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"Creating systemic changes in weak markets to deliver responsive solutions for Indigenous rice growers in Vietnam: Bridging the food gap towards improved diversification of income"

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Policy implementers and local leaders should explore and evaluate the use of market strategies to deliver poverty alleviation even in weak markets. Market based strategies tend to be more sustainable, demand responsive and participatory than centrally planned and highly subsidized conventional poverty reduction approaches. Central to formulating market based approaches for poverty alleviation; local leaders should take into consideration the ability from smallholders to bear risk in the context of existing food insecurity and vulnerability towards external economic shocks. This paper brings the experience in formulating and implementing market strategies that have proved to work in weak markets through the introduction of compressed fertilizer technology in the upland of the central region of Viet Nam.

Introduction

The upland areas of Vietnam represent some of the poorest areas in the country, both in terms of numbers and depth. The dominant economic activity in these areas is agricultural. However, the performance of these smallholder farms has been insufficient to help the farmers achieve food security and rise out of poverty. Upland smallholder farmers face many constraints including poor transportation infrastructure, low crop yields, regular climatic hazards, poor markets for crop inputs, and poor integration into markets for outputs.

In early 2001, International Development Enterprises (IDE) introduced compressed fertilizer technology for the first time in central Vietnam as part of a programmatic strategy to address food insecurity through rice intensification. The project is the first within a series of strategic steps to bring an enabling environment for smallholders to focus on higher-return on-farm generating activities such as pig-husbandry and high value horticulture as well as off-farm income. The project has evolved to adopt an approach that specifically focuses on the rural ethnic poor.

Although the project takes affordable innovation as a focal strategy to poverty reduction illustrated by promoting highly compressed fertilizer pellet that is placed deep in the soil, the main features of the initiative are the market strategies to deliver the technology through the local retailers at unsubsidized prices. The main market strategies exposed in this paper are three, namely: i) product development to adapt affordable and responsive solutions to upland farmers, ii) promotion and marketing to disseminate affordable innovation among upland farmers and iii) supply chain development to improve the coverage and quality of fertilizer and services to upland farmers.

Recognizing that compressed fertilizer is just one of many potential vehicles to deliver sustainable benefits for the poor, policy implementers should be

encouraged to formulate solutions that address challenges for their specific working environments.

Irrespective of the unfavorable market conditions found in upland areas, the initiative has not only proved to create sustainable changes in rural market systems but it has also proved to be a viable solution for these disadvantaged families to invest their way out of food insecurity. Evidence from the field reveals that the most disadvantaged farmers have experienced average yield increases in paddy cultivation of 1.9 tons of rice per hectare, translating in a 96 percent increase from the initial household rice output and 3 incremental months of rice consumption for the average upland family.

The project and its lessons are relevant in the context of the few initiatives in Vietnam aimed at poverty alleviation that can be regarded as commercially viable and sustainable. Most importantly, the initiative provides an alternative to the more common development agencies subsidized strategies, which are neither sustainable nor empowering.

The market strategies contained in this case study are specifically appropriate for the process of preparation of the Socio-economic Development Plan for the period 2006 to 2010 and the review and reformulation of the national poverty reduction programs, including the Hunger Eradication, Poverty Reduction and Job Creation Program and the Program on Socio-economic Development of Communes with Greatest Difficulties.

Market Outlook

The technology of deep placement of fertilizer pellets can hardly be presented as an innovative solution for paddy cultivation as the process of transforming fertilizer to be deep placed has been in the world market since 1975. The technology is extremely simple, consisting of ordinary fertilizer that is physically modified into discrete particles of fertilizer commonly called fertilizer pellets. It is applied by hand during or after wetland rice transplanting.

Experience from the past 30 years reveals that application of fertilizer pellets presents improved yield for rice cultivation, cash savings in fertilizer inputs expenditures and reduced nitrogen loss to the environment, when compared to applications of prilled urea, NPK or other fertilizers. However, the increased labor required to place the pellets in the field and the demanding operating conditions for pellet producers may pose significant challenges to wider market expansion of this technology.

