</td>
<td>9</td>
<td>1800</td>
<td>N15,000 (CAD67)</td>
</tr>
<tr>
<td>Osun</td>
<td>12</td>
<td>3</td>
<td>9</td>
<td>700</td>
<td>N5,000 (CAD22)</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>72</td>
<td>109</td>
<td>19,750</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benin Republic</th>
<th>Number of clubs in schools</th>
<th>Male</th>
<th>Female</th>
<th>Students reached</th>
<th>Money realized from sales of harvested vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parakou</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>3,783</td>
<td>CFA110,000 (CAD239)</td>
</tr>
<tr>
<td>N’Dali - Bembérékè</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1,450</td>
<td>CFA35,000 (CAD76)</td>
</tr>
<tr>
<td>Djougou</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1,820</td>
<td>CFA45,000 (CAD98)</td>
</tr>
<tr>
<td>Boukoumbé - Natitingou</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1,630</td>
<td>CFA50,000 (CAD108)</td>
</tr>
<tr>
<td>Bohicon</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>1,811</td>
<td>CFA40,000 (CAD86)</td>
</tr>
<tr>
<td>Tchaourou</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>985</td>
<td>CFA30,000 (CAD65)</td>
</tr>
<tr>
<td>Ouaké</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1,240</td>
<td>CFA35,000 (CAD76)</td>
</tr>
<tr>
<td>Djidja</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>1,340</td>
<td>CFA40,000 (CAD86)</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>35</td>
<td>23</td>
<td>14,059</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>218</td>
<td>107</td>
<td>132</td>
<td>33,809</td>
<td></td>
</tr>
</tbody>
</table>

As of September 2016 reporting period (Table 5), our project had established a total of 181 and 37 youth vegetable scientists clubs in Nigeria and Benin, respectively while a total of 239 teachers (132 women) were trained on fertilizer micro dosing and vegetable production. The total number of students involved in the project reached 19,750 in Nigeria and 14,059 in Benin. Fresh vegetable markets have developed around the schools in both countries, serving as hub for sales of good quality and nutritious vegetables for the schools staff and even the public. During the first production cycle in August-September 2016, the clubs generated revenue from sales of vegetables in the range of 22-133 CAD in Nigeria and 65-239 CAD in Benin Republic.
MICROVEG ROJECT

Picture Gallery

YOUNG VEGETABLE SCIENTISTS' CLUBS (YVSC)

YVSC Training

YVSC Training

YVSC Training

MICROVEG SCALING UP MODELS: SDA AND IP

IP, Oluyole Ext., Ibadan

IP Lagos

IP Ilorin-Ekiti

IP Women, Iseju

IP Land owners, Ilorin

NIGOs

PARTNERS IN SUCCESS

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