

# Durham University and its role in Malta's development planning during the 1950s through applied research

John A. Schembri  
Department of Geography,  
University of Malta,  
Msida MSD 2080,  
Malta  
E-mail [john.a.schembri@um.edu.mt](mailto:john.a.schembri@um.edu.mt)

David K. Chester  
Department of Geography and Environmental Science,  
Liverpool Hope University,  
Liverpool  
L16 9JD  
E-mail [cheded@hope.ac.uk](mailto:cheded@hope.ac.uk)

Ritienne Gauci  
Department of Geography,  
University of Malta,  
Msida MSD 2080,  
Malta  
E-mail [ritienne.gauci@um.edu.mt](mailto:ritienne.gauci@um.edu.mt)

Janet Speake  
Department of Geography and Environmental Science,  
Liverpool Hope University,  
Liverpool  
L16 9JD  
E-mail [speakej@hope.ac.uk](mailto:speakej@hope.ac.uk)

Angus. M. Duncan  
Department of Geography,  
University of Liverpool,  
Liverpool,  
L69 3BX  
E-mail [aduncan@liverpool.ac.uk](mailto:aduncan@liverpool.ac.uk)

Joanna Causon Deguara  
Department of Geography,  
University of Malta,  
Msida MSD 2080,  
Malta  
E-mail [joanna.causon-deguara.10@um.edu.mt](mailto:joanna.causon-deguara.10@um.edu.mt)

## ABSTRACT

In the 1950s the University of Durham was involved in a number of separate externally-funded projects that were aimed at assessing Malta's potential for development after it became independent from the United Kingdom. Following a pilot study, a group led by W.B. Fisher of the Department of Geography together with a team from the University of Malta, obtained what at the time were substantial funds from the Colonial Office's *Colonial Economic Research Committee* (CERC). Concurrently K.C. Dunham, Head of the Department of Geology, successfully obtained support from British Petroleum to carry out a geological survey, while a soil survey was separately commissioned. As well as marking the first of what was to become an established tradition of applied development projects in the eastern Mediterranean and Middle East, the Durham Geography Department also used its growing profile of external funding to stimulate an expansion of both its teaching and its research, so as to become one of the largest departments in the United Kingdom. Reflecting the zeitgeist of the time, Fisher and his colleagues viewed applied research, not only as an academic exercise but also as a route to human betterment, and perceived the researchers' task as providing information and policy options upon which decisions makers may formulate policy. They eschewed any attempt to fully consider different development strategies. However, some younger researchers in their later outputs and doctoral theses adopted a more critical approach about the options for Malta's future. The principal issue raised by Durham team was a concern that post-independence Malta was facing a Malthusian trap in which the islands would not have a sufficiently productive resource base to support its growing population. Over the past six decades the trap has been avoided because of a growing economy,

but today pressures of people on resources are once more acute and a case is made for a second land-use survey.

## 1. Introduction

On September 21 1964 Malta achieved its independence from the United Kingdom after serving as a Mediterranean military outpost for over a century and a half.<sup>1</sup> From the mid-1950s onwards the University of Durham was involved in a number of separate, though interlinked and largely externally funded projects in order to assess the islands' potential for development.<sup>2</sup> Although the Department of Geography provided the lead with a major land-use focused study, valuable contributions were made through research undertaken by members of the Department of Geology and the Soil Survey of England and Wales, so that by the 1960s these projects had spawned a major research monograph, *Malta: Background for Development* (Bowen-Jones et al. 1961a), four Ph.D. theses (Beeley 1960a; Charlton 1960; Richardson 1960; Wigglesworth 1964) and a plethora of reports, published papers and maps (Bowen-Jones 1955a, 1955b, 1972; Cirillo 1959; Mitchell 1958, 1959; Beeley 1960b; Lang 1960a, 1960b).<sup>3 4</sup>

The burgeoning of Malta-based research in Durham was due to a conjunction of circumstances that came together in the middle years of the 1950s, these being: first, a desire by a group of young scholars led by W.B (Bill). Fisher, H. Bowen-Jones

---

<sup>1</sup> The three principal islands in order of size are Malta, Gozo and Comino.

<sup>2</sup> Until 1963 the Durham Colleges were part of the federal University of Durham. In 1963 it split into the University of Newcastle, with the Durham Colleges becoming the University of Durham. In addition to Durham and Newcastle, the federal university also included Fourah Bay College, Sierra Leone and Codrington College in Barbados.

<sup>3</sup> Concurrently economic geographer, R.W. Hill, carried out research in Malta but produced his PhD thesis on Libya (Hill 1960) and P.K. Mitchell, research fellow on the land-use project, later successfully submitted a PhD thesis in historical geography (Mitchell 1965). Geological research was officially independent of the work carried out by the geographers, but the latter drew extensively on the findings of the former.

<sup>4</sup> The methods used in this paper involve: detailed bibliographic study; interviews with two of the senior surviving members of the research teams, Drs Brian Beeley and the Revd. Dr. J.C. (Chris) Wigglesworth, and archival research in the University of Durham and the London School of Economics, the latter being the location the Colonial Office Archive.

and John. C. Dewdney to use geography to assist reconstruction following the depredations of war and in developing emerging economies within an intellectual climate that favoured applied research; secondly, a wish for the department to grow both in student numbers and research quality and, finally, the availability of funds to assist in the development of Malta which was soon to become independent. A discussion of the career trajectories of these scholars, together with that of Professor Charles Kingsley Dunham, Head of the Geology Department and leader of the geological research programme, is provided in the supplementary information which accompanies this paper.

### *1.1. Applied geography as an engine for development*

One aspect of applied geographical research in the period from the Second World War to the 1970s was that its practitioners were largely concerned with description, classification and providing data upon which politicians and civil servants could base public policy. This was a period before the trenchant criticism levelled by David Harvey and others over the covert support and legitimisation such studies provided to the state and its agencies, prevailing political ideologies and, in the context of the Malta, a shoring-up of post-colonial independence agreements and desired patterns of future economic and political development (Harvey 1973, 1974; Bennett and Wilson 2003). At one level this is true and *Malta: Background for Development* begins with the statement: 'it is not intended to provide a plan for specific lines of development - we feel strongly that this is not our function. Instead we hope our study will provide a background for development, the establishment of a factual corpus of knowledge that will allow development and future policy making by others' (Bowen-Jones et al. 1961a, 8).

Even at the time, one reviewer was highly critical of the approach taken by the Durham researchers, claiming that they should have been more proactive in providing pointers to the better use of the islands' resources (Young 1962). As will be argued later this was not the whole story and, in contrast to 'official' reports provided to the project's sponsor, in academic publications and doctoral theses staff and research students provided many critical comments on both past and possible future economic development of the Maltese Islands. In retrospect, Fisher and Bowen-Jones remained unrepentant and justified their approach on anthropological grounds, arguing that by claiming not to be working on the development of policy allowed researchers to develop close contacts at grassroots level, so as to appreciate the complexities associated with local environmental, cultural and technical conditions. Following the Malta project the Durham team used their approach across a range of Middle Eastern and North African countries, which included: Ethiopia; Iran; Jordan; Libya; Oman; Saudi Arabia and the United Arab Emirates (Fisher and Bowen-Jones 1974).

### *1.2 Aims of the Paper*

In this paper we will first discuss the complex evolution of the Malta projects focusing in particular on the land-use based studies carried out within the geography department at Durham University and, secondly, the findings and outputs of these studies in the context of the development history of islands before and since independence.<sup>5</sup>

Funding for the Malta land-use survey was provided by the United Kingdom's Colonial Office, through its Research Council and the Colonial Economic Research

---

<sup>5</sup> On 21 September 1964 Malta became an independent constitutional monarchy, with Elizabeth II as Queen of Malta and Head of State. In 1974 Malta became a republic.

Committee (CERC), but the British State was also heavily involved across a range of programmes in preparing its colonies and overseas territories for independence. The aim was that future development should, not only allow the new state to prosper, but also be in the best economic and strategic interests of the former colonial power. With reference to the research discussed in this paper, two additional United Kingdom initiatives were important. The first was the Directorate of Colonial (Geodetic and Topographical) Surveys which was set up in 1946.<sup>6</sup> Although focusing mainly on topographic mapping, it also carried out land-use surveys in northern Nigeria, Kenya and Malawi, and an environmental survey on Grand Cayman (West Indies). In contrast to the Durham survey of Malta, great use was made of aerial photographs because of the large areas involved (Brunt 1964; Mc Grath 2006; Anon 2020). The second programme was geological research undertaken by the Directorate of Colonial Geological Surveys in a large number of colonies and territories. This involved not just geological mapping, but investigations into mineral and hydrocarbon potential, engineering geology and water supply. By 1956 it employed over 200 geologists, geophysics and geochemists, all of whom were good honours degree graduates (Dixey 1957).

