

---

---

# Research into Practice: Product Development Pathways in Developing Countries

---

---

Roma L Gwynn, Rationale Biopesticide Consultants

# Background



- Department for International Development in UK (DFID)
- **Crop Protection Programme** - Development and promotion of sociably and environmentally acceptable technologies to reduce crop losses from pests in developing countries  
[www.nrinternational.co.uk](http://www.nrinternational.co.uk)
- Programme running for over 20 years
- Last 10 years programme (finished in March 2006), funded development of IPM and biocontrol as part of pro-poor strategies for improving food security in developing countries
- End of programme - research into practice  
e.g. Baculoviruses in Kenya, Ghana and Tanzania, IPM for cotton in Malawi



# Millennium Development Goals



Eight Development goals agreed at the United Nations Summit in 14-16 September 2000, subsequently 190 countries signed up

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV and AIDS, malaria and other diseases
7. **Ensure environmental sustainability**
8. Develop a global partnership for development

Intention to achieve almost all of these targets by 2015

# Development of Biological Based Control Agents



## Examples of DFID funded projects leading to products

- Projects leading to products mainly involved a commercial partner
  - Baculovirus – control of Armyworm (*Spodoptera exempta*) in Tanzania
  - Baculovirus – control of Diamond back moth (*Plutella* sp.) in Kenya
  - Baculovirus – control of DBM, *Heliothis armigera*, *Spodoptera exigua* in India and Thailand
  - Pheromone – control of Yellow Stem Borer in India
  - *Pasteuria penetrans* - a bacteria active against Root Knot Nematodes
  - *Pochonia chlamydosporium* - a fungus active against RKN

# Product Development Pathways Project



## Aim

- Review BCA projects with respect to product development
  - Product development pathways followed
  - Collaborations and partnerships
  - IPR
  - Commercialisation (stakeholder engagement, regulations)
  - Focus on Kenya
- In context of this talk will consider findings as applicable to EPN
  - no consideration of IPR
  - no registration issues – except simple efficacy testing
  - need to consider biodiversity rights

# Product Development Pathways Project



## **Definition of Product**

- Product produced by commercial company and sold to growers (subsidised or full economic price)
- Produced by local research institute and used by growers
- Produced by growers and applied directly
- Produced by commercial company and bought by government

# Product Development Pathways Project



## Consultation

- Interviews, following topic guide, with stakeholders :
  - Kenyan farmers – small holders (1-10 ha)
  - Kenyan export growers
  - Export growers associations
  - Regulators – pesticide registration and import/export authorities
  - International and National research and development organisations  
ICIPE, CABI, NRI, Reading University, KARI
  - BCA Producers – in South Africa, Kenya, USA, Europe

# Product Development Pathways Project



## **Features of a typical product development pathway followed by research based organisations**

- Linear
- Project often technically driven
- Follows funding cycles (series of 2 - 3 year project)
- Predominantly laboratory based
- Applied tests in glass house
- Directed by one lead scientist
- Some initial production – for trials use
- Engage with commercial companies when isolates show promise

