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Sustainable broiler production in North Macedonia – A value chain guide to best practice



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Preface

The demand for chicken meat is rising rapidly around the world, signalling strong growth opportunities for local chicken value chains in emerging markets. Global annual meat consumption per capita is expected to reach 35.3 kg retail weight equivalent (r.w.e.) by 2025, an increase of 1.3 kg r.w.e. compared to 2015, according to the OECD-FAO 2015 Agricultural Outlook report.

Broiler meat accounts for roughly 40% of this increase following a shift in market demand from red meat to chicken meat, driven by health concerns and rising beef prices. Rapidly growing urban populations and the middle class are also increasingly concerned with the quality of meat products available for consumption. Total consumption growth in developed countries over the projection period is expected to remain small relative to developing regions, where rapid population growth and urbanization remain core drivers.

Locally produced chicken offers an investment start-up opportunity to farmers and does not require a lot of space as required for other agricultural enterprises. Furthermore, the domestic broiler industry has a recognised potential to generate higher income and transform living standards if appropriate interventions such as improved genetics, better feeding, housing and management are developed and implemented. The benefits of local chicken production to rural producers are potentially quite high when developed in conjunction with an effective integrated value chain.

The aim of the Guide on Sustainable Broiler Value Chain is to enhance the development of a sustainable broiler meat industry in North Macedonia in order to deliver a high-quality product that can compete directly with the current high volume of imported product.

This Guide on Sustainable Broiler Value Chain is a tool that supports the FAO mission to advance track record of efficiency gains and better environmental stewardship. Broiler growers, integrators, processors, suppliers, foodservice companies, retailers and outside stakeholders realise the importance of working together to collaborate on the shared goals of implementing best practices, tracking progress, and continuing to drive continuous improvement through the creation of the Guide on Sustainable Broiler Value Chain including the best management practices as outlined in this Guide.

The Guide is a tool to support and communicate continuous improvement in sustainability through leadership, innovation, multi-stakeholder engagement and collaboration. It successfully aggregates a list of best management practices that could be utilised on farms, hatcheries and processing operations both today and into the future. It also incorporates the important function of maintaining the highest achievable standards for welfare and food safety.

The Guide on Sustainable Broiler Value Chain has been developed by the Food and Agriculture Organization of the United Nations and the Faculty of Agricultural Sciences and Food of the Republic of North Macedonia.

It is expected that this publication will serve as a practical guide providing valuable information to both experienced and novice poultry producers alike, as well as for students, researchers and those involved in development in general.

Acknowledgements

The Guide on Sustainable Broiler Value Chain in North Macedonia was prepared by Fintan Grimes, FAO International poultry expert and professors from the Faculty of Agricultural Sciences and Food, University of Ss. Cyril and Methodius in Skopje, Republic of North Macedonia.

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The Guide would not be brought to life without the supervision and technical guidance of Siobhan Kelly, Programme Advisor, Food Systems Programme and Jodean Deprise Remengesau, Agribusiness Officer, Food and Agriculture Organization of the United Nations, Rome, Italy.

Abbreviations

AA	Amino Acids
ACC	Aerobic Colony Count
AMR	Antimicrobial Resistance
BOD	Biochemical Oxygen Demand
CCP	Critical Control Point
COD	Chemical Oxygen Demand
CPI	Campylobacter Performance Improvement Programme
CRRU	Campaign for Responsible Rodenticide Usage
EC	European Commission
EFK	Electronic Fly Killer
EMA	European Medicines Agency
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FASF	Faculty of Agricultural Sciences and Food
FCR	Food Conversion Ratio
FSM	Food Safety Management
FSMS	Food Safety Management System
FSRA	Farm Safety Risk Assessment
FSS	Farm Safety Statement
FVA	Food and Veterinary Agency
FVM	Faculty of Veterinary Medicine
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Points
IAB	Institute of Animal Biotechnology
IAE	Institute of Agricultural Economics
IE	Integrated Emissions
IPM	Integrated Pest Management
ISO	International Standardization Organization
LPIS	Land Parcelling Information System
MAFWE	Ministry for Agriculture Forestry and Water Economy
MOEPP	Ministry of Environment and Physical Planning
MSM	Mechanically Separated Meat

NA	Not Applicable
NGO	Non-Governmental Organization
POM	Prescription Only Medicine
PPE	Personal Protective Equipment
PRP	Pre-Requisite Programme
QA	Quality Assurance
QACP	Quality Assurance Control Plan
QCP	Quality Control Plan
QSP	Quality Control Plan
SAI	Sustainable Agricultural Initiative
SPP	Species
SRM	Specified Risk Materials
THP	Terminal Hygiene Programme
TVC	Total Viable Count
VC	Value Chain
VPA	Veterinary Prescribed Administration

Introduction

Background

In 2015¹ the Food and Agriculture Organization of the United Nations (FAO) commissioned a feasibility study to assess the domestic broiler value chain in response to a request from the Government of the Republic of North Macedonia to support development of an import substitution strategy for the sub-sector based on the National Strategy for Agriculture and Rural Development. Findings shown despite national market demand, the broiler meat subsector has however not seen much growth over the past decade and has a share of less than one percent of the market. The weak development of the broiler sub-sector can be attributed to increasingly high competition and weak market linkages and coordination between value chain actors to entry to the rest of the market currently represented by the formal retail sector (e.g. butchers, supermarkets, public and private institutions), high cost production inputs, such as feed and parent stock, and lack of a customised enabling policy framework. Albeit these challenges, current and projected size of the domestic market for broiler meat require investments by both public and private sector in the development of a sound broiler industry that will enable domestic broiler stakeholders to compete and penetrate the import saturated food market.

Despite the slow pace of development, the domestic broiler meat sub-sector has a large potential to improve not only national food and nutrition security, but also to contribute to the economic development. The chicken meat is valuable source of animal protein, employment generation and income, thereby contributing to food security and poverty reduction. Based on the feasibility study and driven by a higher quality sustainable production based on improved animal welfare, environmental protection, health and security and ethical content that can differentiate locally produced chicken meat on the market, the FAO and MAFWE formulated and launched the FAO Technical Cooperation Project² titled “Development of a green and competitive broiler sub-sector that contributes to poverty reduction and improved nutrition for the population”.

The project contributed to the development of a competitive, green and smallholder-inclusive broiler sub-sector in the Republic of North Macedonia, with spill-over effects and lessons for the rest of the agriculture sector looking to develop food-safe, nutritious and high-value agri-food sub-sector that can tap into the growing domestic market demand for high-value locally food, sourced from green and inclusive value chains, capable of attracting investment in safe and nutritious fresh poultry meat for the domestic market.

Objectives of the guide on sustainable broiler value chain for participants and other stakeholders

The adaptation benefits of the FAO project to develop a Guide on Sustainable Broiler Value Chain are related to the capacity of the project to improve agricultural policies, ensuring sustainable agriculture development and sustainable environmental and socio-economic development of the broilers sector in the

¹ TCP/MCD/3501/baby01 “Technical support to the development of a program for the poultry sub-sector”

² TCP/MCD/3605

country. The project will improve competitiveness of the broiler sub-sector thanks to enhanced linkages and collaboration among value chain stakeholders in a more conducive enabling environment.

The main primary beneficiaries of the project include a) government institutions and staff at central level as well as the technical staff at local level, industry players across the broiler chain and b) farmers/producer groups and c) consumers. The main institution is the Ministry of Agriculture, Forestry and Water Economy and related departments, which take on the primary stakeholders' role and will lead function institutionally. The staff at both levels will benefit from the project by the development of policies and from the knowledge sharing activities.

At the national level, policy will be enhanced by improved policies in the sector, and at the local level, producers and other value chain actors will access capacity development opportunities and have a structured organization model suited to their environment and as result, can provide economic benefits and improving the agriculture production in the sector.

In addition, other national sectoral institutions, international organizations presently involved in activities related to agri-business, will benefit greatly from the project. The decision-makers at the central and local levels will be supported by the assessment reports, guidelines, and methodological documents prepared from the project. The provision of improved information on management to agricultural strategists and planners legitimately has the potential to indirectly support all smallholders and farmers at the intervention/working areas. As well the training programme can be packaged and ultimately mainstreamed to upgrade agri-business capacity across the agricultural sector.

In addition, NGOs, international organizations, and others working in the area of agriculture would be considered as secondary stakeholders. These secondary stakeholders will be engaged in, and benefits from knowledge sharing, information dissemination, methodologies, guidelines, participation in the workshops organized by the project, etc.

Areas could for instance address food safety and traceability, return on investment analysis for technology and equipment, marketing and branding, policy and legislative appraisals on agricultural cooperative governance and structures, collaboration with the Ministry of Health on nutrition and food safety campaigns are envisaged.

For these objectives to be achieved, a Guide on Sustainable Broiler Value Chain has been prepared by the Faculty of Agricultural Sciences and Food at Ss. Cyril and Methodius University in Skopje and international experts in poultry production, quality assurance and sustainability.

The Guide on Sustainable Broiler Value Chain is based on integrated Processor and Producer criteria. The Guide involves the Poultry Processor working in partnership with Producers to ensure best **practice in Broiler production and processing**.

The primary objectives of the Guide are:

- To set out the requirements for best practice in broiler production at farm, hatchery and slaughter/processing levels;
- To provide a uniform mechanism for recording and monitoring broiler meat production criteria on the farm with a view to achieving continual improvement in production standards;
- To provide a means of demonstrating best practice at producer, hatchery and processing level;
- To underpin the successful marketing of the Macedonian broiler meat.

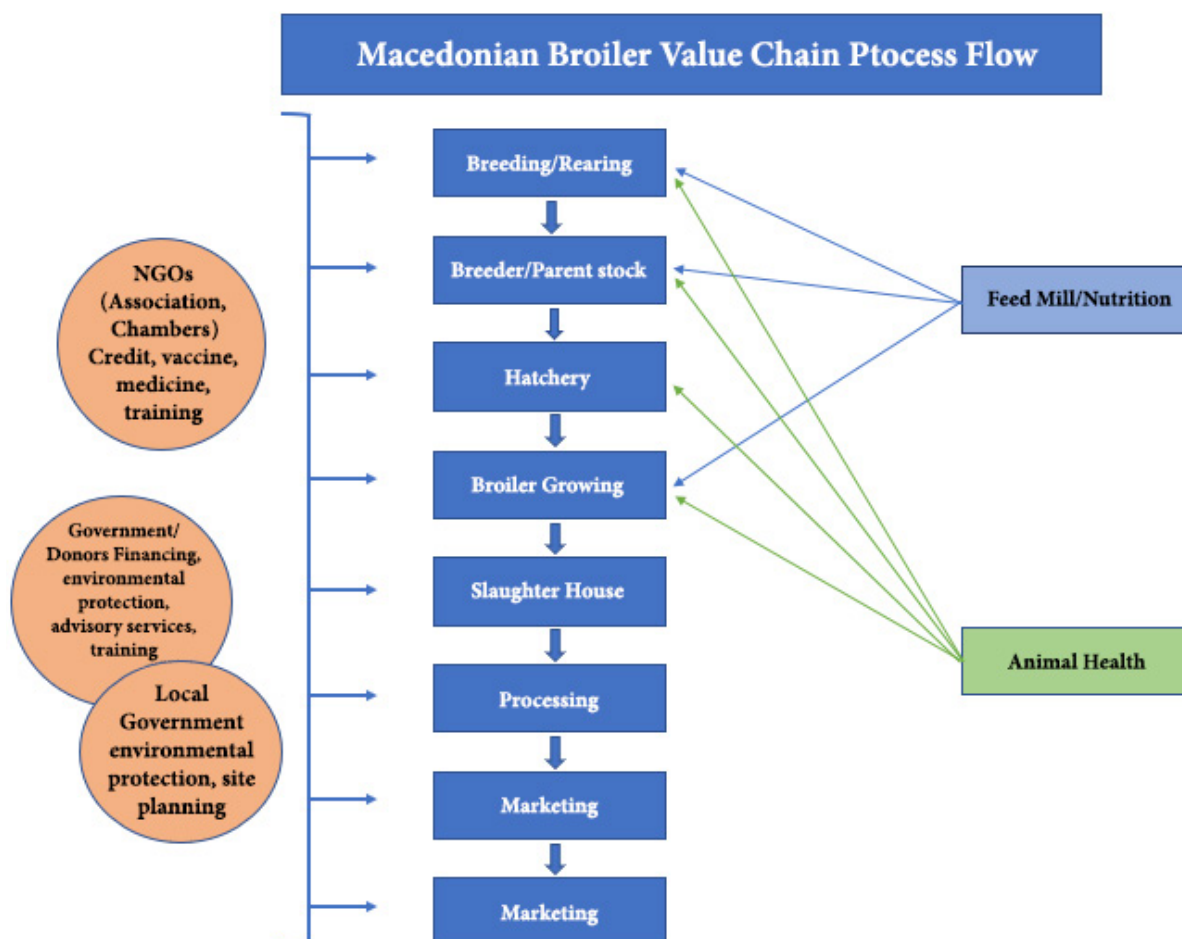
On-farm benefits

Sustainable production and efficient production go hand in hand. Sustainability involves minimising the amount of resources (e.g. energy, feed, water etc.) used by the enterprises involved, and implementing measures that enhance the environmental performance of the enterprises. These sustainability measures also typically deliver socio-economic and environmental benefits through lower production costs.

Industry benefits

The Guide on Sustainable Broiler Value Chain will assist in the marketing of locally produced broiler meat in several ways including by providing access to markets that demand broiler meat that is sourced from sustainable farms including demonstrating the commitment of participating poultry farms to “green” farming practices. It will also give an opportunity to develop a quality mark, through establishing a full Sustainable Quality Assurance Scheme, to differentiate Macedonian produced broiler meat from imported product.