## **2. The Malta Projects**

The 'Malta Projects' had a long gestation. Bill Fisher first visited the islands in 1946, returning in 1953 and 1954 in the latter case to conduct a course of lectures for staff officer candidates on the political geography of the Mediterranean Region. He also began to consider research opportunities and, following discussion with Sir James Duff, Warden of the Durham Colleges, was able to obtain funds to carry out,

---

<sup>6</sup> In 1957 it became known as the Directorate of Overseas (Geodetic and Topographical) Surveys and in 1966 the Directorate of Overseas Surveys.

not only a reconnaissance land-use based survey in Malta, but also to establish working relationships with the Maltese Government, agriculturalists and economists, in order to bid for a more substantial grant from the Colonial Office. The total cost of the reconnaissance survey was around £444, less student contributions of between £20 and £25 each. Given a total cost of around £263 (equivalent to £7,100 in 2020). The value of the student contributions represented more than twice the average weekly wage in 1954, raising questions over whether participation was equally open to all students regardless of circumstances (Anon 1955a, 1-2).<sup>7</sup>

A group of geographers visited the islands in March and April 1955 comprising: two staff, Howard Bowen-Jones and John Dewdney; one research student (Peter Mitchell) and four student helpers who paid for their visit. Given the limited monies available the aims of this initial project were restricted and concentrated on producing a preliminary land-use survey and a broader review of Maltese agriculture (Bowen-Jones 1955a, 1955b). A surveyor was also 'loaned' from the Geography Department to the Geology Department's field mapping programme (Anon 1955b, 16-17). There were two outputs from this initial land-use survey, both authored by Howard Bowen-Jones. First, there was an 'official' account of what had been achieved by the field party (Bowen-Jones 1955a), but this was only part of the report with much of the rest reading like the first draft of a grant application it subsequently turned out to be. The report was based on a combination of field work, archival research and interviews with farmers and officials, and anticipated future funded

---

<sup>7</sup> Translating historic costs from the mid-1950s into contemporary values is difficult because several measures may be used. Using purchasing power, then £1 in 1954 is approximately equivalent to £27 in 2020, CPI Inflation Calculator (<http://www.in2013dollars.com/uk/inflation/1954>) viewed on 27 May 2020. For comparison of remuneration, wages and salaries, values are related to current University of Durham salary scales.



collaborative research with the Royal University of Malta. It succeeded in cementing academic relationships between the Durham team and Maltese academics and public officials. Collaborative links were established with: Revd. Dr Renato Cirillo, Lecturer in Economics; Mr J.J. Cole, Minister of Agriculture; Mr O. Paris, economic adviser to the Prime Minister and Mr D.H. Simpson, librarian of the Royal Empire Society in London. The second publication was a more critical personal view of Maltese agriculture, farmers, wholesalers and government (Bowen-Jones 1955b). Produced in just six months, the principal findings of both narratives are summarised in Table 1.

At the same time the Geology Department fielded a party of four, whose research was concentrated on mapping the geology of Malta and Gozo, which was long overdue because at the time the most recent map was originally published in 1890 (Debono 2019; Gauci and Schembri 2017, 2019). Funded by D'Arcy Exploration (which was associated with British Petroleum), this was led by Professor Dunham and included Dr. M.H.P. (Martin) Bott, Dr M.R. (Michael) House and Dr A.A. (Albert) Wilson.<sup>8</sup> The geological research allowed two maps to be published by the UK Ordnance Survey in 1955, one of Malta the other for Gozo, at a scale of 1: 31,680 (2 inches to the mile). From 1958 to 1964 J.C. (Chris) Wigglesworth undertook postgraduate research funded by the Department of Scientific and Industrial Research and was supervised by Michael House (see the supplementary material).

---

<sup>8</sup> There was feeling at the time that the motivation for the research was not just the economic search for hydrocarbons, but was also strategic as a means of demonstrating that the United Kingdom was committed to the future development of Malta. There were concerns that Prime Minister, Dom Mintoff, might be 'flirting' with the Russians. Dr Wigglesworth's research began in 1958 and was funded by the UK's Department of Scientific and Industrial Research (DSIR), which in 1965 had its functions dispersed across a variety of bodies, including the Science Research Council (SRC) and the Natural Environmental Research Council (NERC). Dr Wigglesworth later became a Minister in the Church of Scotland. Interview with Revd. Dr J.C. Wigglesworth, at the National Library of Scotland, Edinburgh 9th August 2017.

. With an initial focus the field mapping of Gozo, Chris Wigglesworth completed his PhD in 1964 (Wigglesworth 1964) and Michael House subsequently moved to a Chair at the University of Hull. Research on the geology of Malta then continued in Hull with the appointment of Martyn Pedley to undertake postgraduate research on the Oligo-Miocene sediments of the Maltese Islands (Pedley 1974a). Michael House provided Pedley with the field slips prepared by Kingsley Dunham's mapping team and he followed this with further detailed mapping. This resurvey by Martyn Pedley led to a revised Geological Map (scale 1:25,000) of the Maltese Islands being published by The Office of the Prime Minister of Malta in 1993 (printed by the British Geological Survey). Martyn Pedley continued his research on Malta as a member of the academic staff at Hull University into the 1990s and is currently regarded as a leading expert on the geology of Malta (Pedley 1974b, 1978; Pedley et al. 1976).<sup>9</sup>

In his novel *The Go-Between*, A.P. Hartley remarks that the 'the past is a foreign country; they do things differently there' (Hartley 1953, 1) and it is our contention that there are few academics active today who would appreciate the arcane manner by which the Durham land-use and associated projects were, not only funded, but also staffed. A background account is therefore included as Supplementary Material.

### **3. Development issues facing Malta in the 1950s**

When academics from Durham and their Maltese partners began their research they were faced with a host of issues which needed to be addressed. These were not just focused on preparing the islands for independence, but also in examining the

---

<sup>9</sup> Some information from an interview with Dr. H. Martyn Pedley, University of Hull, 27 August 2018.

ways in which the Maltese economy and society might develop in the post-independence era.

Inhabited from around 8,000 years ago, for most of its history and as a result of its strategic position in the Mediterranean, the archipelago of Malta has been dominated by larger and more powerful political entities which have included: the Phoenicians (ca. 750 - ca. 480 BCE), who brought trade and in their wake a nascent Semitic language and culture; the Carthaginians (ca. 480 BCE - ca. 218 BCE); Roman invaders (ca. 218 BCE to the end of fourth century CE) and Byzantines (fourth century - 870 CE). During the ninth century the islands fell under Islamic domination which left its mark on the Maltese language, religion, place-names, crops and agricultural techniques. European powers asserted their suzerainty from the eleventh century. Initially this was Norman rule, re-Christianisation was complete by 1249 and was followed by successive episodes of Swabian, Angevin and Aragonese government, with the Spanish King Charles I ceding control of the islands to the *Sovereign Military Order of Malta* (SMOM)<sup>10</sup> in 1530. The Ottoman Turks attacked the islands in the sixteenth century, culminating in the unsuccessful Siege of Malta in 1565. After a brief interlude of French control under Napoleon (1798-1800), from 1800 British rule was established and ratified by the Treaty of Paris in 1814 (Bowen-Jones and Beeley 1961).

For the British, Malta was an important staging post in its seaborne empire and, after the opening of the Suez Canal in 1869, the islands became a major strategic asset in the central Mediterranean for its armed forces, especially for the Royal Navy. Activities were initially focused around the harbours adjacent to the island's capital,

---

<sup>10</sup> Officially the *Sovereign Military Hospitaller Order of Saint John of Jerusalem, of Rhodes and of Malta*.

Valetta (Figure 1), but later spread to include the infrastructure necessary to support a large garrison and, from the 1940s, three substantial military air-fields. The effects on the islands were economic, demographic, social and political. Until the 1950s and stimulated by defence spending, the economy grew, a skilled, educated labour force emerged to support the garrison and dockyard activities, but produced an unbalanced economic structure with an over-dependence on defence-related activities. For instance: in 1918 visible exports paid for only 10% of all imports, but had fallen to only 5% in 1956; in 1954, 81% of negotiable income was derived from service pay, dockyard labour, expenditure by the armed services and grants from the imperial power, and the islands were heavily dependent on food imports even of produce that could have been grown and locally sourced (Balogh and Seers 1955; Bowen-Jones and Charlton 1961a, 1961b; Briguglio 1988).

