

Chapter 2

Programme Objectives

ToR 1.

Identify the programme objectives and examine their compatibility with the overall strategy of the Department of Agriculture, Fisheries and Food

2.1 Introduction

This chapter, together with Chapter 3, will examine the first of the evaluation questions, which concerns itself with the programme's validity or rationale. Specifically, this chapter will attempt to

- Identify the need for a programme for the eradication of bovine tuberculosis;
- State the objectives of the programme under review;
- Evaluate the compatibility of these objectives with government strategy; and
- Comment on the nature of the inter-linkages between the BTEP and other programmes operated by the Department of Agriculture, Fisheries and Food.

2.2 The need for a bovine TB eradication programme

The review of the literature [Appendix B] and the views of stakeholders interviewed in the preparation of this report support the contention that the Programme meets three clearly distinguishable needs:

- The maintenance of market access, in particular by enabling compliance with Directive 64/432/EEC and the bovine tuberculosis chapter of the *Terrestrial Animal Health Code* of the World Animal Health Organisation (OIE);
- The reduction of TB-related animal production losses; and
- The protection of public health.

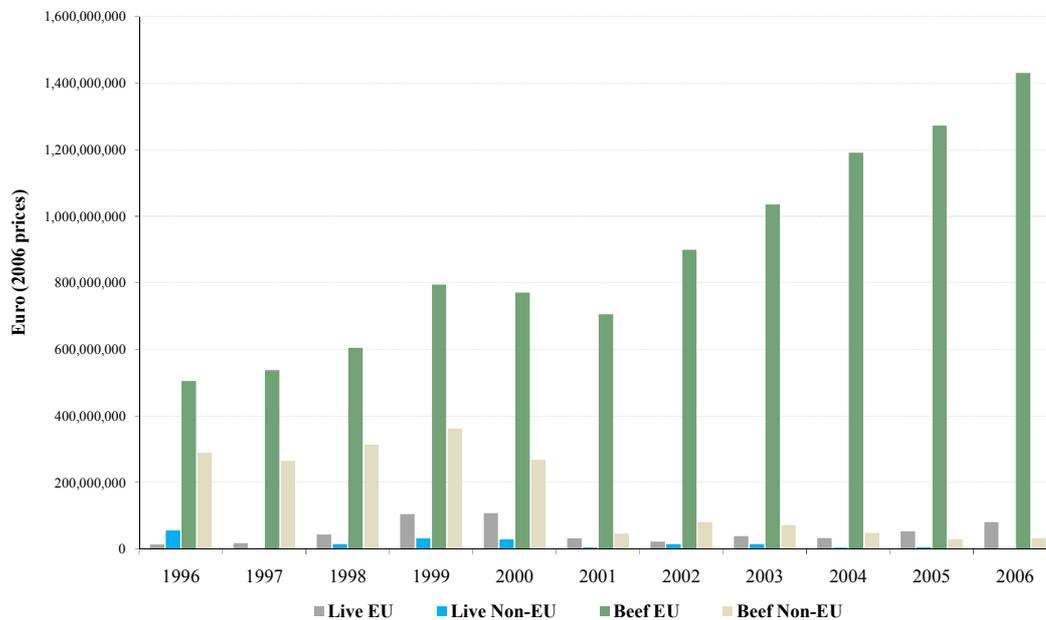
2.2.1 Market access

The need to maintain export markets for Irish cattle played a pre-eminent role in bringing about a programme for the eradication of bovine tuberculosis in Ireland. The earliest comprehensive review of the programme states that

... the introduction, in 1954, of measures to eradicate bovine tuberculosis in this country was necessary to safeguard our store cattle export trade with Great Britain in view of the rapid progress of the attestation programme in that country.
(Watchorn)

It is difficult to overstate the importance of this trade to the national economy of the day. Watchorn places the value in 1954 of the Irish store cattle export trade at over ‘20% of the total value of all exports to all countries’ (ibid.), while the absolute monetary value of the trade at that time has separately been estimated at some £19m, then equivalent to 3.3% of GNP (Sheehy & Christiansen).

Figure 2.1 Net exports of Irish beef and live cattle by destination



Source: DAFF
Note: 2006 data are provisional

Today, the agricultural economy continues to play a significant role in our economic well-being [Table 2.1], and the generation of wealth through agriculture continues to be inextricably linked to the country’s ability to export agricultural produce [Table 2.2]. Following the decline in the importance of third country markets, particularly from about 2000 onwards, Irish beef and veal exports have relied increasingly on EU markets, which have become the prime destination for Irish live cattle, beef and dairy products [Table 2.3 and Figure 2.1]. In order to safeguard the continued existence of this trade, Ireland has no option but to comply with EU legislation regulating intra-community

trade in bovine animals and their products, in particular Council Directive 64/432/EEC (see below).