In addition, conditions for a viable commercialization of agricultural inputs in the remote upland areas of Vietnam are extremely demanding. The farmers' willingness and ability to invest in fertilizers is constrained by a low perception of benefits of investing in fertilizer inputs, negligent cultivation practices, cash limitations and the high level of subsidized fertilizer by government programs.

As a result, sustainable supply of agricultural inputs is constrained, with low participation of small-scale private providers and low distribution of retailing networks of fertilizers in the most remote communes in the uplands, making access to affordable fertilizer extremely challenging.

Performance

By September 2004, in less than 4 years of implementation, the initiative managed by IDE has expanded from 9 to 34 of the poorest communes in the central region with sales of fertilizer pellets almost doubling for each rice crop every season.

The total number of farmers regularly buying fertilizer pellets stands today at 2,858, of which 522 belong to indigenous populations, placing this project as one of the few poverty alleviation initiatives in Vietnam that are commercially viable and sustainable in the market.

Fertilizer pellet adoption by September 2004

	Spring 01	Spring 02	Spring 03	Spring 04	Summer 04
Number of communes		13	16	22	34
Areas					
Coastal Plains households	-	288	979	1,436	1,858
Upland households		101	181	1,068	1,000
Total households	-	389	1,160	2,504	2,858

After its adaptation phase, the project has been gradually diverting its focus towards the most disadvantaged upland populations.

Cash flow estimations reveal that an average upland family that has fully adopted compressed fertilizer technology would save approximately US$28 a year in family cash expenses for buying rice at the upland market price. Although this figure may seem low, US$28 represents approximately 3 incremental months of food security for the average family and a significant step towards better income opportunities.

Consumer acceptance towards fertilizer pellets seems strong as on average, two thirds of households belonging to disadvantaged groups adopt the product after having been exposed to its benefits through marketing and promotion activities.

Market performance

	Coastal plain areas		Upland areas	
	Spring 03	Spring 04	Spring 03	Spring 04
Households exposed to promotion activities	2,187	2,953	328	1,626
Households purchasing fertilizer pellets regularly	979	1,436	181	1,068
Closure rate	*44.8*	*48.6*	*55.2*	*65.7*

Monitoring information of market activities reveals the high degree of satisfaction from farmers with the technology as the repurchase rate stands at almost at 80 percent. Evidence reveals that most ethnic farmers still choose to invest in fertilizing pellets, regardless of the fact that most of them can obtain free fertilizer from the highly subsidized government poverty policy programs.

During this 4 year period a total of 33 new small-scale enterprises have entered the fertilizer pellet commercialization business. By September 2004, 3 machine producers, 8 pellet manufacturers, and 15 pellet retailers are part of the network of small-scale upland private sector suppliers of this market.

Analysis

IDE's experience suggests that three main approaches to market development of compressed fertilizer seem to have been critical in achieving these results. First, market segmentation and consumer profiling has proved to be crucial in formulating responsive solutions for the poor. Second, the use of advertising and promotion seem to have significantly accelerated adoption of this new product by ethnic farmers and increased their willingness to invest in this new initiative. Finally, facilitation of incentives for promoting small-scale private suppliers of compressed fertilizer has significantly overcome the prevalent barriers for market entry for scaled producers. At the same time, promoting decentralized supply enterprises has brought the fertilizer pellets closer to the farmers in remote upland areas.

1. Segmentation leads to responsive innovation

Consumers respond differently to innovation according to their specific needs. IDE differentiated consumer segments into upland farmers and coastal plain farmers in relation to demographic and psychographic characteristics, such as existing cultivation practices, fertilizer usage patterns, ethnicity and overall affordability.

This segmentation strategy has been the basis for differentiated product development as well as for defining specific audiences for effective advertising and promotion. Besides compressed urea (urea pellets), compressed NPK and NK pellets have been included in the product portfolio in response to market demand.