In just over a century from 1842 to 1956 the population of Malta nearly trebled from 114,000 to 316,000 with its density increasing from 361 per km<sup>2</sup> to 969 per km<sup>2</sup> and showed a concentration around the capital, Valletta, and its harbours (Figure 1). Growth was due to a combination of increased economic prosperity, falling death rates as a result of improvements in health and high rates of natural increase. One controversial political issue in the 1950s was the question of Malta's ability to support its population and, following the major destruction caused by the Second World War, emigration was perceived as a desirable policy option.<sup>11</sup> By December 1946 some 12,000 potential emigrants had been identified, with preferred destinations splitting roughly equally between Australia and the USA. This figure rose to over 42,000 in 1949 and in the same year a financial package, the Passage

---

<sup>11</sup> Across Malta, around 30,000 buildings suffered destruction or damage during the Second World War including homes, churches, hospitals, government offices, military installations and factories. In addition almost 1,300 civilians were killed (Spooner 1996, 111).

Assistance Scheme, was introduced later supplemented by bilateral agreements between Malta and Australia and further subsidies from the UK government. Despite fluctuations year on year, between 1948 and 1956 some 43,000 people left the islands mostly settling in Australia (Figure 2) (Richardson 1961).<sup>12</sup>

The issues raised by this policy are twofold. First many of the migrants were skilled younger workers and funds were also made available for vocational training so denuding the islands of some of its most highly trained and potentially productive labour. Secondly the notions of 'over-population' or 'optimum population' then current in the political sphere, were disputed by the Durham team who pointed out that for centuries Malta had had to support its population through international trade and colonial linkages, rather than by means of its indigenous land-based resources. 'Up to the present time fortune has smiled and there has been no fall in living standards as might be expected in consequence of extreme over-population. Yet, during historical times at least, the population has always been too great for self-sufficiency and in this sense has always been over-large. ... The obvious question is whether this process has now reached its limit' (Richardson 1961, 161-162). Indeed in the late 1950s and with the exception of Cyprus and Israel, the per-capita income of the Maltese Islands was higher than that of other countries in the Eastern Mediterranean Region and twice as high as the average for the states in the Middle East and North Africa, though its rural areas contained many redoubts of poverty (Richardson 1961, 161-162). The Durham team viewed these issues as major foci for their research. Whilst recognising that self-sufficiency was an unachievable goal,

---

<sup>12</sup> Between 1950 to 1965 migration to Australia also included 310 unaccompanied minors, many but not all of whom were sent ahead by their parents (Plowman 2010).

nevertheless they were clear that far more could be achieved to reduce reliance on agricultural imports and to address poverty and deprivation in rural society.

After a period of instability between the wars, with episodes of representative government and also of direct rule, the latter being imposed throughout the Second World War, a new constitution was enacted in 1947. This provided for a legislative assembly, with party government acting through an Executive Council who advised the governor, the latter retaining powers for public safety and defence. When the Durham project was conceived and up to independence in 1964, political instability was endemic reflecting deep cleavages within society. This was manifest: politically, by the economically centre-right and socially conservative Nationalist Party and the socialist and more secular Labour Party; religiously, as expressed in commitment to Catholic social policy and in particular in attitudes towards birth control; spatially, as contrasts between urban and rural areas and culturally and economically, as reflected in the social and occupational structure of Malta. Further discussion of these issues is to be found in the Supplementary Material.

#### **4. Research Findings**

In accordance with the *zeitgeist* of applied research in the 1950s and the restricted remits set by the Durham teams and their Maltese partners, the research findings of the funded research programmes and those of commercial consultancy largely comprised detailed information upon which future policy could be based. Although limited suggestions were made about alternative options, policy formulation remained firmly the purview of government, its agencies and, in the case of geological and geophysical data, the company who paid for the research. In contrast within doctoral theses, younger academics showed a greater willingness explicitly to

explore the implications of their research in the context of Maltese development after independence.

#### 4.1. Project-Based Publication

The details of geological investigations remained commercially confidential and this meant that reported findings entering the public domain were more descriptive than those of either the soil survey, or of the research funded by the Colonial Office. In addition to the 1: 32,680 scale maps, the geological team authored a chapter in *Malta: Background for Development*, in which they confirmed in some detail the previously accepted five-fold sub-division of stratigraphy of the islands (House et al. 1961).<sup>13</sup> No discussion was forthcoming on such key issues, however, as: the economic geology of individual formations; their hydro-geological characteristics; the earthquake exposure of the population; weathering and erodibility of different rock types or landslide risk.<sup>14</sup> Some, though not all these issues, are considered in subsequent chapters of the volume which are authored by John Dewdney, who hones in on what he considered the crucial issue of water supply (Dewdney 1961a., 1961b), although the extent to which he was aware of the 'confidential' parts of the geological report is unclear. In 1952 the Morris Report had been published by the Government of Malta and this gave Dewdney *carte blanche* to be highly critical in his assessment of water supply problems since he could align his

---

<sup>13</sup> From youngest to the oldest these comprise: Upper Coralline Limestone (maximum thickness 162 m); Greensand (0-15 m); Blue Clay (0-70 m); Globigerina Limestone (23- 207 m) and Lower Coralline Limestone (at least 191 m).

<sup>14</sup> J. C. (Chris) Wigglesworth reports (per. com) that British Petroleum drilled a bore hole between 1958 and 1960 and that he visited the site. In fact the situation was more complex. In 1955 an exploration concession was granted to BP Exploration Co. Ltd. Between 1955 and 1959, four bore holes were drilled at: Ghar Lapsi (ca. 280 m); Naxxar (ca. 610 m); Zabbar (ca. 590 m) and Naxxar 2 (ca. 3000 m). As a result of negative results, BP gave up its licences in 1959 (Anon 2019a)

findings closely with official thinking (Morris 1952). The Morris Report concluded that, as the population of Malta has risen 'higher consumption ... has had to be painfully met at the cost of higher salinity ... (and that the) present rate of over-pumping is suicidal', so allowing Dewdney to call for sustained action to reduce consumption pointing out *inter alia* conflicts between irrigation and urban water and concluding that 'water shortage is a background against which all plans for future development, including the industrial, must be viewed' (Dewdney 1961b, 45-46).

Soil science investigations undertaken by D.M. Lang<sup>15</sup> were significantly more analytical than those of the geological survey largely because its results, were not just summarised in *Malta: Background for Development*, but were also published under the *imprimatur* of the Colonial Office as an official publication (Lang 1960a, 1960b 1961). Amongst other things Lang concluded that: most soils are calcareous requiring better aeration so that an excess of CO<sub>2</sub> may reduce pH and so allow more nutrients to be available for plant growth; that experimental plots and field trials are required fully to assess future fertilizer applications; that the utilisation of town refuse may already have had unfavourable effects on soil toxicity and that ground water salinity, plus irrigation with brackish water, has affected many soil profiles. There is also a strong policy steer towards better drainage and the use of less saline water in irrigation. In extending the soil survey results to a discussion of erosion under different types of tillage, Bowen-Jones and Dewdney point out the importance of the maintaining field boundaries, retaining walls and terraces and the need for constant vigilance, both under traditional methods of cultivation and before the introduction of any new techniques (Bowen-Jones and Dewdney 1961, 99).

---

<sup>15</sup> Dr David Malcolm Lang of the Soil Survey of England and Wales.



As far as the funded CERC research is concerned, virtually all the points made in the reconnaissance survey (Table 1), were supported by the detailed research reported in *Malta Background for Development*, though the conclusions of the former are notably more forthright than those of the latter. The volume is divided into four sections: I. Land; II. People; III Agriculture and IV Assessment of Culture Landscape. In Section I, in addition to descriptions of geology, relief and landforms, soils, erosion and tillage, there is also detailed study of climate. For decades after this remained the most authoritative account of Maltese climate and concludes with the trenchant observation 'that current Maltese farming practices are adjusted to average conditions ... Flexibility to cope with departures from mean conditions must be a major consideration in any plans for agricultural development' (Mitchell and Dewdney 1961, 81).

