PHILSURIN: Transforming Sugarcane Research, Development, and Extension

Presentation for: Management Association of the Philippines
Metropolitan Club, Sept. 13, 2011
Sugar crisis and the creation of Philsurin

- 1995 was disastrous for the Philippine sugar. We imported close to 900 KMT of sugar to meet domestic consumption and export quota to the US.
- Philsurin was organized to arrest the declining production.
- Main cause of declining yield was poor quality of sugarcane varieties.
- Starting in 1997, Philsurin embarked on a massive distribution of HYVs with high sugar content using micropropagation and regular seedpieces.
During the last 10 years we achieved (3) production peaks:
- ‘03-’04 – 2.34 MMT
- ‘08-’09 – 2.455 MMT
- ‘10-’11 – 2.39 MMT

Production of 1.97 MMT in ‘09-’10 was a fluke due to extreme drought condition.

We achieved self-sufficiency in 2003. We resumed exporting in 2004. (Except in 2010)
How did we achieve this dramatic turnaround?

- Creation of PHILSURIN
  - Organization
  - Funding
  - Vision, mission, core values
- Programs that successfully increased sugar production
- PHILSURIN approach
- Acquisition of new technologies
Creation of PHILSURIN

- Incorporated – Aug. 11, 1995, by the members of the National Council of Sugar Producers in response to EO 18 dated May 18, 1986 which mandated:”It shall be the policy of the State to promote the growth and development of the sugar industry through greater and significant participation of the private sector….”
PHILSURIN Vision, Mission, and Values

“We aim to be the leading sugarcane research and development institution in Asia.

Our mission is to provide appropriate, efficient, and cost-effective R,D,&E support to the Philippine sugar industry to improve its competitiveness and attain self-sufficiency.

We are committed to fulfill our mission by adhering to a code of excellence and professionalism.”
Sources of funds

- Initial funding came from contributions of the consortium of sugar millers and NASUREFCO. They contributed Php 9.76 M.
- Main source of funds comes from Php 2.00 levy per bag of sugar produced. The enabling order was issued by SRA under Sugar Order No. 2 Series of 1995-96. About Php 68 M annually is generated from this source. The Sugar Order was extended for another 10 years and will expire on Sept., 2015.
- In the past we also got Php 2.00 per bag of imported sugar. Since 2003, there was no need to import sugar.
Focused and demand-driven R,D,&E

- Causes of low productivity:
  - Limited use of HYVs
  - Presence of pests & diseases
  - Low ratooning due to RSD
  - Improper fertilization
  - Harvesting immature canes
  - Delay between cutting and milling
Productivity Enhancement Programs:
Massive dispersal of new High Yielding Varieties

Quantity of planting materials distributed from 1997 - 2010.
(In millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Plantlets</th>
<th>Patdan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1.05</td>
<td>50.49</td>
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<tr>
<td>1998</td>
<td>0.73</td>
<td>48.47</td>
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<td>2000</td>
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<td>48.28</td>
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<td>2001</td>
<td>1.23</td>
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<td>2002</td>
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<td>2003</td>
<td>1.76</td>
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<td>2004</td>
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<td>47.83</td>
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<tr>
<td>2006</td>
<td>2.17</td>
<td>47.14</td>
</tr>
<tr>
<td>2007</td>
<td>0.56</td>
<td>48.11</td>
</tr>
<tr>
<td>2008</td>
<td>0.76</td>
<td>47.96</td>
</tr>
<tr>
<td>2009</td>
<td>0.56</td>
<td>47.70</td>
</tr>
<tr>
<td>2010</td>
<td>0.76</td>
<td>47.52</td>
</tr>
</tbody>
</table>

Total Patdan = 1,329.13  Total plantlets = 16.22
Cost of distributing planting materials from 1997-2010.
(In million pesos)

Total: Php 290.17 million
THEN: Dominant varieties were: Phil 67-23, Phil 66-07, & Phil 58-260. VMC varieties only accounted for 4.8%
NOW: VMC varieties now account for 45.2%. (VMC 86-550, PS3, VMC 87-599, VMC 71-39, &PS1)

Source: MCCC reports
THEN: Declining LKg/TC.
Trend indicates it will be less than 1.5 LKg/TC in 1995. (Actual LKg/TC was 1.44 in 1995)
NOW: LKg/TC increased by 42.36% from 1.44 in 1995 to 2.05 in 2010. LKg/TC increased for 5 consecutive years (2006 – 2010)

Source: SRA
Distribution of new HYVs.

**Goal**

Distribute new HYVs:
- 20% by CY 2000-2001
- 35% by CY 2001-2002
- 50% by CY 2002-2003
- 70% by CY 2003-2004

**Performance**

- Weighted %HYV penetration in CY ’03-’04 was 69.5%.
- Luzon-34%
- Negros & Panay – 87%
- EV & Mindanao - 62%

Ave. Philippine production data for CY ’03-’04:
- TC/Ha.- 69
- LKG/Ha. – 126
- LKG/TC – 1.81
Characteristics of VMC 86-550

- High sugar content – sugar recovery as high as 15%.
- High tonnage – as high as 150 TC/Ha.
- Highly self-thrashing.
- Heavy tillering.
- Resistant to leaf scorch, rust, yellow spot.
- Susceptible to smut & downy mildew.
Major research activity: Sugarcane breeding
Released 15 VMC and Philsurin (PSR) Varieties since 1997

PSR 97-41

PSR 97-45
Varieties released this year

PSR 00 -343

PSR 00 - 161

PSR 00 - 34
2. Integrated management of pests and diseases.