EU Legislative requirements

The European Commission takes the view that the eradication of bovine TB should be the ultimate objective of all member states, and that the requirements of Community legislation should be considered to be no more than the absolute minimum level of measures to be implemented in order to achieve that objective. The Commission regards the implementation of specific, additional measures by member states facing particular constraints as being essential to ensuring that the national programmes are effective and capable of delivering the long-term objective of eradication. EU legislation establishes that member states' surveillance systems for bovine tuberculosis must be based on a dual approach of diagnosis of disease in the live animal (through tuberculin testing) and its detection at the point of slaughter. This approach is endorsed by the European Food Safety Authority (EFSA), which holds that, while meat inspection at abattoirs provides an indispensable tool of both public health protection and animal health surveillance, the combination of meat inspection and live animal testing represents best practice for bovine tuberculosis surveillance (EFSA, 2003).

Trade in animals

As a member of the European Union, Ireland's ability to preserve access to the Community market depends on her continued capacity to meet the requirements of the legislative instruments governing intra-community trade in live animals, meat and milk. Trade in live animals is governed by Council Directive 64/432/EEC, which sets out the conditions necessary for qualification to trade in bovine animals, establishes the measures member states must undertake to diagnose tuberculosis in cattle and defines the officially tuberculosis-free (OTF) status of animals and herds. Under the terms of the Directive, bovine animals consigned from one member state to another must originate from an OTF herd and have been submitted to a pre-movement test for TB. As previously stated, the TB eradication programme not only enables Ireland to meet the requirements of the Directive but also to address the equally important objective of eliminating this disease from the national herd.

Dairy products

Trade in milk is governed by Council Directive 2004/41/EC and by Regulation 2004/853/EC of the European Parliament and Council which establish that milk originating from herds that do not have OTF status must be heat-treated and that milk from animals showing a positive or inconclusive reaction to the tuberculin test must not be used for human consumption.

The role of trade in live animals

The existence of a live cattle trade is commonly thought to provide a benefit to cattle farmers by stimulating competition in the beef processing sector. This effect was referred to by a number of the stakeholders interviewed for this review, and it has been the subject of previous economic analysis which found that processor concentration to be inversely related to producer prices, and, conversely, the number of buyers to be positively associated with the price paid for livestock (O'Connell, 1995)¹. In addition, the live trade is said to provide benefits to producers by virtue of its ability to reduce home product bias in the country of destination, and because it allows finishing and slaughter in the country of destination to be matched more closely to local taste than is possible in the case of beef slaughtered in the country of origin (ibid.). The magnitude of the price stimulating effect was estimated in 1994 to be almost IR£58m, or some IR£64.05 per animal. A similar study, carried out in 1997, estimated the benefit to producers of the existence of the live trade to be of the order of IR£60.10 per animal (O'Connell, 1997). Both studies concluded that, while live exports do not of themselves determine price levels, they do make a positive difference to Irish cattle prices and that producer prices may be expected to be stronger when live exports account for a relatively high proportion of total export disposals.

2.2.2 Animal productivity

In addition to the trading needs met by the BTEP, it has also been acknowledged that the Programme has the effect of reducing the level of tuberculosis-related animal production losses that would be expected to occur in its absence. A cost-benefit analysis, carried out in 1991, estimated that the avoidance of such losses led to productivity gains that were of an order of magnitude of between 3% and 4% of total cattle and milk output (Sheehy and Christiansen). This conclusion was based on previous work (Morris, 1988), which

had identified the various components of improved productivity resulting from the absence of disease.

Thanks largely to the comprehensive programme of TB testing, in which the cattle population of some six and a half million is subjected to some nine million tests *per annum*, tuberculosis in cattle has become a sub-clinical disease in Ireland. However, the abandonment, or significant curtailment, of the current monitoring programme would be likely to result in a resurgence of TB-related production losses in the national cattle herd. The time scale over which this would occur is unclear, given that the relationship between the rate of reduction of animal disease and the intensity of TB testing is not linear (Downey, 1991). While the health and productivity of the national bovine herd, as manifested by clinical disease, is unlikely to suffer significantly at moderate reductions in programme intensity, reducing the frequency of testing beyond that required to ‘crop’ reactor numbers on an inter-annual basis may lead to a disproportionate resurgence in disease, particularly given the powerful ‘seeding’ effect exercised on the bovine population by infected wildlife reservoirs. The experience of Great Britain in the period following the outbreak of Foot and Mouth disease in 2001 is instructive; the drastic curtailment of the national TB testing programme in that year, resulted in an acceleration in the underlying rate of increase (evident since the mid-1980s) of TB incidents². The total number of TB incidents recorded in 2002 was 92% higher than that in 2000. Despite a decline in the number of incidents reported in 2006, disease levels in that year remained close to or above those reached in 2002 (Defra, 2007).