Section II begins with a detailed historical study and then examines modern Malta, focusing its narrative around: population and migration; economy and trade; constitutional questions and social concerns. Some authors yearned to be more forthcoming in making firmer policy recommendations, but remained broadly compliant with their remit to provide data with minimal commentary. Non-prescriptive suggestions were, however, made to policy makers which included:-

- i. Can an ever-increasing population be supported, by a combination of on-shore marine-based activities, Malta's limited indigenous land resources and the nascent tourist industry (Richardson 1961, 162-163).
- ii. Doubts were raised about whether the measures contained within the 1959-1964 *Development Plan for Malta* would be sufficient to maintain living standards once funds from the United Kingdom were removed (Bowen-Jones and Charlton 1961a; Bowen-Jones et al. 1961b, 172-173).

iii. Overcoming divisions in society. Improvements in social services and better educational opportunities since the Second World War had created dichotomies within Maltese society, between people over and under 30-35 years of age. The former cohort comprised many illiterate and socially conservative inhabitants, whereas the latter are more 'radical and impatient (and are) largely responsible for the drift from the land which encourages the domination of agriculture by a residual conservatism' (Bowen-Jones et al. 1961b, 177).

Although disagreeing profoundly with the authors' decision to eschew policy advice, one highly critical reviewer of the project was forced to admit that Section III was its most successful and played to the academic strengths of the research team (Young 1962, 80-81). The heart of this section is a descriptive account based on the land-use survey, the mapping being supplemented by field sketches (Figure 3), and at the time and subsequently the clear intention was that the maps would form a data-base upon which future land-use planning could be based.<sup>16</sup> Mapping was focused at a very detailed field-scale on a base of either 1: 10,560 (6 inches to the mile) or 1: 2,500 (ca. 25 inches to the mile) when fields became small and/or cropping was very complex. Aerial photographs were not used to any great extent and between 1955 and 1958 field work comprised four seasons of five weeks carried out during Durham University vacations (Bowen-Jones et al. 1961a; Aquilina 1991). Information was additionally collected on: farm holdings; farming families; the practice of farming and, by means of a strongly anthropologically-based study, the attitudes of farmers and characteristics of rural society, all with the aim of facilitating evidence-based

---

<sup>16</sup> Section III of Bowen-Jones et al. (1961a, 188-348), *Malta: Background for Development*, is divided into many small sections authored by B.W. Beeley, H. Bowen-Jones; J.C. Dewdney and P.K. Mitchell. The original maps were stored in the Department of Geography University of Durham, with the hope that they would eventually be published at a scale of 1: 32,680 (2 inches to the mile). The present authors have been unable to locate these maps and assume they have been either lost or destroyed.

policy making in the future. Although no specific actions are suggested, the authors provide conclusions that point toward policy development. These include:-

- i. The rate of migration to urban areas is at its lowest where agriculture is most productive.
- ii. Land classified as waste and abandoned is spreading most rapidly in remote areas, on land that is physically difficult to crop and on land of moderate quality located on peri-urban margins, where there is fierce competition with urban land-uses. On better quality peri-urban land there are cases of successful intensive market gardening.
- iii. Although the Maltese Islands are small in area, remoteness was still an important factor and was associated with lower standards of farming practice and a more restricted range of crops.
- iv. Several aspects of land tenure - including fragmentation of holdings - severely constrained agricultural production and imposed a brake on agricultural improvement (see Table 1).
- v. Though most farmers are market orientated, there are problems with appreciating the needs of both domestic and foreign markets, and in being dealt with fairly by traders and wholesalers. 'This inability must be corrected because the farmer and his (*sic*) land are potentially capable of supplying more of the Islands' agricultural needs than they do at present, and of making a considerable positive contribution to the balance of trade which at the moment they help to distort' (Bowen-Jones and Charlton 1961b, 336).
- vi. There is a serious problem of younger members of farming families being dissatisfied with the social *milieu* of the village and with making a career in farming.

*Malta: Background for Development* concluded with Section IV which sums up the major aims and findings of the research. It introduces no new materials, but

calls for stable post-independence political and economic environments in which harbour-based commercial activities, *entropôt* trade, tourism and export-focused market gardening and horticulture may flourish. Without such developments and a stable polity, Bowen-Jones paints a bleak picture, predicting a combination of 'a starvation level existence' set within a degraded landscape (Bowen-Jones 1961, 353).

#### 4.2. Doctoral Theses

Earlier discussion has indicated that, when free of the shackles of producing materials under a brief agreed with the Colonial Economic Research Committee (CERC), academics could be highly critical of official policy (see Table 2). In the case of doctorates produced by the geologists, J.C. Wigglesworth and H.M. Pedley, their originality lies in the manner in which they address questions of a pure research character and, in the context of this paper, require no further discussion. In contrast to their more senior colleagues who had to embrace the CERC research ethos, younger academics associated with the project were free to challenge policy options for post-independence Malta. The findings of these theses are summarised in Table 2 and, from the perspectives of rural society, the Maltese economy and demography, authors agreed that the prospects for post-independence Malta were far from certain.

### **5. The CERC project, post-independence Malta and the future**

The key issue raised by the Durham team, whether expressed implicitly or explicitly, was the fear that post-independence Malta was facing a Malthusian 'trap' in which, once external support from the United Kingdom was eliminated, the islands would not have a sufficiently productive resource base to support its growing population. They were not the only ones to be concerned. By 1964 this pessimism

was heightened by a report of a United Nations Mission to Malta (the Stolper Report), which advocated renewed emigration and predicted a fall in per capita incomes because the islands would not be able economically to absorb its increasing population (Stolper et al. 1964; Jones 1971; Briguglio 1988). A second Five Year Plan was launched in 1964 and, whilst accepted that unemployment and emigration would remain high, forecast that the economic transition to independence would have to rely on a mixture of export-orientated industry, agriculture and tourism. In the event by 1969 the economy was faring much better than had been predicted, with output per capita and employment expanding, and emigration lower than envisaged. This was due to a construction boom, fuelled by a vibrant tourism sector, an increase in manufacturing and dock-related activities.

In terms of economic development, the period since 1970 may be divided into two phases: 1970 to European Union (EU) accession in 2004 and the from 2004 to 2020. During the first phase strong economic growth was based on: shipbuilding and repair; manufacturing, especially of textiles, clothing and electronic components and tourism.<sup>17</sup> Industrial estates were established, two on former airfields at Ta' Qali and Hal Far, and by the late 1990s manufacturing and dock-related activities were employing a quarter of the workforce and generating between one quarter and one third of gross domestic product (GDP); not quite replacing British government expenditure in percentage terms.<sup>18</sup> Economic growth was, however, predominantly driven by tourism. The one million tourist mark was passed in 1992: by 1990 the

---

<sup>17</sup> The summary of the situation between 1970 and 2004 is based on information in: Briguglio (1988); Metwally (1977); King (1978); Charlton and Beeley (1987); Lockhart (1991); Beeley and Charlton (1994); Markwick (2001); Schembri (2003); Main et al. (2018).

<sup>18</sup> Other industrial estates included: Albert Town (Marsa); Attard; Bulebel (Żejtun); Kordin (Paola); Luqa; Marsa; Mosta; Mrieħel (Qormi/Birkirkara); Ricasoli (Kalkara, being redeveloped from 2007 to become Smart City technology park); San Ġwann; Ta' Maġġi (near Żabbar); Tal-Handaq (Qormi); and Ta' Dbieġi (near Għarb on Gozo) and Xewkija (on Gozo), most of which ring the harbours of Malta.

sector was accounting for ca.39% of GDP and ca.40% of Malta's exports of goods and services, and was largely responsible for the growth both in population and the urban footprint. The former reached over 400,000 by 2005 and the footprint increased in size from 4.5% in 1960 to 23% in 2001, the later causing a severe loss of agricultural land and further sector contraction. The *Structure Plan for the Maltese Islands* (1992), which involved a major input from the planning consultants Colin Buchanan and Partners UK<sup>19</sup>, included over 300 'policies on settlement, the built environment, housing, social and community facilities, commerce and industry, agriculture, minerals, tourism and recreation, transport, urban and rural conservation and public utilities' (Camilleri 1993; Attard 2005, 159). The government also expressed the desire to broaden the tourist base, but by the time of EU accession the islands were still predominantly a mass-tourism destination. Partly fuelled by constructing the accommodation and infrastructure needed to support the growing tourist industry, there was also an increase in building in the years up to 1970. Building was also stimulated by the construction of industrial estates, and government assisted and private housing (Beeley and Charlton 1994).