The project has gradually shifted its focus towards upland farmers belonging to indigenous populations following the poverty strategy of the intervention design. At the same time, ethnic farmers have rapidly adopted the technology. Emerging evidence (Market performance table) suggests that the specific benefits of compressed fertilizer pellets appeal strongly to the poorest segments belonging to ethnic groups,

supporting the relevancy of this strategy to help Vietnamese policy makers to meet the national poverty goals.

One factor that seems to explain the strong market penetration of compressed fertilizers among upland customers is the high level of economic returns generated through the application of the pellets versus existing fertilizing practices.

Paddy cultivation productivity - In tons per hectare

Project areas	Existing practice[1]	Fertilizer pellets	Growth index
Uplands	2.3	4.5	196
Coastal Plains	4.2	5.0	119

The average rice yield increase for these families experienced through the application of fertilizer pellets is 1.9 tons per hectare, almost double the initial output figure of 2.3 tons of rice per irrigated hectare. More than 60 percent of ethnic farmers in the project areas experience 4 months or more of food insecurity in a given year. The average output achieved by these families through the application of compressed fertilizer stands at 4.5 tons of rice per irrigated hectare. In gross terms, farmers in the uplands have been able to bridge one month of incremental food security per each sao ($500m^2$) of irrigated paddy land under the application of fertilizer pellets. The relatively increased availability of family labor among upland households and the low opportunity cost of alternative sources of income to rice cultivation seem to offset the potential labor constraints of using the technology.

The simplicity of application of fertilizer pellets versus the multiple applications of fertilizer prills seems to provide incremental benefits to upland ethnic farmers. Unlike prilled fertilizer, fertilizer pellets are applied once to the field and its application does not require complex calculations of different amounts of NPK. In addition, the protective nature of the pellet placed under the soil seems to be particularly relevant for terrace cultivation: the most common form of paddy cultivation for upland communities. For some indigenous farmer groups, the application of fertilizer pellets resembles the methods of traditional horticulture practices.

2. Advertising and promotion to stimulate demand

The role of advertising and promotion for the introduction of the compressed fertilizer technology has been twofold, to stimulate demand for the product among male farmers and to educate female farmers in the right application of the product to ensure consumer satisfaction, repurchase and loyalty.

The marketing process considers not only formulating a persuasive way to convey the benefits to the farmers but also to identify the most effective ways to deliver the messages. Within the marketing process, four key strategies seem to have been the main drivers of strong results: Developing systematic consumer understanding, targeting differentiated messages according to the role in the purchase and usage process of compressed fertilizers, stimulating trial of a high performing product and leveraging market development through early adopters among the pool of potential customers.

One of the promotion activities to stimulate demand

Developing systematic consumer understanding has been critical to position key rational and emotional benefits in relation to perceived labor demand and cash constraints. Extensive consumer research with farmers has collected perception insights regarding motivational factors and local beliefs. In addition, the communication campaign to convey the benefits of the pellets was pre-tested and validated with the farmer through Focus Groups Interviews that included indigenous groups, to ensure the message was clearly understood and that the benefits of the

[1] The figures relate to the most prevalent practice in each of the project areas. In the case of the upland areas under the scope of the project, the unsystematic application results from a combination of NPK normally subsidized by government poverty programs. In the case of the coastal plains the existing practice is represented by the systematic application of prilled urea.

pellets are convincing and engaging to the farmers' audience.

Targeting differentiated messages according to the role from household members in the purchase and usage process of compressed fertilizers has ensured outstanding product performance and farmer satisfaction. Since the male householder is the key decision maker in investing in fertilizer for the family, most of the benefit formulation and delivery has considered him as the target. However, the main user and beneficiary of the availability of compressed fertilizer is the female in the family. The right application of the product in the field depends on her knowledge and the level of mastery of the key skills for deep-placement of compressed fertilizer. Her role as a key influencer in purchase and re-purchase of the pellets has made her a key target for advertising and promotion of the product.