Figure 1: Macedonian Broiler Value Chain Process Flow

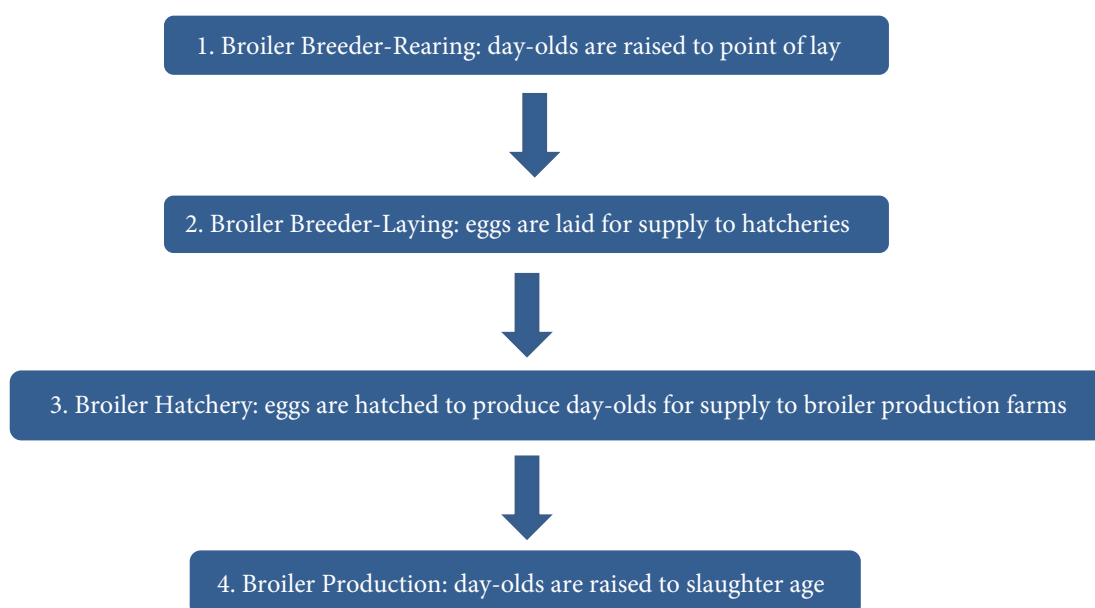


Part 1:

Breeder rearing, breeder laying, broiler growing, hatching and sustainability

This section of the Guide on Sustainable Broiler Value Chain applies to farms and hatcheries involved in the production of chicken meat. It deals with the 4 main flow processes of production as follows.

Figure 2: Chicken meat production



Please Note: This Guide on sustainable broiler value chain incorporates substantial quality assurance and sustainability criteria that could be used later to create a separate, stand-alone document.

The layout for this section of the Guide is as follows:

- Section 1: Criteria Common to Breeder Rearing, Breeder Laying and Broiler Farms
- Section 2: Breeder Rearing background information and Requirements
- Section 3: Breeder Layer background information and Requirements including Rearer and Laying Nutrition
- Section 4: Broiler Growing background information and Requirements including Nutrition
- Section 5: Hatchery background information and Criteria
- Section 6: Sustainability background information and Criteria
- Section 7: Appendices.

Note: Text that appears in “**Bold**” indicates criteria that if breached, could cause a food safety or animal welfare issue either immediately or later in the Value Chain. It also indicates a food or animal welfare regulatory requirement.

Text in “**Brown**” and in *italics* text within the Guide, are to provide some background information for each relevant section.

Section 1

Criteria that are common to breeder rearing, breeder laying and growing sites

The responsibilities outlined in this section relate primarily to the person who manages the house(s). However, the processor also has responsibilities with regard to certain requirements.

Farm registration

Producers should be registered with the MAFWE and where possible, evidence of this registration maintained.

Producers should maintain a copy of this Value Chain Guide and incorporate any subsequent amendments. Copies of all inspection findings conducted by the processor and the competent authority should be maintained.

All sites should comply with the requirements on salmonella controls as set out by MAFWE.

Records relating to each crop should be maintained on-site for a minimum of 3 years.

Producers should appoint a designated person responsible for the implementation of the criteria of the VC Guide.

Producers should understand the basic principles of Food Safety Management (based on Food Safety Management/HACCP) principles and apply them to the production process. An illustrated food safety management plan is included in [Appendix 4 - FSMS/HACCP Plan](#) for reference.

Producers should facilitate their processor to conduct an inspection(s) on each house during the cycle, in a manner that ensures that all applicable relevant criteria are checked, and a copy of these checks maintained.

Personnel and competence

The stockperson is responsible for the welfare of the flock. Those who care for the birds should have adequate knowledge of poultry, as well as of the husbandry systems used on-site. Producers should therefore be aware of the need to deal humanely with ill, injured, overtly lame birds, or birds finding it difficult to reach feed or water. Where required, producers should be aware of the need to carry out humane slaughter.

Where staff are employed on the farm, a workplace policy should be in place stating their responsibilities and entitlements. This should be explained to the employees and their understanding and acceptance recorded (e.g. by signing and dating).

The stockperson should be able to demonstrate competence with regard to the welfare of the flock (i.e. have either received formal training in flock welfare or have a recognised qualification in bird production or have a minimum of 5 years poultry experience).

The stockperson should be able to demonstrate competence in the humane slaughter of birds.

Site hygiene, biosecurity and visitor management

producers should be aware of the need to ensure that best practice in biosecurity is central to the prevention of disease in the flock. They should have appropriate controls in place. Producers should also be aware of the risks associated with the movement of personnel between farms (e.g. catching teams, advisory staff, veterinary practitioners, electricians/service personnel). It should be noted that good biosecurity and high health status can result in higher feed conversion efficiencies.

The Guide on Sustainable Broiler Value Chain incorporates the key recommendations for a Practical Control Programme for Campylobacter in the Poultry Production and Slaughter Chain. Campylobacter is the most frequent cause of food borne illness in the EU. The main sources of campylobacter are multi-species farms, pets or flies.

Producers should have a documented terminal hygiene programme in place (equivalent to [Appendix 7 - Terminal Hygiene Programme](#)), which was prepared in consultation with their veterinary practitioner. After cleaning and disinfection is completed, a terminal hygiene checklist should be completed and dated. If a house has been vacant for a period of 6 months or more, swab testing should be completed within 7 days before re-stocking.

An effective hygiene control measure should be provided at the entry to each house including): Provision of covered foot dips with replenishment as required, but at a minimum, on a weekly basis, should be available. A step over barrier should be in place to indicate a red and green area in the access store. House-specific footwear, protective clothing and headwear should be used once in the green area prior to entry of the bird area. Use disinfectants with regulatory approval for the species in accordance with the manufacturer's instructions.

Only site personnel should be allowed access to the site; all others should be regarded as visitors, with only essential visitors permitted to access the site. A record of all visitors should be maintained that includes:

i. Date of visit; ii. Name and organisation/company; iii. Name of poultry (production or processing) site previously visited, with date of visit; (Note a 72-hour limit should apply). iv. Vehicle registration; v. A commitment to complying with the applicable biosecurity protocol; vi. A declaration on arrival all recording equipment (cameras etc.) brought onto the site.

Visitors, including maintenance/service personnel should be provided with full protective clothing (disposable coats/suits, shoes and hairnets), which should only be worn in the clean area (i.e. inside the step-over barrier), in accordance with the House Entry Protocol in [Appendix 14 - Biosecurity protocol](#).

Farm staff should not keep or have contact with any other live birds whatsoever (either for food or hobby purposes) at any time while working with a producer operating the VC Guide and this should be demonstrated through records (e.g. staff declarations).

An inspection should be conducted of all equipment used at another site, as well as all vehicles entering the site, and they should only be allowed to enter when thoroughly clean.

Dead birds should be removed from the house at a minimum daily and should be kept in a locked sealed vermin-proof container outside each house (or in a central container which serves all houses) and the container(s) should be identified with the following words clearly visible on the container: "Category 2 – Not for animal consumption". Measures should be implemented to avoid contaminating the house when removing dead birds from the house for disposal (e.g. using a house-specific dual container system for dead bird removal).

Dead birds should only be disposed of by a licensed collection contractor (for rendering) or via licenced incineration or to a land burial site, whichever is applicable. Bins and containers should be retained on-site, and these should be washed and disinfected after each time they are fully emptied.

A record of bird mortality should be maintained daily in a checklist in accordance with [Appendix 8 - Flock inspection checklist](#).

The production site should be clearly defined and signposted in order to prevent entry of unauthorised personnel or vehicles.

The area at the entrance to each poultry house should be level for ease of access and constructed from concrete to allow effective cleaning and there should be a facility for collection of the wash water.

Production site

A site map should be maintained showing each building on the site; each house should be identified as to be clearly visible and on the map.

At any given time, the site should be dedicated to one species. This means that egg laying, rearing and broiler production houses should be dedicated to that enterprise only.

Stock on-site should be single age (i.e. 'all in all out') or a complete inter-crop production break should be in place.

The site should be isolated from other farm/poultry enterprises and protected by a physical barrier (i.e. a perimeter fence at least 2m from the house(s) at any point) that precludes entry of other farm animals. The site should be free of all debris, vegetation (excluding the range area) and equipment, so that cover is not provided for rodents and so that the site is tidy and organised in appearance.

Where the previous flock was infected by a notifiable disease or on veterinary advice, the manure should be retained in the sealed house until it can be removed off-site in accordance with [Appendix 13 - Manure Management](#).

Farmland manure and litter should not be spread on flock owners' land within 50 metres of the boundary of the site.

Domestic pets should be excluded from the production house(s).

Production house, housing, environment and house preparation

*Houses should only be erected in accordance with planning laws and designed with due regard to the visual impact of the building on the local landscape. Producers will be aware of the need to carefully control the house environment. Ventilation systems should be installed that are sensitive, responsive to environmental change and easy to clean. **Note:** The main contaminants of the air in a house are dust, ammonia, carbon dioxide, carbon monoxide and excess humidity. Other gases can also be present (e.g. hydrogen sulphide). In the interests of the safety and economic production, producers should manage ventilation to ensure that the following levels are not exceeded:*

Name of gas limit (mg/l air or ppm)

Ammonia: 20

Carbon dioxide: 3 000

Producers will also be conscious of the need for good lighting during the initial brooding period, to ensure that the birds can easily find water and feed and to encourage even distribution of the young birds throughout the house.

Forward planning is essential for successful and efficient production. With good planning, provision can be made to allow adequate inter-crop intervals and to ensure proper cleaning and disinfection of house(s) and site. Producers will be aware that uneven litter will create an uneven floor temperature and young birds may huddle in pockets and be deprived of heat, water and feed.

The building should be structurally sound and vermin-proof. All surfaces within the house should be easy to clean. The roof should be waterproof and in good condition. The floor should be leak-proof and safe, as well as easy to clean and disinfect between flocks. Walls should be water and draught-proof. Houses should be insulated, in cases where this is required to maintain temperatures suited to the production system. Houses should be well maintained and free of sharp edges or projections that could cause injury to the birds or to personnel.

A floor plan of the house should be available, which details floor area and equipment layout (feeders, drinkers and fans etc), as well as all measurements, numbers and capacities in accordance with [Appendix 16 - House Specification](#).

Dust should not be allowed to accumulate on surfaces, walls, ceilings and floor areas. Conditions in the house should be managed in a manner that minimises the risk of fire.

Feeding and watering equipment (see the specification information in the following sections) should be designed, constructed, placed, operated and maintained in such a manner that: i. Birds have easy and continuous access to feed and water so that aggressive, competitive behaviour is prevented; ii. Spillage of feed and water is avoided; iii. Injury to the birds is avoided.

Flooring should be designed, fitted and maintained to avoid distress or injury to the birds.

Ventilation fans, feeding machinery or other equipment should be constructed, placed, operated and maintained in such a way that they cause the least possible amount of noise.

A record for each House should be maintained that complies at a minimum with [Appendix 16 - House Specification](#).

Temperatures inside the house should be monitored and controlled, with the maximum and minimum temperatures at bird eye level recorded daily.

Processor – The ammonia and carbon dioxide levels should be tested and recorded as per the Farm Sampling Procedures Guideline

The birds should have permanent access to litter which is kept dry and friable, and the quality of the litter should be evaluated and recorded on a daily basis (see also [Appendix 8 - Flock inspection checklist](#)).

Note: Checks for footpad dermatitis should be conducted in all the slaughter plants.

The heating/ventilation system provided, should be capable of maintaining an environment conducive to the health and welfare of the birds (i.e. sufficient to avoid overheating (see also [Appendix 12 - Heat Stress Avoidance](#)), to control gas and dust levels and, where necessary, in combination with heating systems to control moisture levels within limits which are not harmful to the animals).

Note: See also specific requirements regarding heating/ventilation in Sections 2 – 4.

The ventilation system should be designed to minimise most noise and should be responsive to environmental change, easy to clean and capable of maintaining air quality (depending on stocking density and bodyweight of birds in the house) to minimise condensation.

- the concentration of ammonia (NH₃) does not exceed 20 ppm and the concentration of carbon dioxide (CO₂) does not exceed 3 000 ppm measured at the level of the chickens' heads;

- the inside temperature, when the outside temperature measured in the shade exceeds 30 °C, does not exceed this outside temperature by more than 3 °C;
- the average relative humidity measured inside the House over 48 hours does not exceed 70% when the outside temperature is below 10 °C.

Note: For chicken production, houses should be capable of meeting the criteria specified in EC/43/2007 Annex II, 3: The producer should ensure that each house is equipped with ventilation and, if necessary, heating and cooling systems designed, constructed and operated in such a way that:

All production houses should be fitted with:

An effective alarm (either audible up to 400m or remotely detectable) that is triggered by failure in the main power supply or by temperature fluctuations or computer malfunction. This should be tested weekly, and the results of this test recorded. An operational fail-safe system should be in place.

All sites should have a stand-by generator, which should be tested at least once each week, with the result of the test recorded. A written procedure should be in place for connecting to the stand-by generator.

All electrical controllers, motors, computers and fail-safe systems should be tested annually. This could be done by either the service technician from the supplier/installer, or an approved electrical contractor trained in this field. All repairs, alterations or improvements carried out should be documented.