- **Most serious pest in sugarcane.**
- **Need based and monthly application.**
- **Use of 1\textsuperscript{st} and 2\textsuperscript{nd} generation anticoagulant.**
- **Monthly based application for 2 years @Victorias district reduced sugar losses by Php 59 million at a cost of Php 2.0 million.**
2b. Integrated management of Ratoon Stunting Disease (RSD)

- RSD is difficult to diagnose visually.
- Developed diagnostic procedures using:
  - RSD ELISA
  - RSD DBIA
  - PCR
  
  with the assistance of BSES, University of Queensland, and USDA.
Locally designed and fabricated Hot Water Treatment Tank.

- Yield improvement of 13% in 1st ratoon.
- Available in 23 mill districts.
- Capacity of 800 kg. per batch.
- Heat source – firewood, bagasse.
- Heat sink – malleable refractory materials.
Large capacity HWT (4 MT) at BUSCO HPCO, CAC, CAT & Sagay.
Seed cane production manual.
Protocol for Program HQS (High Quality Setts)

- Guide in establishing seed cane nursery.
- Nursery management
- Harvesting clean seeds.
- Disinfecting cane knives & equipment
- Hot water Treatment
- Disease indexing.
- Identification of common sugarcane diseases.
2c. Management of Sugarcane Borer using *Trichogramma chilonis*.

- *Trichogramma* program has significantly suppressed the population of sugarcane borers. There has been no reported outbreak of the pest lately.
- Seven rearing laboratories with a capacity of 70,000 cards per month.
- Eight releases – 64 to 80 cards per hectare.
2d. Management of white grubs.

- One of the most destructive pests attacking sugarcane.
- Integrated management combines biological, cultural, physical, & chemical strategies.
- Research for more effective control is continuing.
3. Purposeful and effective utilization of technologies.
Creation of Mill District Development Councils (MDDC) – Extension arm of Philsurin

- Grass root level organization mandated to perform development and extension activities.
- Philsurin provides funds, personnel, infrastructure, and technical support.
- Empowered & institutionalized 28 MDDCs.
4. Publications

- Published 7 leaflets, 4 monographs, 1 book on sugarcane.
- First edition of Philippines Recommends for Sugarcane. (Manual for growing sugarcane in the Philippines.)
- Available at no cost to stakeholders.
- Easy-to-understand style.
5. Training

- Three-day live-in seminar workshop called Outreach Program for the Sugar Industry. (OPSI) conducted by SRA
- Regular up-dates.
- Village level teach-ins.
- Invited foreign resource persons.
PHILSURIN approach

1. Focused and demand driven R,D,&E programs.
2. Priority resource budgeting.
4. Recommendations are piloted on a commercial scale.
5. Infrastructure needed for effective extension services are provided.
6. Involvement of stakeholders in management and administration of programs.
Average expenses for the last 5-years.
In million pesos

- MDDC: 52.1%
- R&D: 30.5%
- G&A: 16.3%
- Capex: 1.0%

Total: 35.15
Performance audit result in 1999: “Impressive progress”

- Key findings—”The short-term goals were more than satisfactorily achieved”
- Conclusion—”The Review Team is very much impressed with the progress made by PHILSURIN in R,D&E matters for the sugar industry, and with the enthusiasm and commitment of the staff at various levels. …It is our opinion that PHILSURIN should and can play a pivotal role in R,D&E in the Philippine sugar industry”
Collaboration, networking and linkages

- CFC/ISO/20 Project on sugarcane variety improvement program for SEA & the Pacific (5 countries, USD 1.5 M Philsurin is PEA)
- International Consortium for Sugarcane Biotechnology (17 members)
- International Consortium for Sugarcane Microsatellite (7 members)
- Variety exchange agreements with 13 countries (USDA, CIRAD, BSES, & China)
Project funded by CFC: DNA Fingerprinting of sugarcane using microsatellite markers.
Acquisition of new technologies

- Philsurin pioneered in the application of Geographical Information System (GIS) in agriculture.
- We have established a complete molecular marker laboratory in Negros.
- We have established a quarantine glasshouse with complete disease indexing facilities at UPLB.
GIS project to determine area planted to canes.
GIS project to determine land suitability.

Land Management Unit (LMU)

Elevation

Soil

Slope
Quarantine greenhouse at IPB, UPLB. Imported more than 300 varieties from 13 countries.
K88-87

-Average growth
-Large stalks
-Average in tillering
-Semi-self detrashing
-Erect to reclining
-Moderate tasseler
UTHONG 1

- Tall but slow starter
- Large stalks
- Semi-self detrashing
- Moderate tasseler
- High in tillering
- Lodging
PS 851

- Fast growing
- High in tillering
- Profuse tasseler
- Reclining to lodging

- Ave. stalk size
- Self-detrashing
K88-65

- Average growth
- Very large stalks
- Semi-self detrashing
- Erect to reclining

- Sparse tasseler
- Ave. in tillering
Conclusion:

- Philsurin’s experience in improving productivity did not involve sophisticated technologies.
- Our action programs are demand-driven to address identified production problems.
- Our goal in the next 5-10 years is to produce a super variety using biotechnology and conventional breeding.
For more information visit our website.
Thank you!