2.2.3 Human health

The link between tuberculosis in cattle and in humans had been clearly established long before the inception of the Irish eradication scheme. The tubercle bacillus (*M. tuberculosis*) was identified and isolated by Robert Koch in the late nineteenth century, but the recognition of the possibility of disease transmission between cattle and man predates Koch’s discovery by some 40 years. A study carried out by a Royal Commission in England in 1911 had reached the conclusion that bovine tuberculosis constituted a risk to human health and that measures should be taken to remove the hazard. Testing of cattle herds was introduced in the United Kingdom in 1935 in order to reduce the incidence of tuberculosis in the bovine population and this measure, combined with milk pasteurisation, which also became common in the 1930s, is believed

to be responsible for a marked fall in the human incidence of tuberculosis (Hardie and Watson; Moore; O'Connor).

In Ireland, by the mid-1950s, the development and widespread use of antibiotics and BCG vaccination, together with the pasteurisation of dairy products, had already contributed to a dramatic reduction in the prevalence of human tuberculosis prior to the initiation of a programme of testing for bovine animals. The number of deaths from tuberculosis fell quite steeply from 8,798 in 1904 to 3,216 in 1938, before stabilising and recrudescing during the 1940s and 1950s (Dáil Éireann, 1945, 1957, 1993). However, the difficulty in differentiating isolates of *M. tuberculosis* from those of *M. bovis* complicates the estimation of the relative contribution of human and bovine sources to human infection (Thoen et al.)³. In the period 1st January to 31st December 2007, 474 cases of human TB were notified, of which 224 cases were culture positive. *Mycobacterium tuberculosis* was isolated in 201 of these cases, *M. bovis* in 5 cases, and *M. africanum* in a further 2. In 16 of the culture-positive cases the isolate was unknown (Health Protection Surveillance Centre). Given the extremely low level of human *M. bovis* infection in contemporary Ireland and the prophylactic effect of vaccination and pasteurisation, it seems clear that such human health benefits as can be attributed directly and exclusively to the BTEP are likely to be confined to those individuals whose occupations bring them in direct contact with cattle (Thoen et al.; O'Connor).

EU Legislative requirements

Trade in animal products for human consumption is governed by Directive 2004/41/EC and by Regulations (EC) 2004/853/EC and (EC) 2004/854, which form part of a package of legislative measures⁴, introduced by the EU to modernise, consolidate and simplify previous EU legislation in this area, to establish effective and proportionate controls throughout the food chain, and clarify the responsibilities of food business operators in relation to the safe production of food. Regulation (EC) 2004/854 lays down the procedures for post-mortem inspection at the slaughterhouse, some of which are specifically aimed at detecting lesions of TB. Strict conditions are laid down for inspecting the carcasses of animals that have shown a positive or inconclusive reaction to the TB test. Meat from animals with generalised TB must not be declared fit for human consumption. In cases where tuberculous lesions are confined to the lymph nodes of

only one organ or part of the carcase, only the affected organ or part of the carcase and the associated lymph nodes need be declared unfit for human consumption.