A written lighting programme (as specified by the processor or breeding company and complying with legislation) should be in place specifying daily duration and intensity (see also criteria in sections 2 - 4). The duration and intensity of lighting should be recorded daily. Light intensity should be uniform at bird level, in order to encourage even distribution throughout the house. Light intensity should also be capable of being dimmed. Lights should be clean, and spent bulbs replaced promptly.

For poultry producers, all buildings should have a lighting programme in accordance with the intensity of at least 20 lux (i.e. permitting a document to be read) during the lighting periods, measured at bird eye level and illuminating at least 80% of the useable area. A temporary reduction in the lighting level may be allowed when necessary following veterinary advice.

Broilers: Within seven days from the time when the chicks are placed in the building and until three days before the foreseen time of slaughter, the lighting should follow a 24-hour rhythm and include periods of darkness lasting at least six hours in total, with at least one uninterrupted period of darkness of at least four hours, excluding dimming periods (EC/43/2007)

Litter should be sourced from a documented source. Litter should be stored in a manner that prevents water or pest damage. Measures should be in place to ensure that damaged bales are not used.

Measures should be in place to minimise the cross-contamination of the house during chick placement, by personnel moving in and out of the house.

A house preparation sheet should be completed, dated and signed before the arrival of each batch of young birds. This sheet should comply (at a minimum) with the checklist in [Appendix 2 - House Preparation](#).

Birds should not be housed where surfaces have been treated with either strong-smelling wood preservatives or disinfectants, or with any substance that could lead to the presence of significant toxins in the birds or in eggs.

Feed and water

Producers understand birds require a wholesome diet appropriate to their age and species and easy access to feed and clean water that, in terms of both quantity and quality satisfies their dietary needs. The rate of consumption of water by the flock is an excellent indicator of flock health and vigour. Accurate measurement of consumption is therefore essential.

Animals should be fed a wholesome diet which is appropriate to their age and species and which is fed to them in sufficient quantity to maintain them in good health and satisfy their nutritional needs. Water should be continuously available. The following criteria for feed and water apply:

Feed

Producers will also be conscious of the need for good lighting to ensure that the birds can easily find feed and water.

All feed should be sourced from a feed supplier that is approved/certified by the processor.

Poultry feed should be treated by heating to 80°C for a minimum 4-minute period or equivalent.

Anti-microbial substances administered through feed should only be used where deemed necessary by the veterinary practitioner. Administration should occur under veterinary control, with a record of each administration maintained in the remedies record.

Each feed delivery should be accompanied by a declaration of ingredients (in descending order of weight) and nutrient analysis, together with a record of the licence number, batch number, date of manufacture and expiry date. Feed samples of each delivery traceable to the delivery should be retained for 3 months after the supply has been used. Samples should be maintained in a vermin-proof container and made available for inspection during the growing period. In a fully integrated system, the samples can be held at the mill. All deliveries should be stored in bins/bags that are clearly identified and dedicated to the poultry enterprise. In the event that a feed delivery is unsuitable, the rejection of this delivery should be recorded. The appropriate corrective action taken (as outlined in [Appendix 4 - FSMS/HACCP Plan](#)) should also be recorded. All feed should be used before its expiry date.

The feed hoppers and the feed lines should be cleaned between crops, in accordance with [Appendix 7 - terminal hygiene programme](#).

Water

All water supplies should be sampled and tested. Public supplies should be tested at least annually (or in the event that the source is changed) between May 1st and September 30th. For private wells, testing should be conducted at least biannually i.e. during the summer period as specified above and also during winter. The tests should include E. coli and enterococci and the results should show absence of both organisms. All results (positive and negative) should be retained. Where there is a failure (i.e. a detection of either E. coli or enterococci), corrective measures (e.g. treatment process) should be taken, the group adviser notified immediately, and the supply re-tested within one week. In the event that there are two consecutive failures, the field officer should be notified, and the water treated to address the failure.

Each house should have a water meter installed, and the consumption should be recorded daily. The water storage tank should always be covered to ensure that the risk of contamination is minimised. The primary water supply source should be fitted with an alarm. An emergency water supply should be available, which guarantees a minimum 12-hour supply for all birds on the site.

The use of untreated surface water for the birds should be prohibited as this can be a source of contamination.

Drinkers should be provided in sufficient numbers, consistent with the manufacturer's recommendation for the species and age. Drinkers should be maintained in good condition to prevent leakage or spillage.

A written plan for dealing with emergencies, such as feed or water supply failure, should be in place.

Where the water supply comes from a well, the well-head should be sealed and the area around the well-head should be maintained to prevent water contamination.

For testing procedures, refer to the guideline for Farm Sampling Procedures in [Appendix 15 - farm sampling and test procedures](#).

Flock health, welfare, medicines and remedies

the welfare and health of a flock/crop depends on the implementation of good stock management and the provision of a suitable environment. It is an obligation of the poultry farmer to ensure that the health and welfare of the flock is maintained at all times in a responsible manner especially with respect to the use of animal remedies where necessary. Producers should therefore develop an Animal Health and Welfare Plan to establish how this will be achieved while at the same time setting targets for the reduction in the overall use of antimicrobials. The stockperson is responsible for the welfare of the flock/crop and personnel who care for the birds will have adequate knowledge of poultry and of the husbandry systems used. Farmers will also be aware of the importance of feather cover as an indicator of the welfare status of the birds. Feather cover is essential for temperature regulation, protection from the sun (free range/organic), dust bathing and preening. Feather loss can be associated with welfare issues (including stress and injury).

Producers have a duty to safeguard the health and welfare of the animals under their control. Animal remedies should be used in such a way that the commitment of Producers to the production of safe food is not compromised. This a responsibility that Producers share with their veterinary surgeon, both of whom play a major role in ensuring that animal remedies are used responsibly. In particular, Producers and their veterinary practitioner(s) will ensure that any possible development of resistance to the prescribed antimicrobials is minimised. Antimicrobial resistance (AMR) has emerged as a serious problem in human and animal medicine. When AMR occurs in zoonotic bacteria present in animals and food it can compromise the effective treatment of infectious diseases in animals and humans.

Producers will be especially aware that the incorrect use (including incorrect dose, over-use or under- use) of veterinary medicines can have serious unforeseen effects on humans. All animal remedies for use in food-producing animals are currently authorised by either by the Food and Veterinary Agency of the Republic of North Macedonia or by the European Medicines Agency (EMA).

An Animal Health and Welfare plan addressing the issues identified in [Appendix 9 - animal health and welfare plan](#) aimed at safeguarding the health and welfare of the flock should be drawn up and implemented in consultation with the veterinary practitioner. A documented review of this plan should be conducted annually.

The Animal Health and Welfare Plan should include a plan created by the assigned Veterinary Practitioner for the flock treatments that could be expected to be required on the Farm throughout the life cycle of the flock and should also include measures to minimise the use of antimicrobial products.

Producers should have a procedure in place that specifies how the health and welfare of all the birds is assured daily. The checks required by this procedure should be recorded in a checklist that meets the requirements of [Appendix 8 - Flock inspection checklist](#) at a minimum.

Birds that are ill, injured or show evident signs of health disorder should receive prompt treatment with veterinary advice or else be humanely culled.

Producers should provide evidence that the birds were not put through a forced moulting programme (breeder layers).

Each integrated group should have access to the services of a veterinary practitioner who is available to the growing farms for advice and monitoring and any on-site visits should be recorded.

The veterinary practitioner's record of flock treatments should be available for reconciliation with the Farm record.

Only authorised remedies that carry a VPA, EMA or other official approval number, which were purchased from approved sources, are permitted.

For each POM (Prescription only medicine) administered, there should be a veterinary prescription. All prescriptions should be retained for 5 years.

Cephalosporins (3rd and 4th generation) and Colistin should not be permitted. Fluoroquinolones should only be administered in circumstances where deemed necessary by the group veterinary practitioner and where there should be a documented justification for use based on antibiotic susceptibility testing.

Clear procedures should be in place to ensure that the withdrawal period is observed for each administration and that no food (meat or egg) is sold for human consumption during this withdrawal period.

Where remedies/medicines are administered through feed or water, and where there is more than one flock present, there should be controls in place (i.e. cleaning, flushing or separate storage) to prevent accidental contamination of feeds for non-target birds.

Where remedies are administered by injection (e.g. for breeders) there should be a receptacle for disposing of used needles.

Where medicines are stored, they should be maintained in a secure cabinet (see [Appendix 10 - Medicine storage](#)).

All animal remedies should be retained in their original labelled container, stored in isolation from other products such as farm chemicals and, where requiring refrigerated storage (e.g. vaccines and other remedies), stored in a suitable fridge.

Label instructions and prescriptions (with respect to target species, dosage rates, treatment duration and withdrawal periods) should be observed. This should be subject to verification via the animal remedy records.

For each POM (Prescription only medicine) administration, the following information should be recorded:

- Date of administration;
- Authorised name and quantity of the animal remedy administered;
- Identity of the flock or crop to which the remedy was administered;
- Date on which the withdrawal period ends;
- Name of person administering remedy;
- Name of prescribing veterinary practitioner;
- Reason for the administration.

Administration records should demonstrate that all remedy usages were necessary for the health of the birds. The remedies should be used at therapeutic dosages only (i.e. not at sub-therapeutic levels).

Records should demonstrate that birds were not dispatched for slaughter before the expiry of the withdrawal period.

The person responsible for the unit should sign the administration record after house depopulation, and a new record should be used for each subsequent flock.

Catching and transport

Producers will be aware of the need to work together with the processor in order to minimise the risk of disease transmission through vehicles (trucks, trailers, forklifts and modules). Producers and processors will be aware of the need to ensure that vehicles are properly washed and disinfected before entering a site. Producers will be aware of the need to train all catchers in these procedures.

Feed should be withdrawn from the birds no more than 8 hours prior to expected slaughter.

Producers (or a nominated representative) should be on-site during catching to ensure that good hygiene practices are adopted, and the welfare of the birds safeguarded.

Producers should conduct an inspection of all equipment used at another site as well as all vehicles and modules entering the site and prevent them from coming on-site if they are not clean.

The requirements of [Appendix 3 - Hygiene and welfare for catching teams](#) and of [Appendix 12 - Heat stress avoidance](#) should be made available to the members of the catching team prior to initiating the catching operation.

Producers should have a documented module stocking density as specified by the processor at slaughter (see also [Appendix 3 - Hygiene and welfare for Catching Teams](#)) and should ensure compliance with this density.

A dispatch docket should be completed for each consignment of poultry for slaughter, with a copy retained on the farm, in which the following is recorded:

- Date
- Site name
- Loading times (time of commencement and finish of catching)
- Number of birds dispatched (males and females or, for layers, spent birds)
- Destination
- Vehicle or trailer identification and transport registration
- Condition and cleanliness of vehicles and/or modules

Note: Transport time should not exceed 8 hours from commencement of loading until unloading is completed.

A food chain information document or equivalent should be fully completed for each dispatch of live birds. A record should be completed (e.g. the dispatch document, the food chain information document or another equivalent document) that demonstrates that the collection modules and vehicle were clean, and also that clean clothing (e.g. disposable clothing) was used by the catching staff during the operation. For chicken producer producers, either light-reducing curtains should be placed over the exit door(s) or the exit door(s) should have continuous supervision to expedite the catching process during daylight hours.

Environmental protection

Producers will be aware of the desirability of locating poultry units and conducting operations on-site, so as to minimise the impact on the environment and on the amenities beyond the site boundary. Producers will therefore have taken advice and sought relevant permissions prior to establishing a new production house, including industrial emissions (IE) licensing where relevant.

Producers will also be aware that sites exceeding the bird number threshold require an IE licence from the MOEPP.

Producers should have documentary evidence of the appropriate IE status and licensing (where relevant). Producers should have a documented procedure for reporting to the environmental protection emission incidences where the license limit is exceeded.

Facilities for collecting, storing and disposing of litter/manure, chemicals, fertilisers or other potential pollutants should be in place that are effective in preventing pollution and the spread of disease.

Any effluent that arises within the poultry house (e.g. wash water) should be collected in a leak-proof tank that is safe and secure for storage and disposal.

Producers should have a manure management programme in place to minimise the incidence of overspreading or waterway pollution, both of which are associated with poultry manure application. This should be equivalent to the criteria in [Appendix 13 - Manure management](#).

Manure should be stored in a manner that ensures:

- That biosecurity risks are minimised through the implementation of controls including full covering or in enclosed housing (i.e. > 50m from any poultry production house);
- The prevention of cross contamination of subsequent flocks;
- That vermin are controlled effectively.

Note: See also 50m spreading limit in criterion mentioned previously.

A record of manure and litter disposal, with details of final destination, should be maintained as specified in [Appendix 13 - Manure management](#). Where manure is disposed of on the home farm, the requirements of [Appendix 13 - Manure management](#) should be followed and documents retained to demonstrate this. Where litter or manure waste is not used on the farm, or exported, it should be composted, and a record maintained.

Farm and personnel safety

producers will be aware they have a responsibility to have a completed Farm Safety Risk Assessment (FSRA) or Farm Safety Statement (FSS), if there are more than 3 employees on-site) on the production site or farm. Producers will also be aware that this assessment needs to be reviewed on an on-going basis and in the event of change and communicated to all staff.

A current FSRA/FSS should be available and displayed and reviewed at annually.

All hazard areas on the site should be clearly identified, either centrally or at the location of the hazard, with appropriate protective measures adopted.

Note: Hazards could include electrical outlet points, slatted or mesh floor areas, steps, ladders, fans, air inlets, drinkers, feeders, and all structures and installations that could give rise to a hazard.

A notice should be prominently displayed to the effect that eating, drinking and smoking are prohibited in the store and production house. Producers should ensure that basic first aid supplies (including eyewash, disinfectant etc.) are always accessible.