From the time of EU accession in 2004 the economy has broadened. Tourism is now more diversified, but the most significant change has been in financial services. Malta's development was aided by: Eurozone membership from 2008; a free-market economy; the presence of an educated English-speaking workforce and a location in the central Mediterranean less than two hours flying time from most European capitals (Main et al. 2020). Malta quickly became a magnet for inward investment, with individuals and corporations re-developing and re-creating many

---

<sup>19</sup> Sir Colin Buchanan (1907-2001) was an eminent transport planner who produced the seminal work: *Traffic in Towns* (Buchanan 1963).

mainly coastal locations as commodities and investment opportunities for wealthy migrants and offshore national/transnational corporations (Speake and Kennedy 2019). A new source of income is gaming which in 2018 contributed some 13% to the Gross Added Value of the economy (Anon 2018a). To support this boom, labour in the form of both 'official' migrants and refugees has been attracted to the islands often earning very low wages, though in the aggregate contributing much to the economy (Schembri and Attard 2013). The consequences are that: the urban footprint exceeded 33% by 2014; the population reached nearly 500,000 in 2019 (with a density of 1,562 per km<sup>2</sup>) and, at over 24,500 Euros in 2017, per-capita income became the highest in the country's history and the fourteenth highest of the twenty-eight countries of the European Union. So vibrant was the economy of Malta that, in contrast to many other countries in the European Union, there was no recession in the construction sector in the years following the World Financial Crisis. Indeed between 2010 and 2016 activity increased by 23%, despite a 12% real increase in building costs. Over the same period productivity increased as employment in the sector shrank by over 11%, the only cloud being a shortage of skilled labour. Future government plans envisage higher spending on infrastructure, particularly roads (Anon 2018a).

Recently a number of us have posited that Malta is now an advanced 'city-island-state' and one that is, not just vulnerable because of its exposure to environmental extremes, but because the erstwhile colonial power has been replaced by 'informal empires' of neoliberal capitalism and tourism with their concomitant commodification of place (Main et al. 2018; 2020). It may be argued that both sources of income are unreliable in the long-run as means of supporting the current population at its present high standard of living.

The jaws of the Malthusian 'trap' did not close in the early years of independence as Durham team and others assumed. In view of discussion above, the fact that Malta is self-sufficient in virtually no category of foodstuffs and that, according to the World Wildlife Foundation in 2014, the ecological footprint of islands was proportionately equivalent to 2.5 earth-sized planets, then the key question may be that the Malthusian 'trap' first identified in the 1950s has been delayed, not eliminated and that it may close sometime in the future (Main et al. 2020). Since the British and Maltese academics published their findings 1961, land-use studies have been undertaken by both Maltese and overseas academics (e.g. Charlton and Beeley 1987; Briguglio et al. 2002; Role et al. 2005; Spiteri 2011 and Conrad et al. 2019). Policies recently developed in Malta to boost agriculture and to consider more sustainable futures have been published (Anon 2018b; Anon 2019b), partly based on findings of these and other studies and, in view of these new national priorities, there may be a strong case for a second comprehensive land-use survey

Finally as a postscript, involvement of the Durham geography department with Malta did not end with the publication of *Malta Background for Development* (Bowen-Jones et al. 1961a), but less intense collaboration continued until the early years of the current millennium. This collaboration involved: Maltese students studying in Durham for both undergraduate and post-graduate degrees; field work in Malta by Durham undergraduates; scholarly engagement across a range of research themes including a coastal zone land-use survey (e.g. Anderson and Schembri 1989, 1990; Anderson et al. 1991) and the supervision of doctoral degrees. These involved investigations into: water scarcity (Birdi 1987); bird shooting and trapping (Fenech 1997); Maltese geopolitical thought (Baggett 1999); slope instability (Magri 2001) and coastal land-use (Schembri 2003). Durham staff, in particular Professors Robert



(Bob) Allison, Ewan Anderson, Peter Atkins and Gerald Blake, are acknowledged in these works.

### **Authors' Note**

In order to comply with the article length requirements of this journal, the authors present additional detailed research work as supplementary material. This material is related specifically: to the career trajectories of the four British academics William (Bill) Bayne Fisher, Howard Bowen-Jones, Kingsley Charles (later Sir Kingsley) Dunham and John Dewdney; the growth of Durham's Geography and Geology Departments; the funding and personnel details of the Malta Project and, finally, the politico-religious context of Malta in the 1950s. The authors invite the readers to read this supplementary information for a more detailed understanding of the context and background narrative which act as an important backdrop to this paper.

### **References**

Anderson, E.W., Schembri, P.J. 1989. Coastal zone survey of the Maltese Islands. Planning Services Division, Works Department, Government of Malta, Beltissebħ.

Anderson, E.W., Schembri, J.A. 1990. The Maltese Islands: a threatened coastline. In: Lockhart, D., Drakakis-Smith, D. (eds.), Environmental and economic issues in small island development. Developing Areas Research Group, The Commonwealth Foundation, London Monograph 6, 5-24.

Anderson, E.W., Role, A., Schembri, P.J. 1991. Coastal zone surveys of the Maltese Islands: onshore and offshore. Commission on Marine Geography Meeting, Huelva, Departamento de Geografia Humana, Servicio de Publicaciones, Universidad de Sevilla, 139-52.

Anon 1949. Notes and News: The British Colonial Social Science Research Council. *American Anthropologist* 51, 167-169.

Anon 1955a. Estimated Expenditure for the Durham Colleges Research Party - Easter Vacation 1955. Durham University Archives (UND/CC2/205).

Anon 1955b. Report for the Warden for the Year 1954-1955. The Durham Colleges in the University of Durham, Durham.

- Anon 2018a. European Construction Sector Observatory: Country Profile Malta, March 2018. European Commission, Brussels.
- Anon 2018b. National Agricultural Policy for the Maltese Islands 2018-2028. Atriga Consultancy, Pieta, Malta.
- Anon 2019a. Oil Exploration in Malta, Government of Malta. Viewed on 28 September 2019 (<http://www.shadowservices.com/nature/Maltese/Geomorph/oil.htm>).
- Anon 2019b. Malta's Sustainable Development Vision for 2050. Government of Malta, Valletta.
- Anon 2020. The Director of Overseas Survey. National Collection of Overseas Survey. Viewed on 11 January 2020 (<http://ncap.org.uk/feature/directorate-overseas-surveys-dos>)
- Aquilina, J. 1991. Meeting People: Professor John C. Dewdney. The Sunday Times (Malta), October 20, 26-27.
- Attard, M. 2005. Coping with Change. The problems of adopting sustainable transport policies in the small island state of Malta, unpublished PhD thesis, University College, University of London.
- Baggett, I.R. 1999. An investigation into the evolution of Maltese geopolitical thought: its heritage, renaissance and rejuvenation? Unpublished PhD thesis, University of Durham.
- Balogh, T., Seers, D. 1955. The Economic Problems of Malta: An Interim Report. Government Printing Office, Valletta.
- Beeley, B.W. 1960a. The individual and changing rural society in Malta: a study of some aspects of the social and economic geography of the Maltese islands, unpublished PhD thesis, University of Durham, Durham.
- Beeley, B.W. 1960b. The Farmer and Rural Society in Malta. Department of Geography, Durham Colleges, University of Durham, Durham.
- Beeley, B.W., Charlton, W.A. 1994. Maltese patterns of dependence: An historical perspective. *Scottish Geographical Magazine* 110 (2), 112-120.
- Bennett, R.J., Wilson, A.G. 2003. Geography Applied. In: Johnston, R., Williams, M. (eds.), *A Century of British Geography*. The British Academy and Oxford University Press, Oxford, 462-501.
- Birdi, N.S. 1997. Water scarcity in the Maltese Islands: geopolitics and management issues. Unpublished PhD thesis, University of Durham, Durham.