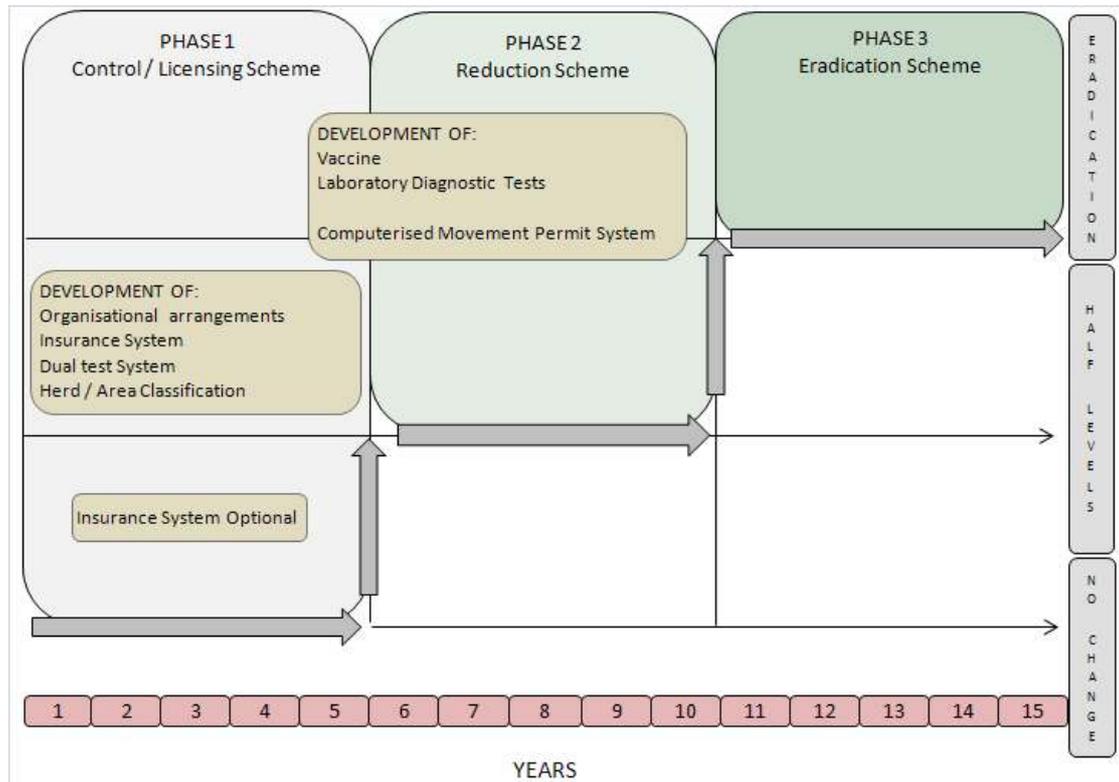
2.3 Programme objectives

In the period from the Programme's inception up until 1991, the Programme's undifferentiated objective was the eradication of bovine tuberculosis. The publication in that year of an assessment of progress by the then National Director of ERAD marked a change in direction, in that disease control, as opposed to eradication, came to be accepted as the '*most realistic expectation, at least in the short to medium term*' (Downey, 1991). This assessment was made following a critical appraisal of the constraints to eradication, carried out by ERAD in the early 1990s [1.5.5 and Appendix B].

As a result of this exercise, ERAD was able to restate the objectives of the Programme by reference to the known (and perceived) constraints then identifiable and to set out a time frame over which it was considered that these might be realistically addressed. Programme objectives were restated in a temporal sequence, running from the control of the disease to its reduction, and finally to its eradication. Progress from one objective level to the next was now predicated on the successful resolution of the constraints relevant to the preceding objective level [Figure 2.2].

Crucially, however, due to the limitations of the knowledge then available, ERAD was unable to quantify the *relative* importance of the constraints identified. With the benefit of hindsight, and in the light of the experience of national eradication programmes in other jurisdictions, it is clear that not all of the factors identified by ERAD are of equal significance in constraining eradication. In other jurisdictions, eradication programmes of considerably less sophistication than the BTEP have shown themselves quite capable of bringing about eradication where the epidemiology of bovine tuberculosis does not involve an endemically infected wildlife reservoir. In comparison, as has been the case in Ireland, bovine tuberculosis has proven to be far more intractable in those countries in which it exists concurrently in bovine and wild animal reservoirs, especially where the latter are both widely distributed and legally protected.

Figure 2.2 Strategy for the eradication of bovine TB, 1991



Source: Adapted from Downey, 1991

The cost-benefit analysis of the Programme by Sheehy and Christiansen (1991) also interrogated the objectives of the Programme and presented two possible strategic responses. Firstly, they postulated as a policy option the abandonment of eradication, even in the long run, and its replacement with a ‘*least cost control programme*’. This would have an estimated annual cost of some £50 million, (then) equivalent to about 2.5% of revenue from bovine products. This expenditure could be regarded as a ‘*quality control overhead, necessary to maintain access to markets for Irish beef and dairy products*’. The alternative, which, in their view, would be more in keeping with Ireland’s declared commitment to produce quality food, would be to

Retain eradication as a long-term objective while taking the necessary steps to make that objective a reality. Only with new technology can eradication become possible.

(ibid.)

Thus, the formally stated long-term objective of the Bovine Tuberculosis Eradication Programme continues to be:

To eradicate bovine tuberculosis.