Note: The first aid supplies may be kept in another farm building (e.g. canteen area) or in the dwelling house provided these buildings are adjacent to the production house.

A detailed floor plan should be available that shows the position of:

i. Internal:

- Electrical points;
- Fan and isolator switches;
- All motors inside the house and their isolator switches;
- Space heaters or brooders and their shut-off points;

ii. External:

- Heating system (e.g. wood-chip burner) electrical supplies and shut-off points;
- Gas/oil tanks and isolator valves.

A written plan for dealing with emergencies (such as personal injury, fire, flood or power failure) should be in place (see [Appendix 5 - Emergency procedures](#)). Relevant contact telephone numbers should be displayed at a central location, or at the exit. At least one member of staff should always be contactable during the production cycle, in order that emergency procedures may be followed.

Effective fire extinguishers should be available in every house and should be checked every 5 years at a minimum and their location should be identified on the site map.

A documented plan should be in place for ensuring that the biosecurity measures are not compromised in the event of an interruption of feed, water or electrical supplies, or any other failure.

Chemicals/pesticides, pest and rodent controls

This section applies to all chemicals in use on the site, including detergents. All chemicals that have a disinfection, sterilisation or sanitisation property should be officially approved. This includes pesticides (plant protection products and biocides). These cannot be used without approval for use in the country. Producers should be aware that they are legally required to comply with the Pesticide Regulations, including the Sustainable Use Directive (EC) 128.2009. Accurate records of usage will therefore be important.

Producers will be aware of the need to ensure that all chemicals are stored in a secure place, segregated from feeds, water, remedies, etc. Producers will understand the need for training in the handling of chemicals and will use appropriate personal protective equipment (PPE), following manufacturer recommendations at all times. Producers will understand the need to ensure that equipment is maintained in good condition, in order to protect the operator from any possibility of contamination with chemicals.

Producers will be aware of the need to use pest control products in a responsible way. The selection of pest control products, along with their appropriate placement, is thus important. Producers will aim to minimise the impact on the environment and the exposure to non-target species through good practices and controls. Selection of the pest control products and placement of them has an important bearing on this. Producers will also be aware of the benefits of using an Integrated Pest Management (IPM) approach to the management of pests – as set out in the CRRU Code. (See link in Appendix 1, Reference Information, CRRU - Responsible Use of Rodenticides).

Note: The responsibility for the pest control requirements can lie with the farm producer or a pest control company. Producers should check this with their processor.

All pesticides (i.e. chemical used to sanitise, sterilise surfaces, or to control pests) to be used on the production unit should be approved for the use. All chemicals should be stored safely (and in their original packages) in a dry place. Chemicals should be stored and handled in accordance with (at a minimum) the provisions of [Appendix 11 – Chemicals: Safe handling and storage](#), which should be displayed prominently (e.g. on a notice board in the store).

Safety information should be available for all chemicals used and should be accessible to all employees (e.g. safety data sheets, instructions for use, labels, etc.).

The safety and protective clothing, footwear and apparatus recommended by the manufacturer of a given substance should be available when handling that substance and the relevant components of this equipment (e.g. respiratory filters) should be within expiry dates. Protective clothing and respiratory equipment for spraying should be stored in a separate enclosed area, away from chemicals or food produce.

Pesticides should only be used for the purpose for which they have been authorised and in accordance with the label instructions.

For each chemical used, a record (as per [Appendix 11 – Chemicals: Safe handling and storage](#)) should be maintained of the following: Location/LPIS No; Product name; Volume of water used; Dilution rate; Date applied; Reason/rationale for use. This record should demonstrate that all chemicals are used in accordance with manufacturer recommendations.

The application method used should be recorded and should be selected to minimise the impact of the chemical on the environment.

Note: The personnel involved should have received training in the use and handling of the chemicals.

The area treated should be selected to ensure that protected areas (e.g. ground water, areas used by the public, etc.) are protected.

Empty chemical containers should be triple rinsed. Empty containers should be crushed and/or pierced to prevent re-use, and they should also be clearly identified and controlled pending safe disposal.

A system for the safe disposal method for rinsate from application equipment and/or surplus spray mix (i.e. on untreated crop or designated fallow ground and where permitted) should be in place. Records of this system should be maintained.

The use of strong products or chemicals with a strong odour (e.g. creosote) or products that could be injurious to bird health (wood preservatives, fumigants) in the production house or near feeds is prohibited, except as required during terminal hygiene cleaning.

An effective rodent control programme, approved by the veterinary practitioner, should be in place for each site. Where rodent control products are used, product specifications should be available that demonstrate suitability for use in the given context. Where the rodent control programme is implemented by producers, there should be evidence that he/she has attended training in rodent control. Where used, the baiting programme should reflect the label instructions for the rodenticide selected. Where baiting is used or where traps are placed, the baiting/trapping programme should include the following:

- A simple plan or sketch identifying the location of all bait and trap points;
- Measures to ensure bait is not exposed to non-target species and does not contaminate feed or water;
- A record of regular inspections of bait and trap points and replenishment of bait points;
- Routine collection of dead rodents and safe disposal as per product label instructions.

Bait should not be placed in feed storage areas where there is a risk of contamination of the feed materials. Bait should not be placed in the bird production area unless these are fixed and inaccessible to the birds. Additional outer perimeter baiting for free range and organic should be in place and where there are high risk areas present (e.g. dungsteeds, streams, hay barns, and outhouses). Where the rodent control programme is implemented by the producer, bait points should be inspected weekly or more frequently where there is a specific risk, and any corrective action recommended by the manufacturer or service provider should be taken. Where a contractor is used, visits should be no less than 8 per annum. Structural, operational and environmental hygiene controls should be in place to prevent insect infestation (including weevils, mites, flies, cockroaches), incorporating the application of physical or chemical treatments as required.

Except for pop holes (where present), all houses should be screened against wild birds, rodents and other animals.

Training

The importance of training is well recognised and producers will be aware of the benefits of having all personnel trained in the criteria of the VC Guide and in the need to ensure the safety of the personnel on the farm, the consumers of the products produced on the farm and the environment.

Note: In accordance with (EC) 43/2007 Article 4(2), it is a legal requirement that persons in charge of chickens should attend flock welfare training courses to cover Community legislation concerning the protection of chickens and in particular the following matters:

- Annexes I and II;
- Physiology, in particular drinking and feeding needs, animal behaviour and the concept of stress;
- Practical aspects of the careful handling of chickens, and catching, loading and transport;
- Emergency care for chickens, emergency killing and culling;
- Preventive biosecurity measures.

All Producers should attend general training in the criteria applicable to them of this Broiler VC Guide. Producers should also have undertaken training in the following areas:

- Flock welfare;
- Hygiene;
- Health and safety (Including First Aid);
- Chemical use;
- Biosecurity.

Where staff are employed, internal training should be conducted for all on the relevant Broiler VC Guide criteria and a record maintained. This training could be given by the producer/manager of the site(s).

Section 2:

Breeder rearing criteria

General

(Processor) A minimum of one field officer report per crop should be completed that addresses the requirements of [Appendix 6 - Field officer report](#).

Production house, environment and house preparation

(Processor) Stocking density should not exceed 30 kg/m² at any stage in the growing cycle.

It is recommended to position perches to facilitate the movement of pullets' underneath and to allow pullets to express normal behaviour.

Where ventilation is fan assisted, fans should be able to expel a minimum of 3.0 cubic metres of air per kilogram of live weight per hour (target 18 week/movement weights: Females – 2.20 kg. Males – 3.00 kg).

Breeder rearers should ensure that a pre-placement environmental swab is taken for salmonella isolation, and that a confirmed negative result is available for inspection. This should be done within an advanced period of chick placement that will allow for a re-clean/disinfection and retest to be done.

Day-olds sourcing

In the sourcing of young birds, safety, traceability, bird quality and welfare are the key considerations. The rearer will therefore be aware that time of delivery should be co-ordinated with the hatchery, so that adequate help is available to place the young birds in the house as quickly and efficiently as possible. Rearers will also be aware that full boxes should not be stacked in the brooding area (as this may cause overheating or suffocation). This will prevent dehydration and minimise stress to the birds.

A documented quality check on the day-old birds should be completed.

(Processor or Hatchery) Where imported day-olds are supplied, written documentation should be available for inspection that confirms that those day-olds have come from parent flocks that were:

- **Not salmonella vaccinated without prior approval from MAFWE;**
- **Tested and proved negative for salmonella within the previous twenty-eight days; and**
- **In compliance with Council Directive 93/120/EC or equivalent.**

(Processor or Hatchery) Documentation should be available for inspection (in the case of both home-reared and imported day-olds) that demonstrates the following:

- Name of hatchery from which the day-olds were sourced;
- Date of arrival;
- Number of day-olds received;
- Beak trimming record (where applicable) that verifies that the process was carried out using infra-red equipment only;
- Vehicle identification;
- Condition and cleanliness of the vehicle;
- A written declaration from the haulier to the effect that all equipment used was dedicated to the transportation of breeding poultry alone (except for turkey and duck breeders, where transport is allowed to collect hatching eggs for delivery to the hatchery).

(Processor or Hatchery) Where day-olds are imported under licence, they should have an EU inter-trade health certificate (or equivalent) and appropriate transport documentation.

(Processor or Hatchery) The day-olds should arrive complete with the approved vaccination programme as directed by the designated Veterinary Practitioner; documentation to verify this should be maintained at the hatchery of origin.

(Processor or Hatchery) Evidence should be available from breeder suppliers that day-olds did not receive any antibiotic therapeutic treatment prior to dispatch from the hatchery of origin.

It is recommended to leave the young birds for a short time to familiarise themselves with their new surroundings. Later, check to ensure that all chicks have access to water and feed. Make any necessary adjustments to equipment and temperature and re-check to ensure the house temperature is stabilised.

Flock health and welfare

Hatcheries will be aware of the need for close collaboration regarding welfare, considering the potential impact of welfare conditions on disease control, particularly with regard to salmonella and other transmissible diseases (e.g. avian influenza). Rearers need to familiarise themselves with the Salmonella Control Plan.

The welfare and health of a flock depends on the implementation of good stock management and the provision of a suitable environment. It is an obligation of the rearer to ensure that at all times the health and welfare of the flock is maintained.

(Processor or Hatchery) Mortality limits (day 1-7) will be determined by the designated veterinarian and where incidents of mortality exceed the limits, the breeder rearer should advise the field officer and samples should be submitted for laboratory examination. After day 7, mortality above 0.3%/day (of initial placement) should be similarly reported.

During the growing cycle, an effective salmonella monitoring programme should be implemented in accordance with [Appendix 15 - Farm sampling and test procedures](#) (at a minimum).

Where salmonella enteritidis or typhimurium are identified in a flock, birds should be slaughtered. This should be carried out in consultation with the MAFWE.

Vaccination against salmonella spp. should be prohibited. If required, this should only be agreed and approved with MAFWE and producer's veterinarian practitioner as part of vaccination policy.

A thorough flock inspection should be carried out at least twice daily, with a record of the following information retained:

- Observation of the physical condition of the birds;
- Observation of the behavioural patterns that would indicate stress;
- Verification that the feeders are in good working order and charged with feed (as relevant to the species);
- Verification that the drinkers are in good working order, with no leakage or spillage; and
- Verification that the ventilation system is operating correctly.

This record should also provide space for the veterinary practitioner to file a site report. Where additional checks are required by the veterinary practitioner or field officer, records of these should be kept.

A written procedure should be in place to deal with heat stress that addresses, at a minimum, the issues identified in [Appendix 12 - Heat stress avoidance](#).

Feed and water

Feeder Spaces should meet the following specifications:

- i. Females (Chicken):
 - Pan Feeders: 6cm/bird at 18 weeks depopulation;
 - Chain Feeders: 9cm /bird linear track at 18 weeks depopulation;
 - Spin Feeders: Manufacturer recommendations;
 - 1 bell drinker/100 birds;
 - Nipple drinkers – per manufacturer's recommendations but no less than 7 birds/nipple.
- ii. Males:
 - Pan Feeders: 7cm/bird at 18 weeks depopulation;
 - Chain Feeders: 9cm/bird linear track at 18 weeks depopulation;
 - Spin Feeders: Manufacturer recommendations;
 - 1 bell drinker/100 birds;
 - Nipple drinkers – as per manufacturer's recommendations.

Section 3:

Breeder layer criteria

General

(Processor or Hatchery) A minimum of one field officer report should be completed every 2 months that addresses the requirements of [Appendix 6 - Field Officer Report](#).

Flock sourcing

Safety, traceability, bird quality and welfare are the key considerations in the sourcing of young birds.

Producers will be aware that time of delivery should be co-ordinated with the rearer, so that adequate help is available to place the young birds in the house as quickly and efficiently as possible. Producers and the rearer will be aware of the need for close collaboration regarding welfare given the importance of disease control, especially with regards to salmonella and other transmissible diseases (e.g. avian influenza). Records of all rearing, transport and salmonella status should be maintained by Producers.

(Processor or Hatchery) A pre-movement salmonella certificate should be available. This should be done within an advanced period of bird placement that will allow for a re-clean/disinfection and retest to be done.

(Processor or Hatchery) **Evidence should be available to prove that pullets were sourced from a rearer who has operated the Breeder Rearing aspect of this VC Guide.**

A delivery/dispatch docket from the breeder rearer (as specified in criterion above) should be available for inspection.

It is recommended to leave the young birds for a short time to familiarise themselves with their new surroundings. Later, check to ensure that all the young birds have had access to water and feed. Make any necessary adjustments to equipment and temperature and re-check to ensure temperature is stabilised.

Hygiene and disease control

Producers will be aware that the health of the birds is crucial to food safety and productivity on the site. Producers will have a close relationship with his or her veterinary practitioner and will be conscious of the need to try to prevent disease, in particular salmonella and other transmissible diseases (e.g. avian influenza). To this end, certain records should be maintained by Producers.