Stimulating trials of high performing fertilizer products among farmers seems to have built the market. This rule of marketing is fairly simple: consumer satisfaction encourages product re-purchase. Experiencing the benefits of adopting compressed fertilizers has been used as a key tool to get new customers. Retailers have been encouraged to invest in trial packages given for free, targeted at leading farmers for a limited period of time, usually one or two crops. In addition, partial adoption has been encouraged, where the farmer's plot of land is gradually switched towards full application of compressed fertilizer. This tactic allows incremental investment according to affordability and enables the farmers to assess product performance against the old method of cultivation.

Leveraging market development through early adopters among the pool of potential customers is an effective way to disseminate a new market initiative. Normally, innovation spreads through key referrals. Most of the farmers adopt ideas and learn from successful experiences from other farmers. In markets and communities, there are certain groups of innovators that serve as reference for other potential customers. The market promotion of compressed fertilizer has taken advantage of these groups of farmers not only to accelerate the technology adoption but also to ensure initial successful experience with the product.

3. Incentives that invite new market players

Supplying of compressed fertilizers seem to be a business tailored to small market players as capacity underutilization is costly when demand is seasonal, the ability to accumulate inventories is limited and the capital requirement is relatively high.

IDE has worked with small-scale entrepreneurs through facilitating development of incentives to make supplying compressed fertilizer not only commercially viable but a profitable business. Key strategies to encourage entry of players to this fertilizer market have been: Improving the capacity of entrepreneurs to effectively respond to the needs of the market, decentralizing operations of pellet production to enhance availability of the pellets to prospective users, reducing the capital requirement of the pellet manufacturing, facilitating improvements in service delivery throughout the value chain, and expanding the fertilizer market by stimulating initial demand for pellets.

Improving the capacity of entrepreneurs to effectively respond to the needs of the market is an imperative. The fundamentals for the successful fertilizer pellet initiative for the rural poor are product relevancy, product availability, and product affordability. IDE has worked alongside small-scale private sector in rural areas to achieve these product fundamentals.

Product development considers consumer research that small-scale enterprises are not capable of carrying out effectively given their lack of technical skills and funds for these kind of strategic investments. IDE has developed at least three different products based on the identified consumer needs and the process has been carried out jointly with the private sector. In addition, business planning such as cash-flow analysis, promotion preparation and technical training on product attributes and proper fertilizer application has enabled new market entrants to gain confidence in participating in the fertilizer market.

In addition, IDE has worked to increase distribution of compressed fertilizer in the project areas through decentralizing pellet manufacturing and supporting a widespread network of 15 pellet retailers. These retailers are able not only to make the product available to farmers but also to provide relevant services to them such as technical advice in the right

application of the product in the field and credit (i.e. working capital).

The role of IDE in relation to the network development has been of facilitating the transfer of marketing skills among service providers and monitoring market performance through consumer data collection and product quality control.

Retail price of pellets during the initial market development phase has been monitored through farmer surveys and government extension agents to avoid unfair practices. In addition, enabling competitiveness among small-scale private providers has avoided abusive pricing practices towards the farmers.

Reducing the capital requirements of the businesses has been crucial to decentralize operations of pellet production and allow new entrants into the fertilizer's market. The inability to stabilize nitrogen in the product prevents pellet manufacturers to accumulate off-season inventories without loosing the fertilizing proprieties of the pellets to volatilization. That said, a profitable and reliable business for fertilizer pellet production calls for an efficient logistic distribution of the product during the tight 2-3 month season in which the nitrogen remains in the product and the product is placed in the field. The limitation of storing the product suggests that a pellet producer enterprise would normally operate under a quarter of its full capacity while modifying fertilizer into pellets requires significant capital investment machinery.