While the interim objective of the Programme, from about 1991 onwards, came to be understood as being:

To control bovine tuberculosis at levels consistent with maintaining trade in bovine animals and their products, at minimum cost to the Exchequer, while overcoming the constraints to eventual eradication through investment in research and technology.

The formal restatement of objectives undertaken by ERAD brought much-needed clarity to the Programme's objectives, and effectively provided the blueprint for the strategic management of the disease eradication programme since that time. The interim and long-term objectives are congruent and mutually supportive; progress towards the interim objective reinforces the achievability of the long-term objective and the preservation of the latter provides the rationale for advancing the former. The corollary of this interdependence is that any weakening of either the long-term or interim objective has the effect of undermining the other.

2.4 Compatibility of Programme objectives with government strategy

The objectives of the Programme, as defined in the preceding section, are compatible with government strategy as reflected in the Programme for Government, the Statement of Strategy of the Department of Agriculture, Fisheries and Food, and the Business Plan of the relevant Division within the Department. In order of increasing generality, government strategy in relation to bovine tuberculosis is expressed in the following manner:

Divisional Business Plan

The Mission Statement of ERAD Division describes its role in relation to disease management as being that of 'managing the programmes for the eradication of bovine

tuberculosis and brucellosis in a budgetary efficient manner'. Its specific objective is expressed in the following terms:

In association with the relevant parties (i.e. veterinary profession and farming bodies): to reduce, through control measures, the incidence of TB and brucellosis leading to their eventual eradication; and to maintain the industry's ability to trade in livestock and livestock products through observance of EU trade rules on animal health.

Statement of Strategy of the Department of Agriculture, Fisheries and Food

Of greatest relevance to the Bovine TB Eradication Programme are the following Departmental Goals:

Goal 1: Develop an internationally competitive consumer focused agri-food sector and support and facilitate trade in agriculture and food.

Goal 2: Ensure the highest standards of food safety and consumer protection, animal health and welfare, and plant health.

(Department of Agriculture and Food, 2004)

Programme for Government

The present Programme for Government undertakes to:

Implement measures, including taxation measures, in order to assist farmers in maximising their income from farming and achieving optimum structures and scale.

(Fianna Fail, The Green Party & The Progressive Democrats, 2007)

Separately, the government's commitment to the eradication of disease and the protection of human health is evident from the stated aim to:

Establish "Biosecurity Ireland" as a division within the Department of Agriculture and Food with a remit to ensure the exclusion, eradication or effective management of risks posed by diseases and pests to the economy, the environment and to human and animal health.

(ibid.)

2.4.1 Compatibility with horizontal government strategy

The Department of Finance actively encourages the development of performance indicators and objectives that are capable of description in both qualitative *and* quantitative terms, preferably using a SMART framework⁵ (Dept. of Finance, 2004). However, examination of the objectives of the BTEP reveals that, while they clearly establish the aims of the Programme in qualitative terms, they fall short of government guidelines in relation to their measurability. It is undoubtedly the case that objective setting is a considerably more straightforward task in some programmes than it is in others and it is a particular challenge for programmes, such as the BTEP, in which the achievement of significant additional progress is conditional on the development of technical solutions to complex problems. It is difficult, in a context in which bovine tuberculosis has generally been kept under control over the period under review [6.3], to set meaningful, quantifiable objectives, particularly when the Programme is faced with significant, continuing constraints. Nonetheless, the specific commitment of the VFM process to critically examine programme objectives is such that this review would be incomplete if it failed to examine the objectives of the BTEP from the point of view of their compatibility with Department of Finance guidelines.

The measurability of the long-term objective – the eradication of bovine tuberculosis – is unproblematic in that the level of disease constituting national official freedom from TB is clearly defined in European legislation⁶. On the other hand, the term over which the long-term objective can be achieved is unknown because it is contingent on progress made against the interim objective. While the interim objective, as presently configured [2.3], may be regarded as an accurate and pragmatic statement of the Programme’s objectives, it is clear that it is poorly quantifiable. It would seem, therefore, that an opportunity exists to improve the transparency and measurability of both the interim and long-term objectives by introducing quantitative elements into the former, relating to disease control and to research and development. This could be achieved by attaching a qualifying statement to the interim objective that provides the required degree of clarity. Thus, the interim objective would remain, as previously stated: ‘to control bovine tuberculosis at levels consistent with maintaining trade in bovine animals and their products, at minimum cost to the Exchequer, while overcoming the constraints to eventual eradication through investment in research and technology’.