Legislative control of salmonella enteritidis and salmonella typhimurium exists and both types are currently notifiable diseases (this list is subject to change at any time). Salmonella vaccines and competitive exclusion

products should not be used in the rearing of poultry flocks unless prior veterinary approval is given. Antibiotics may not be used to treat flocks for salmonella infections.

Producers should ensure that a pre-placement environmental swab is taken for salmonella isolation and that a confirmed negative result is available for inspection.

There should be a documented procedure and records of these events maintained to ensure that:

- i. **The eggs of both suspect and infected flocks are not supplied to hatcheries and are otherwise not used for human consumption unless they are pasteurised;**
- ii. **Confirmed infected flocks should be slaughtered immediately and where a salmonella breakdown occurred (as indicated in environmental testing);**
- iii. **Egg supply may not recommence until there is official confirmation from the competent authority that the suspect problem has been resolved.**

Flock egg production records (daily/weekly) should be maintained and should include an egg production graph.

All flock mortality should be recorded daily, together with the reasons (where known). Any unusual increase in mortality, or a major decrease in bird performance that may cause concern, should be reported to the management or to the veterinarian as appropriate, and investigated immediately by a veterinary laboratory.

House and environment

Houses should be insulated.

Forced ventilation systems should be capable of expelling quantities of air as follows (for broiler breeders and duck breeders):

- I) Breeder: 5.2 m³ per bird per hour;
- II) Cockerel: 8.5 m³ per bird per hour.

Egg collection, storage and delivery

Eggs from breeder-layer production should not be eligible for marketing for human consumption.

An egg collection programme should be in place and documented specifying minimum twice daily egg collection.

Where washing of floor eggs or soiled nest eggs takes place, dedicated egg-washing equipment should be used. Where on-site egg sanitation is conducted, only sanitation products approved by the competent authority should be used (see also chemicals above). Where applicable, egg sanitising rooms should have suitably sloped floors, trapped drainage and air extraction.

Place eggs into the hatching trays with pointed end facing down and remove them from the production house as soon as possible. Separate dirty and reject eggs from clean, sound eggs. Use clean, dry trays for reject eggs. Reject eggs may go for breaking/pasteurisation.

Eggs should be stored in an insulated egg store that is not exposed to direct sunlight and is maintained between 13 and 18 °C or as directed by the hatchery.

A max-min thermometer should be in place in the egg store and a record of the data maintained. The egg store should be separated from the bird area of the laying house. The store should be used for storage of eggs only. Non-conforming eggs should be identified clearly and segregated, and the dispatch documentation should clearly reflect this. All eggs should be clearly marked with an appropriate site code and house identification number.

It is recommended that to ensure that the store is of a size to allow for adequate air circulation where five days' worth of egg production is stored, and that eggs are collected at least every third working day/twice per week.

Each shipment should be clearly identified in accordance with the hatchery instructions and with the following information (at a minimum) and a record maintained:

- Farm code (herd/flock number) and house ID number;
- Collection/shipment date;
- Total quantity of eggs for hatching.
- Total quantity of rejects (only if hatchery accepts reject eggs for further processing)

All eggs for delivery to the hatchery should be certified free from *Mycoplasma gallisepticum*.

Note: *M. gallisepticum* is a notifiable disease.

Laying houses, buildings and equipment: General

Housing requirements are specified for each system in terms of available space per bird. The Guide on Sustainable Broiler Value Chain recommends that expert advice is sought by producers prior to finalising housing parameters and bird numbers. The parameters outlined in this VC Guide need to be carefully considered. Specific housing and environment requirements are described below.

The house should be constructed with a concrete floor throughout. The capacity of the pit below the slatted area should adequately accommodate the manure produced by a flock of birds, unless belts or scrapers are incorporated into the system.

A lighting programme should be documented and in place that ensures that an 8-hour minimum and a 16-hour maximum period of light is provided for the birds and that also meets the rearing organisation's set requirements for the birds.

Note: These periods may be amended as advised by breed requirements.

Feeding facilities should be distributed in such a way as to provide equal access for all birds. Feeders should provide at least 15cm per bird based on track feeder (100 mm), or 1 pan feeder/100 birds. Track feeders should have a cockerel exclusion system installed. Cockerel feeder lines providing at least 12cm per bird, or circular feeders providing at least 6cm per bird, should be in place. Cockerel feeders should be placed in scratch areas.

Drinking facilities should be distributed in such a way as to provide equal access for all birds. Where nipple drinkers or cups are used, the number placed should comply with manufacturer recommendations. The allocation of drinkers should not be less than 1 bell drinker per 100 birds.

Individual nest boxes should provide not less than one box per 5 birds. Automatic or communal systems should provide not less than 1m² of nesting area per 115 birds or otherwise based on manufacturers' recommendations. Nesting systems should be provided with a floor substrate that encourages nesting behaviour. All nesting systems should be inspected daily to ensure the suitability of surfaces for nesting.

Litter should be maintained in a dry and friable condition. The source of the litter should be identified, and the supplier should be recorded. Birds should be able to dust-bathe in a litter area, which should comprise a minimum of 40% of the total floor area available to the birds. This litter scratching area should be incorporated into the house.

Stocking density

The maximum permissible density within the laying house is (for part litter and slats): 30 kgs/m² of total floor area.

Nutrition, feeding programs and diet specifications for breeders

Breeder rearer

Feed specifications and feeding management should always be considered together. Different feed specifications may be used with equal success provided they lead, together with the feed management procedures, to the required bird performance. The main factors influencing feed specifications include cost and availability of feed ingredients, feed processing technology, and bird management procedures. Feed should be formulated to meet nutrient specifications and be consistent over time. Sudden changes in feed ingredients or changes in other characteristics that may reduce feed intake, even for a short period, should be avoided. Feed management and composition should be guided by close monitoring and observation of the flock.

Starter period

Successful breeder performance is to achieve proper early growth and physiological development. It is possible to achieve this with one starter feed which should preferably be provided as a sieved crumb. It is normal to give the starter feed for the first 28 days. Avoid feeding partially ground pieces of grain to the chicks as they can easily select them from the diet. Individual chicks will select these large pieces instead of the crumb and consequently receive an imbalanced diet.

Growing period

Grower feed will follow immediately after the starter feed. The grower feed will generally contain lower crude protein and amino acid specifications than the starter feed to control body-weight gain. During the change from starter to grower feed, body weight should be monitored carefully to safeguard against checks in growth. If there is a problem achieving target body weights by 28 days (4 weeks), then feeding the starter diet for another 1-2 weeks could be helpful. During the growing period, daily growth rates

are low and nutrient requirements, when expressed as daily intakes, are small. However, it is important to maintain good feed quality in this period, and to avoid using poor-quality feed ingredients.

When feed volumes are lower and where the feeding equipment does not distribute it throughout the house rapidly enough, flock uniformity can suffer. If this occurs, it may be necessary to lower the energy level of the feed to support good flock uniformity. If lower energy levels are used, it is important that the ratios of other nutrients to energy are kept constant. Several different feeding strategies can be followed to lead to successful production.

Breeder layer

Transition to sexual maturity

Sufficient amino acids and other nutrients are required for the proper development of reproductive tissues. The provision of supplemental vitamins in pre-lay and early lay periods will increase body tissue levels before egg production commences and may provide a benefit in early hatchability. Pre-breeder diet to provide higher amino acid and protein intake for adequate development of reproductive tissue.

Laying stage

Feed compositions given in the Breakdown of Nutritional Requirements will support target levels of production in properly reared, uniform flocks. Performance during the laying stage is often affected by feeding and management practices applied during earlier stages of growth. Increasing feed allowances because of poor egg production should be undertaken with caution and a clear understanding of the flock's nutritional status. Slightly reduced daily requirements of amino acids are normally fully covered by feed intake reductions post-peak. Calcium requirement increases in older birds and can be satisfied by providing a calcium supplement in the laying house instead of providing additional calcium in the feed. Supplementary phosphorus may be provided if higher levels are needed in the earlier stages of lay to control sudden death syndrome (SDS). Over-sized eggs are often associated with overfeeding. Therefore, it is prudent to evaluate all the elements of nutrient supply and feed intake levels if this is a problem.

Male nutrition

Separate control of male feeding level using sex-separate feeding systems is essential for successful broiler breeder production. The use of a single feed for both sexes is a widespread practice.

Feed manufacturing

Following good feed manufacturing practices will ensure that parent stock receive diets with adequate nutrient fortification, while minimising potential contaminants. Unseen variations in feed ingredient quality and nutrient content are possible causes of bird failure to attain production targets. Frequent and routine control checks upon the physical quality and nutrient content of feed should therefore be completed. Ingredient formulations, and their alteration with changing ingredient price, should be a subject for discussion with the feed manufacturer, and by close examination of declarations of ingredients and specifications.

- Raw material physical quality, ingredient nutritional content, and feed processing techniques should be of a high standard and consistent from batch to batch for a given flock

- Ingredients should be free of contamination by chemical residues, microbial toxins, pathogens, and where possible, mycotoxins
- Raw materials should be as fresh as possible within practical limitations and should be stored under controlled conditions
- Storage facilities should be protected from contamination by insects, rodents, and in particular, wild birds, all of which are potential carriers of disease
- Breeding stock can be fed successfully on coarse mash, crumb or pelleted feed, as long as good feeding management is practiced
- Provide feed as fresh as possible. The risk of nutrient degradation and mould growth in feed increases as a given feed delivery remains in the farm feed bin

Alterations to the inclusion levels of specific diet ingredients - feedstuffs - are the major means by which feed manufacture can be optimised in terms of nutrient content, palatability, and price.

Raw materials

Many feed ingredients are suitable for feeding to parent stock. Supply and price will usually determine the choice; however, a few general guidelines may be given. When comparing cereal sources, maize has been found to give performance advantages in the laying period when compared to wheat. Birds fed maize-based rations consistently have improved eggshell quality compared with hens fed wheat-based feeds. Better eggshell quality leads to improved yield of hatching eggs, less bacterial contamination, and improved hatchability. Feed fats and oils should be used at modest levels at all stages. In general, a minimum inclusion of 0.5-1.0% added fat is recommended to reduce dustiness, improve absorption of fat-soluble nutrients, and enhance palatability.

Feed processing

Breeding stock can be fed successfully on coarse mash, crumb or pelleted feed, as long as good feeding management is practiced. The feed form is highly dependent on available feed ingredients and feed compounding facilities.

- Mash: A good-quality mash extends clean-up time compared to crumble or pellet forms, and therefore allows all birds the opportunity to eat the recommended feed amount. This will support good body weight development and uniformity. Poor-quality mash (e.g. that with a particle size that is too small) can increase the risk of mash bridging in farm feed bins.
- Crumb: A good-quality crumble will reduce clean-up time compared to mash and offers a lower chance for particle segregation of the dietary ingredients compared to mash.
- Pellets: A good-quality pellet is preferred if clean-up time is a concern (e.g. during high environmental temperatures). If floor feeding is applied during rearing, a good-quality pellet is critical.

Feed Hygiene (heat treatment): All feed should be considered a potential source of bacterial infection, particularly coliforms and salmonellae, and should be decontaminated if total bacterial pathogen control is required. Thermal processing involves treatment with adequate heat in a retention vessel at atmospheric pressure for sufficient time to kill the organism. For parent stock feed, temperature and exposure to heat varies within region and with equipment capability and can range from as little as 15 seconds to as much as a couple of minutes. Heat treatment should be enough to reduce the total viable bacterial counts to less than 10 organisms per gram.

Pelleting alone will not completely eliminate harmful bacteria from feed (although it may reduce the contamination below detectable levels in tests of finished feed). Care should be taken not to re-contaminate feed. Critical control points for the prevention of re-contamination include the cooling, storage, and transportation of feed from the feed mill and into the feed lines and feeders. Where feed thermal treatment is not available, safe and permitted additives can be a viable option. When feeds are heated, consideration should be given to components that may be damaged by heat (e.g., vitamins and amino acids).

Finished feed

Quality control is essential. A program of monitoring the quality of finished feed is necessary, which should include both feed mill and farm sampling. It is assumed that feed manufacturing site personnel will take representative feed samples from production runs. At the farm level, retain feed samples from each feed delivery. In the event of flock performance problems occurring, these samples are then available for additional analysis to help identify or exclude nutritional issues.

For further information regarding the breakdown of nutritional requirements for breeder rearing and breeder laying, please consult the guidelines prepared by the breed companies.

Section 4:

Broiler growing criteria

General

Chicken Producers will be aware that a major vector of food related illness is chicken meat that has a high campylobacter level.

All Producers should understand that implementing high quality biosecurity measures will help to protect the health and welfare of the birds and will also be aware of the potential economic benefits from reduced disease and improved feed conversion. Producers will therefore be aware of the importance of the information arising from the Processor's flock monitoring programme (when implemented) and will collaborate on implementing improvements.

A minimum of 2 field officer reports per annum should be completed and the field officer reports should include at a minimum the issues listed in [Appendix 6 - Field officer report](#) should be required as follows: Producers should be able to demonstrate the corrective actions were taken to address issues raised in the field officer report.

Production house and environment

(Processor) Stocking density should not exceed the following limits at any time in the growing cycle: The EU Directive EU/43/2007 provides three stocking density ranges and producers should meet a different set of requirements for each range:

- The general rule is that the stocking density does not exceed 33 kg/m².
- A derogation to allow an increase above 33kg/m² up to 39kg/m² can be given when additional documented details for each house are kept and the house achieves certain climatic parameters. In addition, the documentation accompanying the flock at the slaughterhouse shall include the daily mortality rate and the cumulative daily mortality rate.
- A further increase above 39kg/m² up to 42kg/m² is allowed where, in addition to the conditions mentioned in the previous point being met, monitoring by the authorities confirms records of low mortality rates and good management practices. At these highest stocking densities, the Directive provides an indicator, by way of a formula, for the cumulative daily mortality rate which should not be exceeded.

Free Range stocking density should not exceed 27.5 kgs/m² during the growing cycle.