- Bowen-Jones, H. 1955a. Agriculture in Malta: A survey of land use. Department of Geography, University of Durham, Durham.
- Bowen-Jones, H. 1955b. Impressions and Notes on the Present State of Maltese Agriculture, Department of Geography, University of Durham, Durham.
- Bowen-Jones, H. 1961. An Assessment of the Cultural Landscape. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, University of Durham, Durham, 349-353.
- Bowen-Jones, H. 1972. Malta - An Essay in Historical Ecology. In: Bowen-Jones, H. (ed.), *Human Ecology in the Commonwealth*. First Commonwealth Conference on Development and Human Ecology, Malta, October 18-24 October. Commonwealth Secretariat, London, 59-74.
- Bowen-Jones, H., Beeley, B.W. 1961. Malta before 1800 A.D. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, University of Durham, Durham, 103-113.
- Bowen-Jones, H., Charlton, W.A. 1961a. Economy and Trade. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, University of Durham, Durham, 115-125.
- Bowen-Jones, H., Charlton, W.A. 1961b. Economic & Commercial Characteristics. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, University of Durham, Durham, 333-336.
- Bowen-Jones, H., Dewdney, J.C. 1961. Slope analysis, erosion and tillage. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, Durham Colleges in the University of Durham, 1961, 99.
- Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. 1961a. *Malta: Background for Development*. Department of Geography, University of Durham, Durham.
- Bowen-Jones, H., Beeley, B.W., Charlton W.A. 1961b. Constitutional and Social. In: Bowen-Jones, H., Dewdney, J.C. and Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, Durham Colleges in the University of Durham, 176-183.
- Briguglio, L. 1988. The Maltese economy since 1960. *Hyphen* 5 (5), 205-223.
- Briguglio, M., Ellul, A. E., Formosa, S., Mallia, A. (2002). Physical background, demography, tourism, mineral resources and land-use. In: Axiak, V., Gauci, V., Mallia, A., Mallia, Schembri, P.J., Vella, A.J., Vella, L. (eds.), *State of the Environment Report for Malta 2002*. Ministry for Home Affairs and Environment, Malta, 39-161.
- Brunt, M. 1964. The methods employed by the Directorate of Overseas Surveys in the Assessment of land resources. *Études de Synthèse* VI, 1-10.

Buchanan, C. 1963. *Traffic in Towns*. HMSO, London

Camilleri F. 1993. The structure plan for the Maltese Islands. In: Busuttill S., Lerin F. and Mizzi L. (eds.). *Malta: Food, agriculture, fisheries and the environment*. CIHEAM, Montpellier, Options Méditerranéennes Série B. Etudes et Recherches 7, 77-81.

Charlton, W.A. 1960. *Trends in the economic geography of Malta since 1800*, unpublished PhD thesis, University of Durham, Durham.

Charlton, W.A., Beeley, B.W. 1987. Land use change in Malta. *Land Use Policy* 4 (2), 96-101.

Cirillo, R. 1959. *Report on the social aspects of Maltese Agriculture*, Royal University of Malta, Malta.

Conrad, E., Fazey, I., Christie, M., Galdies, C. 2019. Choosing landscapes for protection: Comparing expert and public views in Gozo, Malta. *Landscape and Urban Planning* 191, article number 103621.

Debono, G. 2019. *Historical Account of the Geological Map of the Maltese Islands*. Government of Malta. Viewed on the 26 July 2019 (<https://continentalshelf.gov.mt/en/Pages/Historic-Account.aspx>).

Dewdney, J.C. 1961a. Relief and Landforms. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, Durham Colleges in the University of Durham, 34-42.

Dewdney, J.C. 1961b. Hydrology and Water Supply. In: H. Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, Durham Colleges in the University of Durham, 43-47.

Dixey, F. 1957. *Colonial Geological Surveys 1947-1956: a review of progress during the past ten years*. Colonial geology and mineral resources. Bulletin Supplement 2, H.M.S.O., London.

Fenech, N. 1997. *Bird shooting and trapping in the Maltese Islands: some socio-economic, cultural, political, demographic and environmental aspects*. Unpublished PhD thesis, University of Durham, Durham.

Fisher, W.B., Bowen-Jones, H. 1974. Development surveys in the Middle East. *The Geographical Journal* 140 (3), 454-466.

Gauci, R., Schembri, J.A. 2017. From outcrops to maps: the birth of geological maps of the Maltese Islands in the 19th century - Part 1. *Malta Map Society Journal* 1 (2), 16-26.

Gauci, R., Schembri, J.A. 2019. From outcrops to maps: the birth of geological maps of the Maltese Islands in the 19th century - Part 2. *Malta Map Society Journal* 1 (4), 40-47.

Hartley, L.P. 1953. *The Go-Between*. Hamish-Hamilton, London.+

Harvey, D. 1973. *Social Justice and the City*. Edward Arnold, London.

Harvey, D. 1974. What kind of geography for what kind of public policy. *Transactions of the Institute of British Geographers* 63, 18-24.

Hill, R.W. 1960. Some problems of economic geography in Northern Tripolitania: a study of agriculture and irrigation on the Jefara plain, unpublished PhD thesis, University of Durham, Durham.

House, M.R., Dunham, K.C., Wigglesworth, J.C. 1961. *Geology and Structure*. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, Durham Colleges in the University of Durham, 25-33.

Jones, H.R. 1971. The economic transformation of Malta in the 1960s. *Scottish Geographical Magazine* 87 (2), 128-41.

King, R. 1978. The changing role of Malta's dockyards. *Geography* 63 (4), 363-366.

Lang, D.M. 1960a. *Soils of Malta and Gozo*. Colonial Research Studies 29, Colonial Office, HMSO, London.

Lang, D.M. 1960b. *Malta and Gozo: Soils Map*. Director of Overseas Surveys, London.

Lang, D.M. 1961. *Soils*. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), *Malta: Background for Development*. Department of Geography, University of Durham, Durham, 83-98.

Lockhart, D.G. 1991. Tourism in Malta. *Scottish Geographical Magazine* 107, 22-32.

Magri, O. 2001. Slope instability along the north-west coast in Malta. Unpublished PhD thesis, University of Durham, Durham.

Main, G., Schembri, J., Gauci, R., Crawford, K., Chester, D., Duncan, A. 2018. The Hazard Exposure of the Maltese Islands. *Natural Hazards* 92 (2), 829-855.

Main, G., Schembri, J., Speake, J., Chester, D. 2020. The city-island-state, wounding cascade and multi-level vulnerability explored through the lens of Malta. *Area* (in submission).

Markwick, M. 2001. Alternative tourism: Change commodification and contestation of Malta's landscape. *Geography* 115 (3), 227-247.

Mc Grath, G. 2006. The setting for the work of the Directorate. *Cartographica* 20 (1), 1-42.

Metwally, M.M. 1977. Structure and Performance of the Maltese Economy. A.C. Aquilina, Malta.

Mitchell, P.K. 1958. Studies in the Agrarian Geography of Malta. Part 1 Moisture characteristics of the climate. Part 2 The Maltese Farm, Department of Geography, Durham Colleges, Durham.

Mitchell, P.K. 1959. Studies in the Agrarian Geography of Malta, Report to Her Majesty's Colonial Economic Research Committee, Department of Geography, University of Durham, Durham.

Mitchell, P.K. 1965. West Cleveland land use, circa 1550 to 1850. Unpublished PhD thesis, University of Durham, Durham.

Mitchell, P.K., Dewdney, J.C. 1961. Climate. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), Malta: Background for Development. Department of Geography, University of Durham, Durham, 48-82.

Morris, T.O. 1952. The Water Supply Resources of Malta. Government Printing Office, Valletta.

Pedley, H.M. 1974a. The Oligo-Miocene sediments of the Maltese islands. Unpublished PhD thesis, University of Hull, Hull.

Pedley, H.M. 1974b. Miocene seafloor subsidence and later subaerial solution subsidence structures in the Maltese Islands. Proceedings of the Geologists Association 85 (4), 533-547.

Pedley, H.M. 1978. A new lithostratigraphical and mineral resources palaeoenvironmental interpretation for the coralline limestone formations (Miocene) of the Maltese Islands. Institute of Geological Sciences, Overseas Geology and Mineral Resources 54, Her Majesty's Stationery Office, London.

Pedley, H.M., House, M.R., Waugh, B. 1976. The geology of Malta and Gozo. Proceedings of the Geologists Association 87, 325-341.

Plowman, D.H. 2010. A fragment of the Maltese exodus: Child migration to Australia 1953-1965. *Journal of Maltese History* 2 (1), 2010, 1-20.

Richardson, M. 1960. Aspects of the demography of modern Malta: a study of the human geography of the Maltese Islands. Unpublished PhD thesis, University of Durham, Durham.

Richardson, M. 1961. Population and Migration. In: Bowen-Jones, H., Dewdney, J.C., Fisher, W.B. (eds.), Malta: Background for Development. Department of Geography, University of Durham, Durham, 133-163.

Role, A, Muscat, J., Camilleri, S., Camilleri, P., Scicluna, K., Sammut, S.J., Attard, G. 2005. Malta Country Report. Sustainable rural land management in the Maltese Islands: An evaluation of policy instruments and future needs. The 4th Medcoastland Workshop with the theme: Drafting appropriate policies and guidelines to support sustainable land management in the Mediterranean Region, Institute of Earth Systems, University of Malta, no page numbers.