Producing fertilizer pellets

Briquetting machine adaptation

Version	Capital requirement (US$)	Production capacity (Kg per day)
1	2,000	1,500
2	1,000	1,500
3	750	1,000
4	450	400

Through pilot operations, IDE learned early in the process of technology adaptation and enterprise development that the installed capacity of pellet producers and its relation to a market size that can be supplied in a limited timeframe is important. Through design focused on affordability, IDE and local machine producers engineered down the capital investment of the pelletizing unit from about US$1,950 to US$450. The average period for small-scale pellet producers to breakeven has been significantly reduced from approximately 10 crops to 3.5 crops.

Facilitating market linkages and service delivery among small-scale enterprises has improved the commercial viability of compressed fertilizer in weak markets. IDE has facilitated provision of business development services that overcome context-specific constraints.

One example of these services is transportation to retailers in remote upland communes. Subsidized transportation during the market development phase has not only linked supply with potential demand in extremely weak markets but also encouraged trial of the pellets by ethnic groups. The participation of retailers in the promotion activities represents another way to improve linkages within the value chain and has also encouraged effective interaction between farmers and pellet retailers.

An example of promotion of market linkages is represented by bundling pellet supply with credit provision for farmers. The linkage of credit providers with the pellet retailers has injected incremental working capital into the value chain enabling farmers experiencing cash constraints to have access to the fertilizer pellets. On the demand side, IDE has facilitated the formation of farmer clusters at remote villages to enable organized ordering of fertilizer pellets through the village head.

Perhaps the single most important service for small-scale providers of compressed fertilizer has been to build the initial consumer base. Without a significant scale of business the operation would remain unprofitable and thereby unattractive to new market entrants.

The initial commitment of IDE during its engagement with small-scale players in the value chain guaranteed a serious effort to stimulate demand for fertilizer pellets. Small entrepreneurs are exposed to the advertising and promotion activities from the beginning to make them part of the market development process. IDE ensures the transferal of marketing and promotion skills to fertilizer pellet producers, wholesalers and retailers during the market development phase, and disengages itself from the marketing role once the consumer base provides adequate volume and turnover to allow private providers to invest in their own promotion activities.

Conclusion

Market based approaches to commercialize compressed fertilizer technology have proved to work for poor farmers albeit the unfavorable conditions found in the upland areas. 1,000 farmers out of 2,828 that are currently adopters of compressed fertilizer technology live in upland areas, with 522 belonging to ethnic groups. The market trend suggests that the number of upland adopters of compressed fertilizer technology will continue to expand in the short and medium term. Therefore, market based strategies represent an alternative solution to conventional approaches to delivering poverty reduction initiatives in Vietnam.

With farmers deciding whether to buy or not, the initiative seems to present enhanced demand responsiveness of service providers and improved participation of the community in the market system. The fact that the fertilizer pellets are being commercialized through local retailers reveals the promising potential for sustainable service provision with minimum external facilitation required. In addition, this mechanism of service delivery suggests that external facilitation may be diverted towards ensuring access to extremely disadvantaged groups, quality control, regulation of product standards and developing weak markets.

Product development to adapt affordable and responsive solutions to upland farmers, promotion and marketing to disseminate affordable innovation among upland farmers and supply chain development to improve the coverage and quality of fertilizer and services to upland farmers are central strategies to develop weak markets. Policy implementers at the local level should evaluate these strategies within their specific working environments.

However, market based approaches cannot be conceptualized in isolation to the capacity of the poor to bear risk. Addressing food security is the first within a series of strategic steps towards advancing diversification of income for poor farmers.

Promising activities that bring additional value to on farm and of farm income should be explored. There is an imperative need to moving away poor farmers from dependency in low value income activities and focusing efforts in the kind of opportunities that bring comparative advantages and value added for the rural poor.

In doing so, market based strategies to deliver affordable innovation through the local private sector to the poor take special relevancy, and even more relevancy, in the context of the transition process of Vietnam towards a market based economy.

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