A record as per [Appendix 16 - House specification](#) should be maintained. The procedure used to measure the House should comply with [Appendix 16 - House specification](#) (House measurement procedure).

Litter should be placed in the house in a manner that minimises the risk of cross-contamination of the House.

Where ventilation is fan-assisted, fans should be able to expel, at a minimum, 4.5 cubic metres of air per kilogram of live weight per hour for chicken production.

(Processor) Testing should be conducted to verify that the ventilation system maintains ammonia <20 ppm and CO₂ < 3 000 ppm at bird head height, and in addition, to verify that relative humidity in a 48-hour period remains < 70% if the ambient temperature is < 10°C.

Day-olds sourcing

Safety, traceability, bird quality and welfare are the key considerations in the sourcing of young birds. Producers will therefore be aware that time of delivery should be co-ordinated with the hatchery, so that adequate help is available to place the young birds in the House as efficiently as possible. This can be achieved by tipping them onto the litter gently, quickly and evenly.

Producers will also be aware that full boxes should not be stacked in the brooding area, as doing so puts the birds at risk of stress, overheating, dehydration and suffocation.

(Processor or Hatchery) Documentation should be provided (i.e. PH 5 or equivalent) to demonstrate that the day-olds were sourced from registered hatcheries implementing the principles of this VC Guide.

A documented quality check on the day-old birds that includes number dead on arrival, condition of the boxes, and general bird condition should be completed and available for inspection and made available to the hatchery on request.

(Processor or Hatchery) Where imported day-olds are supplied, there should be written documentation available to confirm that they have come from parent flocks that were proved negative for salmonella within the previous twenty-eight days.

(Processor or Hatchery) The day-olds should arrive with the approved vaccination programme as directed by the Veterinarian practitioner; documentation to verify this should be maintained at the hatchery of origin.

Where day-olds are imported, the hatch-to-delivery duration should be less than 72 hours, the temperature and condition of the birds should be monitored at all times and the delivery should be accompanied at all times.

Where birds are brooded or reared and moved to a separate site/holding for finishing (free range), the following documentation should accompany the birds:

- A PH5 or equivalent number (or intra-trade certificate number) and details of hatchery/hatcheries;
- **A copy of the pre-movement salmonella certificate, which should be available prior to collection of birds;**
- A dispatch docket as detailed in criterion above.

It is recommended to leave the young birds for a short time to familiarise themselves with their new surroundings. Later, check to ensure that all young birds have access to water and feed. Make any necessary adjustments to equipment and temperature and re-check to ensure the house temperature is stabilised.

Feed and water

Feed

Where a withdrawal period is required for feed, withdrawal feed should be fed for an appropriate period (depending on medication regime) prior to slaughter and this should be demonstrated through the feed log and records. All withdrawal feeds should be stored in a separate bin or compartment that has been verified as being fully emptied prior to delivery.

Feeder Spaces should meet the following specifications:

- Pan feeders – 1/100
- Chain feeders – 15 mm per bird per side
- Hopper feeders - NA

Birds should not have to travel more than 4m to reach feed.

Water

Birds should have access to fresh water at all times (as per manufacturer recommendation for the equipment used) except for 1 hour prior to thinning or de-population. Birds should not have to travel more than 3m for water. Drinker height and water pressure should be checked and adjusted daily.

Flock health and welfare

A written procedure should be in place to deal with heat stress that addresses, at a minimum, the issues identified in [Appendix 12 - Heat stress avoidance](#).

Producers should maintain all processor notifications regarding module stocking density, carcass damage and grading and make these notifications available for inspection.

(Processor) Where there are issues with grading or damage, a corrective action programme should be in place to address the relevant issues.

All flock mortality should be recorded daily, together with the reasons (where known).

(Processor) Written notification of the group mortality limit (day 1-7) should be provided by the Processor and available during audit for inspection. Mortality above the group mortality limit should be reported to the group adviser or veterinary practitioner, with samples submitted for laboratory examination where required. After day 7, mortality above 0.3% per day (of initial placement) should be reported as previously stated.

(Processor) A minimum inter-crop break should be specified based on a documented risk assessment by the field officer.

Producers should be aware of the acceptable levels of disease/welfare issues: (hock burn, footpad lesions, mortality, breast blisters, dead on arrival), should retain reports from the abattoir on the levels detected, should take documented corrective actions to reduce the levels, and should be aware that the farm could be excluded from the VC Guide for persistently failing to meet the levels required.

In each production house, salmonella sampling and analysis should be carried out (through submitting faecal samples or other approved methods) three weeks in advance of thinning or whole house depletion, in order to ensure that the result is available before thinning/slaughter commences. For regulatory purposes, analysis of the test samples should take place in a laboratory that is ISO 17025 accredited or national equivalent for each test.

Where salmonella enteritidis and typhimurium are identified in a flock, birds from that flock cannot be placed on the market as fresh or frozen chicken.

Free range

Evidence of registration (i.e. a permit) as a free-range producer should be available.

Free range poultry should be produced under specific conditions, which include the following (specific stocking density details are 27.5kg m²)

- During at least half their lifetime, birds should have continuous daytime access to open air runs (weather permitting) comprising an area mainly covered by vegetation at 1m²/bird;
- The poultry house should be provided with pop-holes of a combined length at least equal to 4 metres per 100 m² floor area of the house;
- Feed formula used in the fattening stage should contain at least 70% cereals.

The land used should be dedicated to the production of free-range poultry only and should have a secure boundary fence. The land should be maintained in good condition and should be adjoining the production house. Where poaching of the land occurs, it should be re-seeded. Potholes formed in the ground should be filled in, at a minimum between each crop. When grass is excessively high it should only be topped mechanically. A domestic septic tank soak-way is not permitted on the dedicated land. Litter, poultry manure or any other waste materials should not be allowed to accumulate on the land. Baiting for rodents should also be applied at appropriate points outside the house, thus giving double baiting protection. Maintain the land well drained with good grass cover. Avoid placing baits in areas to which birds have access.

Broiler nutrition

Nutrition is the major impacting variable upon broiler productivity, profitability, and welfare. The formulation and balancing of diets require specialist nutrition skills, but farm managers should be aware of the nutritional content of their feeds. Producers/processors should consider routine analysis of the feeds they receive. This will help to determine if expected dietary nutrient contents are being achieved and that the feed is the best available for their particular production circumstances. Knowledge of the make-up of the diet being fed to the birds will mean that farm managers can ensure that:

Feed levels and consumption will provide adequate levels of daily nutrient intake (feed intake multiplied by nutrient content).

- There is proper and expected balance between feed nutrients.
- Supply of nutrients

Feed ingredients

The feed ingredients used for broiler diets should be fresh and of high quality both in terms of digestibility of nutrients and physical quality. The main ingredients included in broiler diets are:

- Wheat
- Maize
- Barley
- Soya meal
- Full fat soya
- Sunflower meal
- Rapeseed meal
- Oats
- Oils and fat
- Limestone
- Phosphate
- Salt
- Sodium bicarbonate
- Mineral and vitamins
- Other additives such as enzymes, mycotoxin binders

Energy

Broilers require energy for tissue growth, maintenance, and activity. The major sources of energy in poultry feeds are typically cereal grains (primarily carbohydrate) and fats or oils. Dietary energy levels are expressed in mega joules (MJ)/kg, kilocalories (kcal)/kg or kcal/lb of metabolisable energy (ME), as this represents the energy available to the broiler.

Protein

Feed proteins, such as those found in cereal grains or soybean meal, are complex compounds which are broken down by digestion into amino acids (AA). These AA are absorbed and assembled into body proteins which are used in the construction of body tissue (e.g. muscles, nerves, skin, and feathers). Dietary crude protein levels do not indicate the quality of the proteins in feed ingredients. Dietary protein quality is based on the level, balance and digestibility of essential AA in the final mixed feed.

The modern broiler is responsive to dietary digestible AA density and will respond well, in terms of growth, feed efficiency, and carcass component yield, to diets properly balanced in AA as recommended. Higher levels of digestible AA have been shown to further improve broiler performance and processing yields.

However, feed ingredient prices and meat product values will determine the economically appropriate nutrient density to be fed.

Macro minerals

Providing the proper levels and balance of macro minerals are important to support growth, skeletal development, the immune system, and FCR, as well as to maintain litter quality. They are particularly important in high-performing broilers. The macro minerals involved are calcium, phosphorus, sodium, potassium, and chloride. Calcium and phosphorus are particularly important for proper skeletal

development. Excess levels of sodium, phosphorous, and chloride can cause increased water consumption and subsequent litter quality issues.

Trace minerals and vitamins

Trace minerals and vitamins are required for all metabolic functions. The appropriate supplementary levels of these micro-nutrients depends on the feed ingredients used, the feed manufacturing process, feed handling logistics (e.g. storage conditions and length of time in farm feed bins), and local circumstances (e.g. soils can vary in their trace mineral content and feed ingredients grown in some geographic areas may be deficient in some elements). There are usually separate recommendations proposed for some vitamins, depending on the cereal grains (e.g. wheat versus maize) included in the diet.

Feeding program

Starter feeds

During the incubation period at the hatchery, the chick uses the egg as a nutrient supply. However, during the first few days of life post-hatch, chicks should undergo the physiological transition to obtain their nutrients from the supplied manufactured feed. At this time, feed intake is at its lowest and nutrient intake requirements are at their highest. Not only should the proper dietary nutrient concentration be provided but also the right environmental conditions to establish and develop good chick appetite.

Final body-weight performance is positively correlated with early growth rate (e.g. 7-day body weight); ensuring chicks get off to a good start is critical. The starter feed should be of a high quality and is normally fed for a period of 10 days but can be given for up to 14 days if target weights are not being achieved. Chicks that don't start well are more susceptible to disease challenges, compromised weight gain, environmental stressors and poorer breast meat quality. Feeding the recommended nutrient levels during the starter period will support good early growth and physiological development, ensuring body-weight objectives, good health and welfare are achieved.

Feed consumption during the first 10-14 days of the chick's life represents a small proportion of the total feed consumed and feed cost to processing. Therefore, decisions on starter formulations should be based primarily on promoting good biological performance and overall profitability rather than purely on individual diet costs.

Grower feeds

The grower feed is normally fed for 14-16 days. The transition from starter feed to grower feed will involve a change of texture from crumble/mini pellets to pellets and also a change in nutrient density. Depending on the pellet size produced, it may be necessary to provide the first delivery of grower as a crumb or mini pellet to prevent any reduction in feed intake due to, for example, pellet size being too large for chicks when the first delivery of grower is made.

During the period the grower feed is fed, broiler daily growth rates continue to increase rapidly. This growth phase should be supported by adequate nutrient intake. To achieve optimum biological performance, the provision of the correct dietary nutrient density (see the Broiler Nutrition Specifications for more details), especially energy and AA, is critical. The transition from starter to grower feed should be well managed to prevent any reduction in intake or growth.

Finisher feeds

Finisher feeds are generally fed after 25 days of age. To optimize profitability, broilers grown to ages beyond 42 days will require additional finisher feed(s). The decision on the number of broiler finisher feeds to include will depend upon the desired age and weight at processing and feed manufacturing capabilities. Broiler finisher feeds account for most of the total feed intake and cost of feeding a broiler. Therefore, finisher feeds should be designed to optimise financial return for the type of product being produced.

Withdrawal periods

Depending on the feed regime, a withdrawal feed will be required when regulated pharmaceutical feed additives are used. The main reason a withdrawal feed is used, is to provide sufficient time prior to processing to eliminate the risk of pharmaceutical product residues occurring in the meat products. Producers/processors should be aware of these to determine the withdrawal time required. To maintain bird growth and welfare, extreme dietary nutrient reductions are not recommended during the withdrawal period. There are also some coccidiostats available requiring a zero withdrawal period.

For further information regarding the breakdown of nutritional requirements for broilers, please consult the guidelines prepared by the breed companies.

Section 5:

Hatchery criteria

Hatchery requirements

General

This Guide on Sustainable Broiler Value Chain is based on collaboration between the breeder rearer, breeder layer, hatchery, broiler producer and processor. These participants work in partnership to meet the requirements as defined in both VC Guide sections. The hatchery section defines current best practice in the procurement of hatching eggs and chicks as determined by technical, industry and other experts. Hatcheries will seek advice from recognised sources and will consult the relevant and current guidelines/publications produced by the relevant regulatory bodies.

This section of the VC Guide Hatchery contains all the requirements with which the hatchery should comply. However, the hatchery also needs to understand fully the breeder rearer/layer and producer requirements.

The key aspects of the hatching of eggs are covered by these hatchery requirements and they should be used in conjunction with the requirements of the introduction and the hatchery appendices. The hatchery appendices offer further information and clarification on various aspects of the hatchery requirements.

Management responsibility

Regulatory approval

The hatchery management should have documentation showing that it is registered with MAFWE or their domestic regulatory body.

Quality and welfare policy statements

Hatcheries should have quality and welfare Policies that include a commitment to the objectives of the VC Guide and to complying with all current welfare, regulatory and customer requirements.

The quality and welfare policies should be approved by senior management and be prominently displayed on the premises.

All staff should be aware of the location of the quality and welfare policies.

The quality and welfare policies should include a commitment to continuous improvement, safety in the workplace, and to the provision of appropriate information, training and equipment for all employees.

The quality and welfare policies should be communicated, understood and implemented by all staff and employees.

The quality and welfare policies should be regularly reviewed for suitability and effectiveness.

Management responsibility

An organisation chart should be available showing individual responsibilities and the reporting structure of the hatchery.

The commitment of senior management to the effective implementation of the requirements of this VC Guide should be clearly demonstrated and communicated.

The responsibilities of key personnel should be documented particularly in the areas of welfare, hygiene, GMP, health and safety and contingency planning.

Management should be able to demonstrate an adequate level of technical support with appropriate qualifications and other resources for the effective implementation of the VC Guide.

Management should define the person(s) with responsibility for:

- Ensuring compliance with regulatory framework and compliance with the requirements of this VC Guide,
- Non-conforming product management,
- Corrective and preventive action management,
- Welfare (who ideally should be independent of the production function).