# Product Development Pathways Project

## Linear product pathway

**Bioprospecting**  
survey or isolate acquisition

**Petri dish screen**  
activity y/n

**Petri dish tests**  
dose rate

**Petri dish tests**  
environmental parameters

**Pot tests**  
in controlled conditions

## Time line

Up to 18 months

Up to 6 months

Up to 1 year

Up to 1 year

Up to 6 months

**Total time approx 4.5 years**

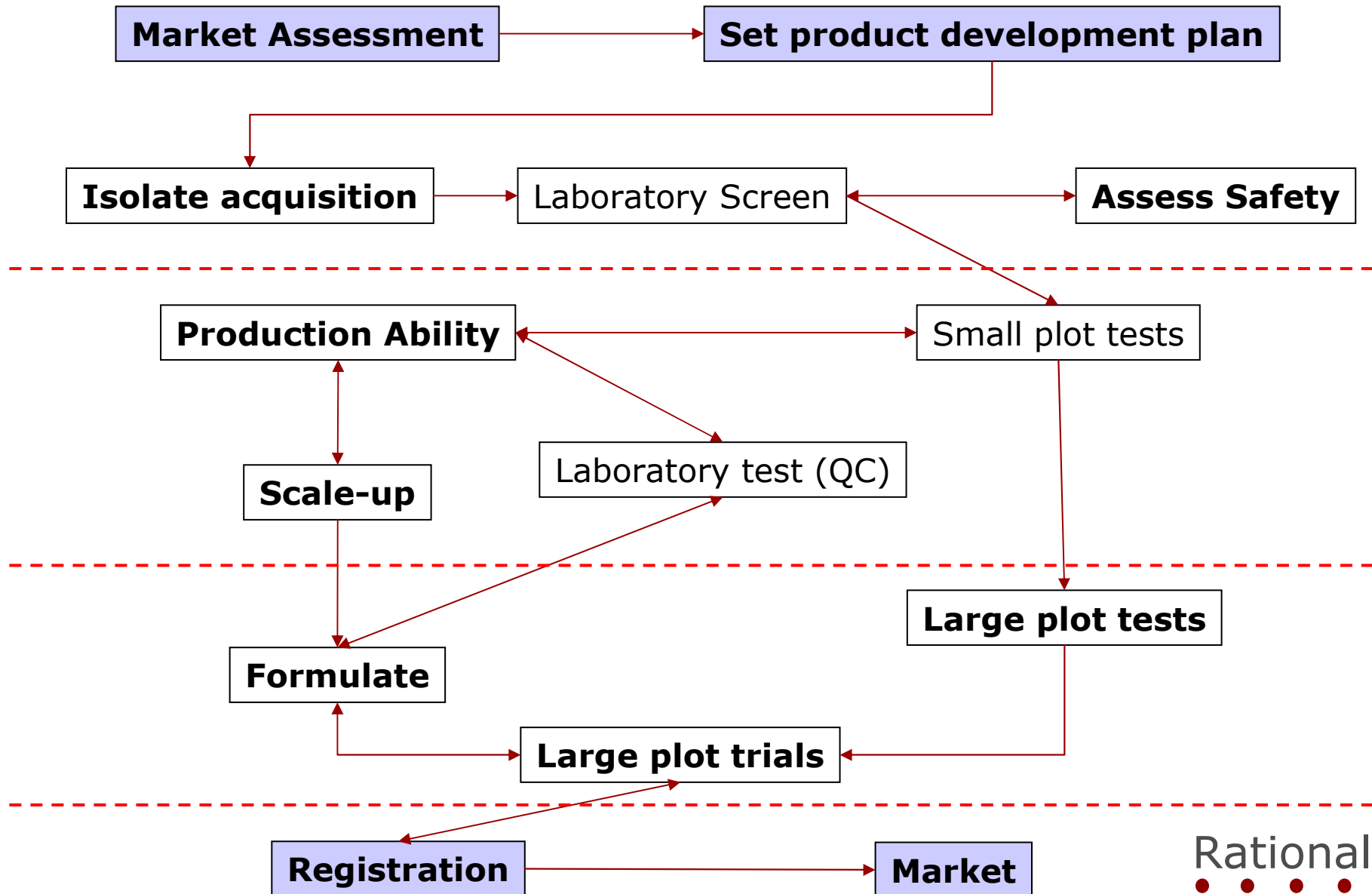
# Product Development Pathways Project



## **Features of a typical product development pathway followed by commercial based organisations**

- Matrix pathway
- Project market driven
- Funding resource and success driven
- Short laboratory phase – focus on field efficacy
- Applied tests in glass house and field
- Managed by team
- Production capability important

# Product Development Pathways Project

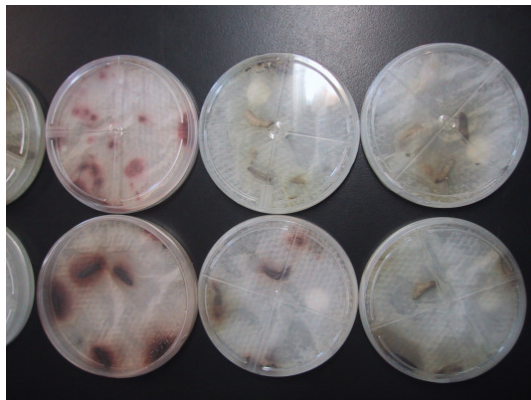


# Product Development Pathways Project



## Approaches to product development

- Use laboratory assays to indicate activity only – y/n
- Screen isolates in pots or semi-field – need large amounts of isolates
- Use semi-field for dose rate, timing etc.
- Use laboratory work to find environmental parameters
- Focus on limits - when isolate **not** working



# Product Development Pathways Project



## Approaches to product development

- Use laboratory work to find environmental parameters
- Focus on limits - when isolate **not** working
- Field trials – tend to do one or two large (expensive) well planned trials
  - Higher risk but higher rewards
- Commercial companies culture of risk, research organisations generally risk averse

# Product Development Pathways



Activity	Research Organisation	Producer
Driver for project	Supply	Market
Resources	Funding cycles	Break points
Isolate acquisition	Search & collections	Isolate collection
Screen for activity	Yes	Yes
Isolate selection	Laboratory based	Pot test based
Safety	No	Yes
Production	Evaluation tests	Commercial potential
Formulation - store	Occasional	Yes
Formulation - applicn	Rarely	Yes
Pot/Semi-field tests	Yes	Yes
Field trials	Occasionally	Always
Grower trials	Occasionally	Always
Market	No	Yes
Registration	No	Yes

# Product Development Pathways Project



## **Reasons for successful product development from funded projects**

- Products developed with partnerships with commercial producer
- Market demand for products
- Take up of BCA often depends on commitment and drive of scientist involved
- Policy framework encourages uptake
  - government pragmatic approach to regulations and registration
  - government funds work and/or subsidises product
  - support from research institute
- Good quality control of final product

# Product Development Pathways Project



## **Role of funding organisations in successful product development**

- Donors scope only from research organisations
- First point of search – scientific papers not products available
- Traditional links between researcher institutes and donors - bias work
- Donors funding demands exclude commercial development  
e.g. rarely include product development route or registration,
- In UK EPN never funded through DFID programme – no traditional links with scientists working on EPN

# Product Development Pathways Project



## **Cultural differences between research and producer organisations that can impede product development**

- Commercial research considered low quality
- Field work – not rated highly for publication
- Many research scientist inexperienced in field work and grower trials
- Difficult to develop long term relationships between the groups
- Scientist can be unrealistic about value of isolates – commercial company values scientist know-how most
- Commercial organisations more willing to take risks

# Product Development Pathways Project



## **Recommendations for successful product development of BCA generated through research**

- Answer these questions first:
  - Is there a market ?
  - Does the isolate work in the field ?
- Involve commercial producer at concept stage
  - May not be final producer but will provide advice and has first option
  - Establish viability of market before resources committed
- Production research – confirm feasibility only
- Develop long term partnerships – but need to be realistic that this often not be full-time work
- Isolate development – research organisation then by Commercial Org.
- Donors - give funds directly to commercial organisations



[roma.gwynn@dial.pipex.com](mailto:roma.gwynn@dial.pipex.com)

**Rationale**  
● ● ● ● ●  
Biopesticide Consultants