The clarifying statement accompanying the interim objective would be as follows:

As long as the constraint imposed by the existence of an infected wildlife reservoir continues to exist, progress towards the interim objective will be considered adequate if the herd incidence, the absolute number of reactor animals and the number of reactor animals per thousand animal tests (APT) continue to follow a declining trend as represented by the respective five-year exponential moving averages. The interim objective will be formally reassessed in 2013, at which time it is expected that research into badger vaccination will have reached a point that will enable projections to be made as to its likely long-term impact on bovine tuberculosis.

In order to reduce the effects of inter-annual variability, the trends in the principal disease indicators, listed above, are best measured using a moving average. The choice of moving average is important, in that it must be capable of presenting long-term trends in disease, while placing an appropriate emphasis on recent events. Following consultation with the Centre for Veterinary Epidemiology and Risk Analysis (CVERA), it would appear that this compromise is best achieved using a five-year exponential moving average, incorporating a 5% tolerance band. Presenting actual disease outcomes against the longer-term trend in this manner provides a means of reporting progress to all stakeholders in a clear and easily understandable manner. The establishment of a common understanding of what is meant by 'disease control' creates an opportunity to re-engage all stakeholders in those tasks that are required to bring the final objective of eradication ever closer, while clarification of the time-frame for reporting progress in relation to the badger vaccination programme highlights the importance of this work to the overall eradication strategy.

2.4.2 Compatibility with other programmes

Brucellosis eradication programme

The programme for the eradication of bovine brucellosis is that which is most closely associated with the BTEP. The Department has traditionally accounted for the two programmes jointly under the same expenditure sub-head and a number of operational synergies exist between the two programmes. Routine brucellosis testing is generally carried out by a single operative - the Private Veterinary Practitioner (PVP) - in conjunction with tuberculin testing, thereby providing efficiency gains to both programmes and savings to the herdowner, resulting from the reduced requirement to

present cattle for testing⁷. Furthermore, ICT systems for the management of brucellosis have a long history of attaching themselves to existing TB computer architecture, ever since limited software to deal with the former was added to the Nixdorf TB management system, which came into service in 1986.

Other animal health programmes

The annual monitor required to maintain Ireland's Enzootic Bovine Leucosis-free status is carried out concurrently with tuberculin testing, as are periodic surveys for Johne's disease and Bluetongue. The marginal costs associated with the taking and processing of samples are thus the only charges incurred by these animal health schemes.

Inter-operability of ICT architecture

The Bovine TB Programme has driven the development of computer systems capable of managing animal disease programmes since the establishment, in 1978, of a mainframe system to automate payments made to PVPs carrying out testing under the tuberculosis and brucellosis eradication programmes. The first comprehensive national epidemiological investigation of tuberculosis using computerised information was carried out by mining data held on this system. Synergies continue to exist between the ICT architecture underpinning the management and surveillance of the BTEP and that of a number of other diseases. A recent report on the introduction of the AHCS system, which came about largely in response to the needs of the BTEP, acknowledges the potential of the system to adapt itself to the management of other diseases:

The generic, multi-species design of the AHCS facilitated a rapid extension of the system to enable the creation of a national database of poultry keepers for Avian Influenza purposes in December 2005.

(Dept. of Agriculture and Food, 2006a)

The inter-operability of ICT architecture has allowed for data held on separate systems to be brought together to improve the quality of the management tools available to individual schemes, such as the BTEP. At the same time, the potential of software developed for use in a particular programme or scheme can rapidly be exploited in other, unrelated programmes. The *HerdFinder* system, discussed in Chapter 4 [4.7.3] is a good example of this type of cross-fertilisation; it was adapted for use during the Foot and

Mouth Disease outbreak in 2001 and has subsequently undergone further adaptations to enable its use in combating other existing and emerging animal disease threats.

Traceability systems

The TB test plays an important role in guaranteeing the traceability of the national bovine herd by acting as a quality control check on the national CMMS database. The undertaking of a national round of tuberculin testing on the entire national herd within any given calendar year provides a unique and regular opportunity for a complete and legally enforceable muster of the national cattle herd, thereby optimising the accuracy of data held on CMMS.