Management should define the person(s) responsible for ensuring compliance with the hygiene requirements and should establish an acceptable system to demonstrate that the requirements are met. Management should ensure that there is sufficient staff cover in place for periods when key staff are absent. Training records should be maintained for all personnel performing key tasks.

Management representative

The hatchery should officially identify in writing the named management representative who, irrespective of other responsibilities, has responsibility for ensuring that the requirements of this VC Guide hatchery standard are met.

Management review

Management, which should include senior management, should meet at least once each year with a clearly defined agenda to:

- Review the complete quality system for improvement opportunities,
- Ensure that all aspects of the quality system as specified in these requirements remain suitable and effective, and that preventive or corrective actions are assigned, documented and implemented,
- Review all quality system data to establish and assign responsibility for improvements, including audit reports, customer complaints, customer satisfaction data, process and non-conformance data,
- Set out quality improvement objectives for the following year.

Minutes of this meeting should be retained.

Management should carry out an annual review which, at a minimum, should cover current and future market requirements and include issues of a regulatory nature, audit reports, customer complaints and incidence rates for non-conformance.

Quality management

All hatcheries should comply with national and EU regulations with regard to the implementation of Hazard Analysis and Critical Control Points (HACCP) All hatcheries should also demonstrate compliance with Good Manufacturing Practice (GMP).

Quality documentation

Hatcheries should document their own quality system, which should incorporate the requirements of this VC Guide and their interaction with other parts of the quality system.

The quality system documentation should detail the hatchery's response to each requirement of this VC Guide and should include or reference any related operational documents, procedures or plans.

The quality system documentation (such as hygiene procedures, work instructions, procedures, specifications, etc.) should be accessible so that all employees clearly understand their roles and responsibilities in the operation of the process.

The quality system should incorporate the VC Guide Operational Procedures (SOP's) relevant to the operations of the individual hatchery.

QACP and GMP plans

The hatchery will be aware of the principles of a Quality Assurance Control Plan (QACP) that was derived based on HACCP principles and will have a quality system in place that supports the HACCP principles.

Hatcheries should have a Quality Assurance Control Plan (QACP) that identifies each stage in the process and describes how the process is operated at each stage so as to ensure the quality of the product through control and prevention.

At a minimum, the QACP should include:

- A detailed description of the process steps (e.g. a flow diagram showing the keys steps of each process);
- A detailed description of the issues and hazards that could arise at each process step and actions taken to control these issues;
- Definition of the monitoring required to ensure that control is maintained at each step;
- Specification of the corrective action to be taken if a non-conformance occurs at any control point;
- Identification of the responsibilities, procedures and records applicable at each step.

The effectiveness of the QACP should be verified or tested at least once per year.

This quality assurance control plan should be supported by senior management.

The data should be monitored, with any emergent trends identified and analysed, so that appropriate actions or corrective actions can be taken and documented.

All procedures and records that are required to ensure GMP should be met.

Documentation should be available that demonstrates that the essential 'Pre-requisite' requirements of GMP and Good Hygiene Practice (GHP) have been adequately addressed at all appropriate steps, including procurement.

The pre-requisite programs (PRP) should all be identified and described.

A schedule should be in place for all internal auditing that might take place in the hatchery.

All operational staff, including maintenance staff, should receive induction, quality and process training and records of this training should be maintained.

Internal auditing

Hatcheries should establish documented procedures for the scheduling, planning and the implementation of internal audits to verify internal compliance with the requirements of the VC Guide and the effectiveness of the quality system, records and procedures.

All corrective and preventive actions defined in these audits should be assigned and tracked until completed by the target completion dates.

The records of such audits should be available for inspection.

Internal auditors should have received training in the requirements of the VC Guide.

Internal auditors should be independent of the activity being audited and should have received formal training in auditing skills.

Customer contract requirements

Hatcheries should maintain a register of all boiler growing sites/customers to whom they are supplying chicks.

In the event that individual customers have specific additional requirements for chicks, these requirements should be documented and maintained up to date and be available for inspection and there should be evidence that these specific additional requirements are being complied with.

There should be a procedure to ensure that contracts are reviewed prior to acceptance to determine that all requirements including documentation can be met prior to acceptance.

Purchasing of eggs, producer approval and monitoring

The Breeding Egg/Supply is a key element of the supply chain. The hatchery should be familiar with the Breeder Producer/Rearer VC Guide standards in order to ensure that the egg production process is being operated in accordance with those requirements.

The hatchery should ensure that procedures exist (at egg producer and hatchery levels) to ensure that the eggs of both suspect and infected flocks are managed in consultation with the regulatory body and are not used for setting or for human consumption unless they are pasteurised. Eggs from a suspect flock or confirmed infected eggs cannot be used for setting until a negative result is obtained. Records of these events should be maintained.

All eggs destined to be hatched within this VC Guide should be sourced from a producer operating the VC Guide or from another hatchery approved under the VC Guide operating Hatchery.

Eggs coming from another VC Guide operating Hatchery should include details of farm of origin, date of lay, date of collection and vehicle identity and traceability should be ensured.

All eggs from supply farms should be continuously monitored and any issues should be conveyed to producer/field staff and corrective actions/plans implemented.

Only hatching eggs placed in the correct setter trays, clearly marked and correctly segregated (floor eggs at the bottom etc.) are allowed to enter the hatchery.

Purchasing (of materials other than eggs), approval and monitoring

A procedure for supplier approval should be in place.

Hatcheries should maintain a list of suppliers that have been approved to supply materials or services that could affect egg or chick quality or safety.

The process of approving suppliers prior to purchasing materials which come into contact with the eggs or chicks should include an appropriate risk assessment and should define appropriate controls.

All approved supplier lists should be reviewed at defined intervals, based on risk, to maintain accuracy of the information.

All materials that could affect egg or chick quality or safety should be checked and approved before use. A record of these approvals should be maintained.

The storage of all materials that could affect egg or chick quality or safety should be managed in a way that ensures continuing fitness for purpose.

All materials should be stored on-site and used in a manner that prevents chemical, physical or microbiological contamination of the product.

The hatchery should have on file current certificates of suitability for use for the following:

- Soaps, detergents, oils and lubricants,
- Pest control materials.

Water

A sample of water should be tested³ at least annually (at a minimum for the parameters described below) and the results retained. Samples should be taken from multiple sites by trained personnel.

A water distribution map should be available, showing the sampling points.

In the event that the source of the water is changed at any time, the new source should be tested for compliance and approved before use.

Microbiological analysis of the water should comply with the following at a minimum:

- *E.coli* 0 / 100 ml (ISO method 9308-1)
- Enterococci 0 / 100 ml (ISO method 7899-2)

³ The sampling should be carried out by trained staff, and the testing should be done by a laboratory accredited to ISO 17025 for testing against these specific organisms using the following methods: *E. coli* (ISO method 9308-1), Enterococci (ISO method 7899-2) or equivalent validated methods.

If there is a failure, an alternative compliant supply should be used immediately. Corrective measures should be taken, and the original supply may be re-used when it has been demonstrated to be compliant.

Non-potable water is not permitted except where dedicated pipes are used, and the non-potable water pipes are clearly distinguished from potable pipes to prevent inadvertent use.

Water tanks should be kept covered.

Where water supply is derived from a well/borehole, the well-head should be designed and the area around the well-head maintained to prevent contamination of the water.

Egg and chick traceability and identification

Hatcheries should have in place an identification and traceability procedure that permits traceability of eggs to the original production house or supplying hatchery, if applicable, and to the growing site/customer(s).

Documentation should include at a minimum:

- farm of origin
- date of lay
- total number of eggs (including floor eggs/dirty nest eggs)
- date of collection and vehicle identity
- setting date
- setter number
- transfer date
- hatchery number
- chick and cull numbers (hatchability)
- transport records
- placement details

Customer complaints

Hatcheries should establish an effective procedure for handling of customer complaints, including any of regulatory origin. The procedures should clearly outline responsibilities for logging, tracking and closing off complaints in conjunction with the complainant. The complaint log and related correspondence should be maintained and be available for inspection.

Welfare related customer complaints should be notified to the official regulatory officer.

Analysis of complaints should be carried out on an annual basis by the hatchery.

Corrective and preventative action

There should be documented and effective procedures for corrective and preventive action management.

Corrective and preventive actions should be tracked, and their priorities appropriately identified (e.g. by means of defined time scales for completion).

Imported eggs

Each consignment of hatching eggs originating in an EU member state and to a hatchery operating this VC Guide should be accompanied by documentation containing: name, address and number of farm of origin, number of eggs, species, category and type of poultry, date of dispatch and name and address of consignee. This information will be detailed in the health certificates in accordance with Annex IV of Council Directive 2009/158/EC and should be available for each consignment. Records should be retained for 2 years. If hatching eggs are imported from a country outside the EU, each batch should be accompanied full regulatory import/health status certificates and these records should be retained for 2 years.

Imported eggs may be used for hatching provided that the eggs are sourced under a standard that has similar requirements to this VC Guide and the standard is approved in advance by the hatchery or processor.

Documentation control and storage

Note: It is recommended that the requirements for document and data control as outlined in ISO9001:2000 be adopted.

Hatcheries should document their own quality system, which should incorporate the requirements of this VC Guide and their interaction with other parts of the quality system.

This system should consist of documentation that details a response to each requirement of this VC Guide and that includes, or references related operational documents, procedures and plans.

The quality system documentation (such as hygiene procedures, work instructions, procedures, specifications, etc.) should be accessible so that all employees clearly understand their roles and responsibilities in the operation of the process.

All documents and data (including relevant external documentation such as this VC Guide, customer and regulatory documentation) that relate to the requirements of this VC Guide should be managed and controlled as part of the quality management system. At a minimum, the hatchery should ensure that:

- Only current issues of all documents are available for use,
- All documents are authorised,
- A procedure for issue of new documents, or for amending existing documents, or for removal of obsolete documents, is in place and is effective,
- Data is reviewed and signed off by an authorised person,
- A master list of documents and procedures exists identifying the current revisions status,
- Applicable documents of external origin should be identified and effectively controlled.

This VC Guide is subject to document control. When revisions are deemed necessary and issued by, it is the responsibility of the hatchery to ensure that their VC Guide is correctly updated.

All records should be effectively controlled (e.g. by signing and dating) and should be maintained at a secure and easily accessible location for a minimum period of three years unless otherwise specified.

It is recommended that management and key operational staff should have received training in the tools and techniques of total quality management/continuous improvement.

Eggs/chicks and process management

hatcheries will ensure that all inspections and testing as detailed in the Quality Assurance/HACCP Plan are carried out and records are available. All incoming materials other than eggs that could affect the poultry products will be from an approved source and records of these approvals maintained. Controls with respect to eggs and non-conforming product will be in place.

Egg and chick flow

Each hatchery should have a plan showing a clear distinction between the egg (clean) and the chick (dirty) areas.

Each hatchery should have in place a plan showing that egg and chick flow from egg delivery to chick dispatch does not involve back tracking or cross-over. However, if this is not the case, the hatchery should demonstrate that measures are put in place to prevent cross-contamination (e.g.: time separation and disinfection).

This plan should show equipment flow to ensure that back tracking or cross-over does not occur. However, if this is not the case, the hatchery should demonstrate that measures are put in place to prevent cross-contamination (e.g.: time separation and disinfection).

This plan should show personnel flow to ensure that back tracking or cross-over does not occur. However, if this is not the case, the hatchery should demonstrate that measures are put in place to prevent cross-contamination (e.g.: time separation, showering and new protective clothing).

Storage and transport of eggs

Records should show that hatching egg stock is rotated on a first in- first out basis.

Transport of eggs should only be undertaken by approved transporters (this can be the hatcheries own transport) and a record of this approval maintained.

Transport should be climatically controlled, be capable of load-locking, and have a mechanical tail lift.

Transport inspection procedures should be in place and documented to ensure that only clean suitable transport is used. Transport should be cleaned between loads delivered to the hatchery (internal) and the exterior cleaned daily at a minimum.

All incoming eggs should be stored in clean, dry, climatically controlled stores where the ambient temperature and humidity is monitored (min and max) and recorded. Control the temperature of the egg stores to ensure that ambient temperature does not exceed 18°C.

Inspection and in-process traceability of eggs

All hatching eggs should be clearly labelled (on trollies etc) at all times to include:

- Farm code
- Date of lay
- Floor and dirty nest eggs clearly identified and stored separately

All incoming eggs should be individually stamped.

All incoming eggs should be approved on the basis of checks for cleanliness/breakages etc and Producer approval status. Records of these approvals should be maintained.

Incoming checks should also be shown on the quality assurance/hazard control plan.

In-process checks (e.g. transfer from farm trollies to setter trollies) should be carried out according to the quality assurance/hazard control plan. Records should be maintained and should show that the controls are effective.

All farm trollies and setter trays should be cleaned and disinfected prior to storage for release.

Training records for operatives carrying out these inspections/tests should be maintained.

Fumigation or sanitising

All eggs should be fumigated or sanitised prior to setting.

All products used should be listed as type 3 (veterinary hygiene biocidal).

Where fumigation is used, access doors should be designed to prevent access during the fumigation process.

Day-old take-off, packaging and dispatch

Where automatic counting sensors are used, these should be checked at periodic intervals of each hatch day to ensure accuracy, and they should be re-calibrated if necessary and a record maintained.

Each batch of day-olds should be accompanied by document containing:

- Name, address and registration number of the hatchery.
- Total number of chicks (if sexing, a breakdown of totals of both males and females should be included);
- Species and breed;
- Vaccines administered;
- Date of dispatch;
- Name and address of consignee;

Day-old holding areas should be climatically controlled with max min temperatures recorded daily.

Day-olds should be delivered in purpose built vehicles that are fitted with fans, a heating/cooling system and a temperature recording device that can be monitored from within the cab.

Each vehicle should be fitted with a load-locking system and a tail-lift and have a communication device fitted or available in case of emergency.