Schembri, J. 2003. Coastal land uses in the Maltese Islands: A description and appraisal. Unpublished PhD thesis, University of Durham, Durham.

Schembri, J., Attard, M. 2013. The foreigner counts: A spatio-temporal analysis of occupiers, immigrants and expatriate residents in Malta. *Ars and Humanitas* 7 (2), 119-134.

Speake, J., Kennedy, V. 2019. 'Buying' into the waterfront dream? Trajectories of luxury property led developments in Malta. *Tourism Management* 71, 246-258.

Spiteri, B. 2011. Towards sustainable management of land and sea uses within the Marsaxlokk Bay area. *Journal of Coastal Research* SI 61, 242-247.

Spooner, T. 1996. *Supreme Gallantry: Malta's Role in the Allied Victory, 1939-1945*. Imperial War Museum, London.

Stolper, W.F., Hellberg, R.E.R, Callander, S.O. 1964. *Economic Adaption and Development in Malta*. Report prepared for the Government of Malta under the United Nations Program of Technical Assistance of the Department of Economic and Social Affairs, United Nations, New York.

Wigglesworth, J.C. 1964. *The tertiary stratigraphy and echinoid palaeontology of Gozo, Malta*, PhD thesis, University of Durham, Durham.

Young, B.S. 1962. Review: *Malta: Background for Development* by H. Bowen-Jones, J.C. Dewdney and W.B. Fisher: *Soils of Malta and Gozo* by D.M. Lang, *The Geographical Journal* 128 (1), 80-81.

## **Acknowledgements**

The authors wish to thank Dr Brian Beeley and Revd. Dr Chris Wigglesworth, who agreed to be interviewed in connection with their role in the project. Dr Michael Stansfield, Deputy Head of Archives and Special Collections University of Durham, provided the authors with invaluable assistance and Mrs Sandra Mather help is acknowledged for expertly drafted the maps. Finally we acknowledge the roles of two anonymous reviewer and the editor whose comments greatly improved the paper.

Table 1

Conclusions	Details
Population and Food Security	An extremely high population density (994 per km <sup>2</sup> in 1955) was supported by large extra-territorial income derived from the islands' location, which allowed Malta to benefit financially by providing services to the armed forces of the United Kingdom (UK), the dockyard being particularly significant. This meant that, although 67% of the land area was cultivated, Malta was far from being self-sufficient in food. Future living standards would depend on the effective use of cultivated land and the maximisation of irrigation potential.
Maximum returns having regards for land conservation	Farming was approximately half-commercial and half subsistence, but required improvement in productivity and specialisation in high-value crops for export, rather than relying on semi-subsistence livestock rearing for domestic consumption. There was extensive use: of the preferred herbicide (a mixture of copper sulphate (CuSO <sub>4</sub> ) and slaked lime (Ca (OH) <sub>2</sub> ) - known as <i>Bordeaux mixture</i> ) and sulphate of ammonia fertilizer ((NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> ). Irrigation and limited mechanisation, were either inappropriately used and/or were not optimised to ensure maximise output, efficient water use and minimal environmental damage.
Suggested Actions	<p>Short-term</p> <ol style="list-style-type: none"> <li>A good husbandry campaign is required to reduce weeds and pests.</li> <li>There is a need for an agricultural advisory service and exemplar holdings to show farmers what may be achieved.</li> <li>Financial support is required to support crops grown for export.</li> <li>A government organisation is required to ensure and maintain quality, inspection and grading of produce.</li> <li>A survey of crops is required, their distributions, farm economies and family budgets so that land may be classified and its potential for development assessed.</li> </ol> <p>Longer-term</p> <ol style="list-style-type: none"> <li>Further focused scientific and social research.</li> <li>Compulsory land registration and a cadastral survey, which have been impediments to land improvement.</li> <li>Trials of new crops.</li> <li>Control of tenurial practices and removal of legal impediments, which have held back land improvement and depressed agricultural yields.</li> </ol>
More critical comments of Bowen-Jones	<ol style="list-style-type: none"> <li>Farmers knowledge of market conditions is limited and not helped by wholesalers ('middlemen') who are widely mistrusted by the farming community. For instance, potatoes were widely grown for export to the UK, but were a low-value water intensive crop. The variety grown, Arran Banner, was also not popular across the whole of the UK. In contrast, vines and olives would thrive in Malta, but were rarely cultivated. In the 1950s these crops were imported in large volumes.</li> <li>At the time of survey, many crops were sown and harvested according to a rigid traditional timetable - causing gluts, shortages and imports at certain time of the year. Given the climate, many crops could be grown at any time of the year.</li> <li>Many examples of poor practice, ignorance and parochialism within farming communities.</li> <li>Ecological research is required if mechanisation and increased yields are to be achieved without deleterious impacts on the soil.</li> <li>As a result of the small size of most agricultural holdings, farmers need to act collaboratively. The notion of the co-operative should be explored.</li> <li>Given the large population and small land area, self-sufficiency is not an achievable goal. There is a need, however, to choose crops that match the ecological conditions of the islands and will produce the greatest financial returns. Market gardening could be more widely adopted.</li> <li>A soil survey is a priority, especially as regards irrigation use.</li> <li>There is a strong case for a major joint Maltese/British research project focused on agriculture.</li> </ol>



Table 2

Research Output	Principal Conclusions
Beeley, B. <i>The individual and changing rural society in Malta: a study of some aspects of the social and economic geography of the Maltese Islands</i> Ph.D. thesis, 1960	<p>It is argued that the agricultural sector and the rural economy were in crisis and Beeley's conclusions are pessimistic about the future and highly critical of existing policy. These criticisms include:-</p> <ul style="list-style-type: none"> <li>i. The younger generation is increasingly unwilling to accept an agricultural way of life. This cohort desires less heavy labour, more limited hours and better financial returns.</li> <li>ii. Subsistence farming has been replaced by a strongly market-orientated agricultural sector. For the younger generation increased income is synonymous with social and economic betterment. Younger people do not expect this to come through farming and are migrating away from the land.</li> <li>iii Farming has a low social status, making it an unattractive way of life.</li> <li>iv. Despite a commercial orientation - there is still a subsistence mindset which is conservative, traditional and resistant to change.</li> <li>v. Government support is causing selective over-production (e.g. of milk) and so is distorting other aspects of the agricultural economy.</li> <li>vi. Official policy is not orientated toward the younger farmer. It is focused on financial support rather than structural change and knowledge transfer.</li> </ul>
Charlton, W.A. <i>Trends in the economic geography of Malta since 1800</i> , Ph.D. thesis, 1960	<p>Since 1800 the Maltese economy has become less and less capable of self-sufficiency. Malta has only survived and prospered because of its strategic position. If this does not continue, either militarily or economically, then 'Malta's <i>raison d' être</i> as a prosperous state will disappear. One problem of development being based on British military expenditure and other government spending, is that it has raised Maltese expectations of high living standards and has encouraged imports. At the same time major disparities exist within society between well-to-do urban groups, who are not wealth producing, and poorer communities whose income is based on dock-related activities, manufacturing and farming. Charlton argued that a vibrant agricultural sector is a vital future strand within economic development. 'Should no new basis for the Islands' economy be found, then there must be serious overpopulation, and because the resources of Malta are so inadequate, little hope of the appearance of a local solution can be held' (page 233).</p>
Richardson, M. <i>Aspects of the demography of modern Malta: a study of the human geography of the Maltese Islands</i> , Ph.D. thesis, University of Durham, 1960	<p>Population growth has been rapid, natural increase is still high and emigration has not been an effective control, depending as it does on external circumstances and policies. There is a policy conflict between welfare measures that raise the rate of population increase and living standards, and the economic reality that necessitates a lowering of the dependence on the external support that will not in the future be provided by the United Kingdom. 'All the measurable trends point to an increasing danger in that the intrinsic Maltese resources, other than position, are being diminished in value while all trends in human and social affairs show a desire for greater independence of action' (page 280).</p>