Contingency planning for exotic disease

The physical and human infrastructure originally developed to deal with bovine tuberculosis is a key resource in Ireland's contingency planning for emerging exotic disease threats such as Avian Influenza, Foot and Mouth Disease and Bluetongue. The existence of an extensive network of District Veterinary Offices manned by trained and qualified staff, familiar with the geography and farming practices in each county, represents a valuable asset in the fight against emerging animal disease threats. The disease dynamics of bovine tuberculosis, which are less 'explosive' than those driving many exotic diseases, permit the temporary diversion of resources from tuberculosis eradication to the provision of an emergency response to exotic diseases, without significantly undermining the ongoing TB control and eradication programme. Good disease management practice would, in any event, dictate that routine TB-related work would cease or be scaled down significantly in the event of an outbreak of exotic disease, in order to minimise the potential for spread of the latter. Resources released from the TB Programme in such an eventuality represent a valuable asset from which the Department can draw if faced with an animal disease emergency. The extent of the negative impact on the bovine TB levels of such a hiatus in the Programme would obviously be related to the duration of the period over which resources needed to be diverted in this way.

Provision of general veterinary advice

The performance of the tuberculin test brings a veterinary practitioner onto cattle holdings on at least two occasions in the course of a year, providing an opportunity for

herdowners to discharge their obligations with respect to other schemes, such as dairy herd health certification. The veterinary practitioner's presence on the farm also provides an opportunity to monitor the animal welfare status of the herd and to provide advice as required.

2.5 Key findings

- The programme addresses three clearly defined needs: the maintenance of access to markets, most importantly that of the EU, for bovine animals and their products; the reduction of tuberculosis-related animal productivity losses; and the protection of human health.
- Preservation of access to the valuable internal market of the European Union depends on Ireland's continued capacity to meet the requirements of the legislative instruments governing intra-community trade in live animals, meat and milk. Maintaining access to extra-Community markets similarly depends on Ireland's continued ability to comply with the relevant requirements of the OIE and such conditions as may be imposed bilaterally by our various trading partners.
- The existence of an export market for live cattle stimulates domestic producer prices.
- The long-term objective, which has remained constant since the programme's inception, is to *eradicate bovine tuberculosis*.
- The interim objective of the programme has evolved as knowledge of the factors constraining eradication has advanced. Since the early 1990s, following the period of management by the executive agency ERAD, it has come to be *the control (of) bovine tuberculosis at levels consistent with maintaining trade in bovine animals and their products, at minimum cost to the Exchequer, while overcoming the constraints to eventual eradication through investment in research and technology*.
- Programme objectives are compatible with government strategy for the agricultural sector.
- Programme objectives, as currently stated, are poorly quantifiable.
- Numerous inter-dependencies and synergies can be identified between the BTEP and other programmes operated by the Department.

2.6 Conclusions

- The rationale for the existence of a programme for the eradication of bovine tuberculosis is strong, deriving from its ability to: (i) ensure that access to export markets for Irish cattle and their products is unimpeded by the continuing presence in this country of bovine TB; (ii) reduce the impact of tuberculosis-related animal productivity losses, and; (iii) provide additional safeguards that help protect our human population from this important zoonosis.
- Programme objectives are congruent with government strategy for the agricultural and wider economy, but alignment with horizontal guidelines for policy development could be improved by incorporating quantitative elements into the interim objective.

2.7 Recommendations

Recommendation 1

The interim objective of the programme, previously articulated, should be clarified by the following statement:

“As long as the constraint imposed by the existence of an infected wildlife reservoir continues to exist, progress towards the interim objective will be considered adequate if the herd incidence, the absolute number of reactor animals and the number of reactor animals per thousand animal tests (APT) continue to follow a declining trend, as represented by the respective five-year exponential moving averages. The interim objective will be formally reassessed in 2013, at which time it is expected that research into badger vaccination will have reached a point that will enable projections to be made as to its likely long-term impact on bovine tuberculosis”.

TABLES

Unless otherwise stated, data in these tables are expressed in constant (2006) prices [Appendices A, E] and are sourced from the Department of Agriculture, Fisheries and Food

Table 2.1 Contribution of agriculture to the Irish economy

Economic Indicator	Primary Agriculture	Agri-Food Sector *
Gross Value-Added at factor cost (estimate)	2.3%	8.0%
Employment	5.4%	8.1%
Exports (estimate)	5.8%	10.0%

* Agri-food includes primary agriculture, food, drinks and tobacco.