Fig.1

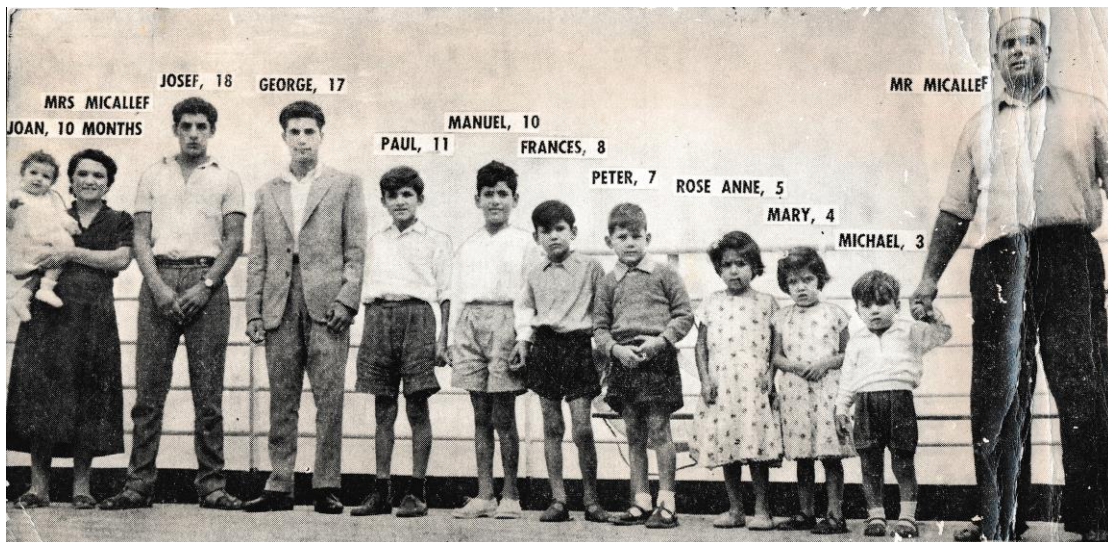


Fig.2

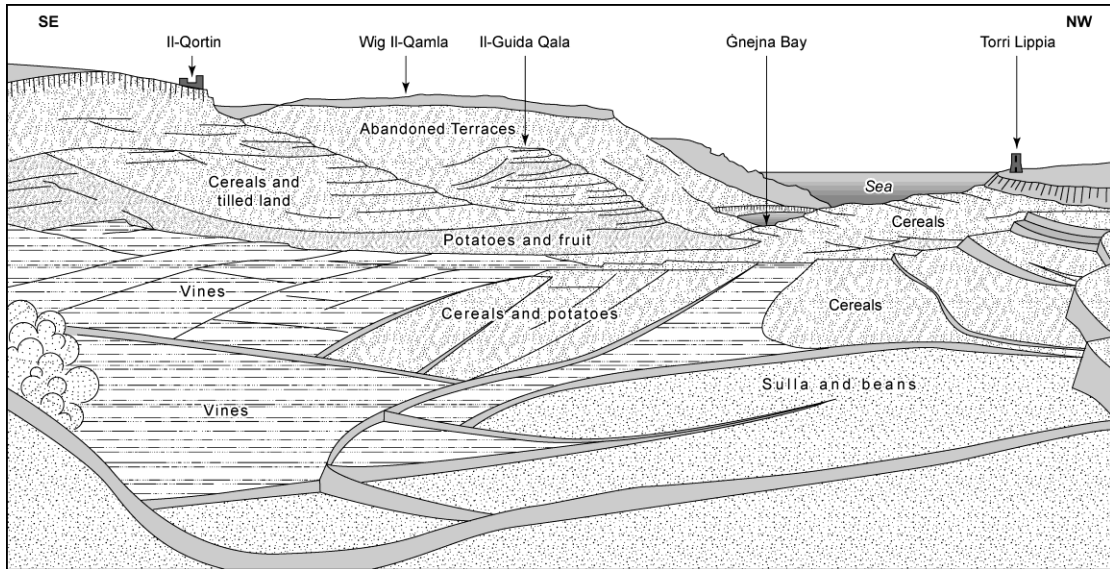


Fig. 3a

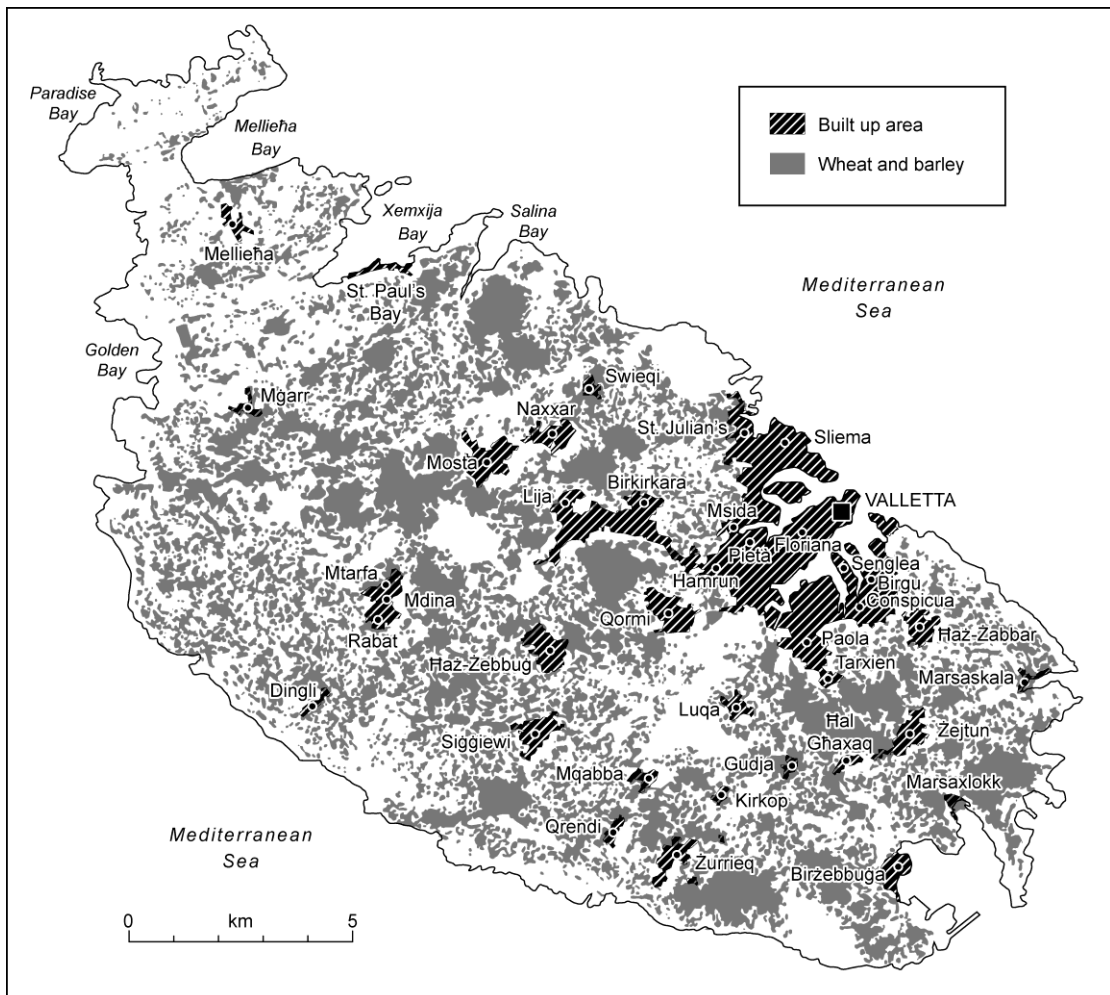


Fig. 3b

## LIST OF TABLES AND FIGURES

Table 1. Principal finding of the reconnaissance land use survey carried out in March and April 1955.

Table 2. Principal conclusions of geography doctoral theses completed as part of the Durham/Malta project.

Figure 1. Malta: General location map.

Figure 2. In 1959 the whole of the 'Micallef Family' including 10 children emigrated to Australia. From *Bulletin Emigranti*, under a headline '*Jittamaw Haija Ahjar*' ('They are hoping for a better life'). Anon, *Bulletin Emigranti* 11, Office of Emigration, Department of Information, Government of Malta 1959, p.4. Published by courtesy of Dr Charles Farrugia (Chief Executive Officer) and Mr Ivan Ellul (Inspector of Records) National Archives of Malta.

Figure 3. A. An example of landuse mapping. Field slips were compiled at a scale of ca. 1: 2,500 or 1: 10,560 and summarised as whole island distributions for publication. The example shows the distribution of wheat and barley across the Island of Malta (based on Bowen-Jones et al.1961a, Fig.72, p. 198).

B. Field sketches were also used to collect data. The example shows landuse inland from Ġnejna Bay. Spelling of place names reflect the usage of the 1950s (see Fig. 4 for locations – based on Bowen-Jones et al. 1961a, Fig 109, page 249).