Table 2.2 Imports and exports of meat of bovine animals

Country	Exports 2005		Country	Imports 2005	
	US\$ '000	Rank		US\$ '000	Rank
Australia	3,563,707	1	United States of America	3,436,316	1
Brazil	2,419,103	2	Italy	2,111,772	2
Netherlands	1,923,635	3	Japan	2,005,516	3
Canada	1,463,896	4	France	1,261,665	4
Ireland	1,435,154	5	United Kingdom	1,064,532	5
Germany	1,326,965	6	Russian Federation	953,104	6
New Zealand	1,269,185	7	Mexico	874,141	7
Argentina	1,170,312	8	Germany	873,299	8
France	992,289	9	Netherlands	868,710	9
United States of America	847,533	10	Korea, Republic of	670,005	10
Uruguay	736,017	11	Spain	607,004	11
India	596,219	12	Greece	483,101	12
Belgium	505,035	13	Denmark	377,837	13
Spain	472,093	14	Chile	346,244	14
Italy	354,814	15	Canada	296,880	15
Poland	334,457	16	Taiwan, Province of China	286,882	16
Denmark	298,918	17	Portugal	274,105	17
Austria	277,874	18	Sweden	272,395	18
Ukraine	142,753	19	Malaysia	189,592	19
Belarus	122,928	20	Belgium	188,269	20
Nicaragua	119,139	21	Hong Kong, S.A.R. China	150,254	21
Mexico	109,059	22	Israel	140,640	22
Chile	54,403	23	Saudi Arabia	124,845	23
Lithuania	50,573	24	Philippines	114,440	24
United Kingdom	46,583	25	Austria	96,582	25
China	41,503	26	Brazil	81,019	26
Costa Rica	32,442	27	Switzerland	76,620	27
Hungary	30,702	28	Ireland	59,002	28

Source: UNCTAD/WTO. Note: 2005 prices

Table 2.3 Irish beef exports to EU markets (1996-2005)

Year	Value €m	EU value as % total beef exports	Volume '000 tonnes	EU volume as % total beef exports	Value / volume ratio
1996	528	64.3%	166.5	43.5%	3.17
1997	566	67.7%	190.0	49.6%	2.98
1998	633	66.6%	210.7	51.0%	3.01
1999	809.32	68.9%	263.7	51.4%	3.07
2000	791.98	74.3%	246.4	57.3%	3.21
2001	728.36	91.9%	220.5	83.1%	3.30
2002	921.82	90.8%	287.3	80.2%	3.21
2003	1,061.82	92.6%	328.7	82.9%	3.23
2004	1,234.44	95.0%	361.4	88.0%	3.42
2005	1,329.16	96.3%	365.0	91.7%	3.64
2006	1,504.25	96.5%	396.6	92.6%	3.79

Source: CSO, DAFF. Note: Current prices

NOTES

¹ Paper prepared for the Irish Livestock Exporters' Association by Dr. John O'Connell.

² In evidence to the House of Commons Environment, Food and Rural Affairs Committee, Professor John Bourne stated that the incidence of TB in cattle in Britain has been doubling every four and a half years (House of Commons, 2008).

³ Routinely, typing of strains is only carried out to the level of *Mycobacterium* complex, and this does not differentiate between *M. tuberculosis* and *M.bovis*. These strains can be differentiated using spoligotyping techniques, however. All of the approximately 800 samples that were typed using this technique between 1996 and 2000 were shown to be *M.bovis*.

⁴ The legislation comprising the 'Hygiene Package' includes Regulations 852/2004/EC on the hygiene of foodstuffs, 853/2004/EC on hygiene rules for food of animal origin and 854/2004/EC, which is concerned with the organisation of official controls on products of animal origin intended for human consumption. Other elements of the package include Directive 2004/41, which repeals previous EU legislation (including Directives 64/433/EEC and 92/46/EEC) or amends existing legislation, and Directive 2002/99/EC which lays down the animal health rules on products of animal origin for human consumption.

⁵ SMART objectives are those that can be described in a *Specific, Measurable, Achievable, Relevant, and Time-Bound* manner

⁶ Directive 64/432/EEC states that, on the basis of information supplied in accordance with Article 8, a Member State or part of a Member State may be declared officially tuberculosis-free according to the procedure laid down in Article 17 if it meets the following conditions:

- The percentage of bovine herds confirmed as infected with tuberculosis has not exceeded 0.1% per year of all herds for six consecutive years and at least 99.9% of herds have achieved officially tuberculosis-free status each year for six consecutive years, the calculation of this latter percentage to take place on 31 December each calendar year;
- Each bovine animal is identified in accordance with Community legislation;
- All bovine animals slaughtered are subjected to an official post-mortem examination;
- The procedures for suspension and withdrawal of officially tuberculosis-free status are complied with.

⁷ This is not the case in all comparable jurisdictions; in Northern Ireland, for example, brucellosis testing is typically carried out by a lay operative employed by the Department for this purpose (DARD)