Vehicles interior should be cleaned between loads and the exterior cleaned daily.

Animal remedies

All vaccines administered to the day-olds should be supplied and authorised by the veterinarian practitioner with responsibility for the hatchery.

All vaccines administered to the day-olds should be recorded in the animal remedies record. This record should be in book format and should contain the following information:

- Date of administration;
- Name and quantity of animal remedy administered;
- Identification of animal/flock to which animal remedy is administered;
- Date of expiry of product;
- Batch number;
- Name of prescribing veterinary surgeon;
- Name of supplier of animal remedy.

Animal remedy records should be retained for 5 years.

Secure storage facilities should be provided for all vaccines.

Equipment Calibration

Note: Hatcheries should be aware of the need to document the procedures used to control, calibrate and maintain inspection, measuring and test equipment.

The following specific requirements apply:

A register of all such equipment should be maintained which includes;

- Identity/location;
- Operating range;
- Tolerance and accuracy required;
- Calibration frequency and responsibility;
- Calibration method or reference;
- Operational checking (e.g. start-up checks) to ensure continuing accuracy;

Records of all calibrations with traceability to a national or international standard should be maintained.

When a device is found to be out of calibration, an assessment of the validity of previous inspection results, the likely impacts and the appropriate corrective and preventive actions should be carried out and recorded.

Control of surplus and non-conforming product

There should be a documented procedure to ensure that product/material at any stage, which does not conform to requirements, is prevented from unintended use or release.

The procedure should provide for clear identification, adequate segregation and final disposition of the non-conforming product. Records of such disposition should be maintained.

Incidents with a potential to cause a welfare hazard should be recorded and reported in writing to the person responsible.

Only non-incubated eggs may be sent for processing.

Cracked eggs with the membrane intact may be used if the eggs are delivered directly to a processing establishment.

Eggs should be marked with a 12 mm circle containing the letter “B”. Containers should be marked as Class B.

Dead chicks and dead-in-shells should be collected in covered, leak-proof category 2 containers.

Hatchery by-products (fluff, shells, infertile eggs that have been incubated) and surplus culled day-old chicks should be collected in covered, leak-proof category 3 containers. Containers should be identified as appropriate:

- “not for human consumption” (Category 3)
- “not for animal consumption” (Category 2) or
- “for disposal only” (Category 1).

Category 2 material should be disposed of at a:

- Category 1 rendering plant (in absence of a Category 2 plant)
- EPA approved incinerator or

Category 3 products should be disposed of at a:

- Category 3 rendering plant
- MOEPP approved incinerator or
- MAFWE approved composting or biogas plant

The killing of embryos, culls and surplus day-olds should be carried out in a manner in which:

- All necessary care is taken to ensure that birds are spared avoidable pain, distress or suffering during killing;
- Killings only take place by an approved method (e.g.: maceration);

Final inspection

All quality assured finished product (day-olds) should be inspected and positively released for dispatch according to a documented inspection procedure (Category 1).

The personnel with responsibility and authority for final product approval and release should be identified in the procedure and the approval/release documentation.

Hygiene and good manufacturing practice (GMP)

The hatchery will have ensured that the premises are designed, constructed and maintained to prevent and control the risk of contamination, and to comply with all relevant legislation pertaining to hygiene.

The requirements listed below define the essential management procedures necessary to implement hygiene or GMP in accordance with this VC Guide. Compliance with these requirements does not, however, lessen in any way the responsibility of the hatchery to conform to existing statutory requirements.

General

Management should document and display on-site its hygiene policy and GMP policies.

Management should define who has overall responsibility for ensuring compliance with hygiene requirements, and should be able, through audits and records, to demonstrate that these requirements are being met.

All staff should not keep or have contact with any other live birds whatever (for food or hobby purposes) and this should be demonstrated through records (e.g.: staff declarations).

Site security

Hatcheries should ensure that site security is maintained to prevent possible product contamination.

All personnel working in the hatchery (temporary or otherwise) should be aware of and have participated in training on the site security policy in order to prevent possible product contamination.

Management should document how visitors are managed to minimise risk to product.

Training of all relevant staff regarding site security should take place and be documented.

Cleaning and sanitation

Hatcheries should document and implement a comprehensive cleaning and sanitation programme covering both the exterior and interior of the hatchery and the transport facilities. The programme:

- Should state the frequency and method of cleaning (including safety hazards)
- Should show the personnel responsible for cleaning and the materials used.

Single stage setters should be disinfected after each batch. Multi-stage setters should be fogged after each batch of eggs is added, and a break in setting should be built-in to allow for a full cleaning and disinfection of the empty setter.

Records verifying the effectiveness of cleaning, for example microbial swabbing or rapid hygiene tests, should be maintained.

A designated person should verify/be responsible for the effectiveness of the cleaning and sanitation programme.

Where cleaning is done by a subcontractor, a contract with full specification should be in place.

The cleaning programme will ideally reference a site map (internal and external).

Microbiological monitoring

Each hatchery should have a monitoring programme covering eggs, surfaces, equipment, air and personnel (e.g. E. coli, salmonella, TVCs, moulds, fungi) including at least TVCs, and specific pathological organisms if the need arises.

Records should be maintained to show the programme is implemented, critical limits defined, and corrective action taken when limits are exceeded.

Emergency power

Each hatchery should have an alternative power source.

Generators should be tested at a minimum once per week and a record maintained.

Pest control

Hatcheries should implement a documented pest control programme and all baiting materials should be certified by the pest control contractor/manufacturer as appropriate for the particular use.

An annual review (e.g. by field biologist) of the programme should be conducted to establish its suitability and effectiveness.

Buildings should be kept in good repair and condition to prevent pest access and to eliminate potential breeding sites. Openings should be sealed or protected with fine wire mesh screens and animals (such as birds, pets, wildlife, etc.) should be excluded from the premises and other at-risk areas.

Where baiting supplies are stored on-site, the store should be kept locked.

All bait stations and electronic fly killers should be secured, numbered and clearly indicated on a site map

Inspections for pest control should be made and recorded (minimum 8 visits per year) by an independent contractor

There should be a multi-level baiting system such as:

- First line of defence: perimeter with bait points at 6-8m intervals along the entire perimeter;
- Second line of defence: along hatchery building wall;
- Third line of defence: internally where there is a risk of rodent ingress.

Bait containers should be secured to the ground or wall and protected from birds and species other than pests.

All air vents and intake points should be covered with 1.2-mm screens/meshes to prevent pest ingress.

Maintenance

A preventive maintenance programme for essential equipment affecting product quality/safety should be in place, the procedure and frequency for which to be determined by risk assessment.

Maintenance schedules and procedures should be documented.

All internal maintenance staff should receive training in hygiene.

All external maintenance personnel should be made aware of the company hygiene regulations prior to commencing work.

Maintenance procedures should indicate the precautions taken to ensure that the product is not contaminated in any way by the maintenance activity whether carried out by own or contracted staff (e.g. ventilate production area post-maintenance). A record of maintenance activities should be maintained. There should be procedure to approve equipment for re-use after maintenance is complete.

Environmental hygiene

Hatcheries should be aware that the structure and fabrication of the premises and the supply of services should be such as to minimise contamination. Hatcheries will appreciate that structures within premises need to be soundly built, constructed of durable materials, and easy to maintain, clean and disinfect. This can be

achieved with several building materials including stainless steel sheeting, PVC sheeting, tiles, smooth- finish plaster treated with non-toxic/non-peel food grade paint, or other equivalent materials.

General

A glass/hard plastics policy and written procedures for handling breakages in all process and storage areas should be in place. This should cover all glass and plastics that are likely to give rise to sharp fragments.

Where glass/hard plastics are present, a glass/hard plastics register should be maintained.

Exterior, structure and grounds

The grounds and all areas of the premises should be well presented and maintained to minimise contamination sources. A perimeter fence, wall, or other suitable physical demarcation should control access to the grounds. Equipment, pallets, and other materials stored in the hatchery grounds should be stored neatly and in clean and clearly defined areas. Any unused buildings, service buildings etc. should be maintained in good repair and free from debris. There should be a clearance of one metre wide around the hatchery to avoid rodent infestation. The exterior finish of the premises should be maintained in sound condition (i.e. no flaking paint or broken plaster).

The grounds should be kept free of debris and there should be no stagnant water, potholes or open drains or pools. Roofs, valleys, and gutters should be maintained in good repair and be free from debris and weeds. Areas directly outside the premises should be free of weeds, grass, rubbish, or any item that may harbour pests and/or disease.

Entry to production

A procedure should be in place to ensure good hygiene practices at entry and exit from all production areas (i.e. hygiene barriers, protective clothing, head coverings and footwear changing).

Protective clothing should be of different colour in the clean (egg) and dirty (chick) areas.

The entry point should contain a hygiene barrier (e.g. seat) for staff entry and exit from the production area. Wash-hand basins should be provided at all entry points to production areas. Taps in production areas should be knee, foot, arm or electronically operated. Paper towel dispensers and used towel disposal facilities should be in place. Hand sanitising solutions or sanitising liquid odourless soap should be provided at each hand washing point and should be clearly identified. Hand-washing instructions should be posted adjacent to the wash stations.

Interior: General

All pipes, pipe work, lagging, electrical cables etc. should be clean, secure and properly constructed.

A schedule of internal cleaning should be in operation.

Working surfaces should be in sound condition, impermeable to water, durable and easy to clean, maintain and disinfect. Work surfaces should be made of smooth, non-absorbent materials and inert to food, detergent and disinfectant under normal working conditions.

All equipment should be placed or installed in a manner that permits cleaning all around.

All electrical fittings and cables should be to an approved standard and retained within the premises structure.

To protect internal walls and prevent damage, a solid barrier should be constructed large enough to limit impact (e.g. trolleys). Coving should be used in areas where walls join ceilings.

All metallic equipment used in the process area should ideally be stainless steel.

Aprons, where used, should be subjected to frequent cleaning (e.g. in wash cabinets designed to minimise the risk of cross contamination).

Hoses (which would ideally be completely constructed of corrosion free materials) should be maintained in a clean and tidy condition and should always be kept off the floor when not in use.

Interior walls

Wall surfaces should be designed and constructed to be durable, smooth, light coloured, easily cleaned and impermeable to liquids. They should be maintained in a clean condition, free from cobwebs and moulds, etc. Junctions and joints should be smooth and impervious. Wall-to-floor junctions should be sealed and constructed to be easily cleanable. Ledges and sills should be sloped and kept free from dust, dirt or other miscellaneous items. Walls should be well maintained, e.g. no flaking paint or broken plaster, no damaged or missing tiles, all tile cracks sealed or grouted.

Ceilings and overheads

Ceilings should be designed and constructed to be of sufficient height, smooth, light coloured, to prevent the shedding of particles and to be easily cleaned. All joints should be sealed and impermeable. Ceilings should be maintained in good repair, be clean and be free of condensation. False or cavity ceilings should have access to the void above to enable cleaning and inspection.

Girders and overhead pipework and structures should be clean, free from rust, dust, mould growth, flaking paint and other extraneous material.

Skylights are undesirable, but where present they should be clean and be fitted with fly screens if openable.

Floors

Floors should be constructed of durable, non-slip, water resistant material and be maintained in good condition (i.e. no holes or cracks). Floors should be kept clean and free from the accumulation of water or debris especially in corners or in areas hidden by machinery. Rubber mats or plastic meshes, where used, should be easily removed and easily cleaned. Concrete floors should be treated with a floor sealant to prevent dust in the premises.

Drainage

Drainage should be such as to prevent the risk of contamination. Stagnant pools of liquid on floors should be prevented by adequate sloping towards the drainage channels or by other management techniques. Where drainage channels crossing personnel working areas and passageways are present, these should be protected with removable covers to facilitate cleaning. Drainage from on-site laboratories should be designed to exit the building before joining up with other waste systems. Where manholes are present

inside the premises, they should be doubly sealed and secured to prevent overflow and odour. Drains should be constructed in a manner that will prevent odours or vermin entry to the premises (such as by using swan neck waste pipes and gridded drain covers). A cleaning schedule for drains should be in place with spot-checks to ensure on-going cleanliness.

Doors

Doors and door frames should be constructed of durable impermeable material, these should be tight fitting and of smooth easy-to-clean finish. Glass should not be used in doors opening into storage or production areas, other clear shatterproof material should be used instead. All external doors and internal doors (excluding emergency doors) leading from non-process into process areas should be self-closing or otherwise screened to prevent pest ingress.

Windows

Exterior windows in production areas should be at least two metres above ground, have sloping ledges and, if opening, be fitted with suitable and effective fly-screens. Exterior windows should be constructed of shatterproof material or, if made of glass/hard plastic, be laminated to prevent shattering. Windows, window frames etc. should be tight fitting, be maintained in good condition, free from cracks, moulds, flaking paint etc. and should be kept clean.

Lighting

Lighting in production areas should be designed to be permanently fixed, easily cleaned, and should be protected by shatterproof covering. Lighting should always be adequate for the particular operation and should be of a type that does not distort colour where process decisions are taken on the basis of colour.

Extraction and ventilation

Vents from drains, sewers and rainwater drainpipes should not be located within the plant. Ventilation systems should be designed and constructed so that air does not flow from contaminated areas to clean areas. All ventilation equipment should be serviced and maintained clean as per the recommendations of the manufacturer(s).

Cleaning materials and storage

All cleaning equipment and materials, chemicals and other substances that are likely to contaminate products should be stored in a lockable, secure place (ideally with appropriate bunding) away from production. A safety data sheet should be available for each chemical. Adequate safety and protective clothing, footwear and other apparatus should be available when handling such substances.

Electronic fly killers

There should be a programme with records for the inspection of electronic fly killers and for the replacement of the light tubes. Electronic fly killers should be located away from egg packing areas and

from packaging equipment or packaging operations. Electronic fly killers should not be located close to or above exposed unpacked product.

Note: Consideration should be given to locating the electronic fly killers to ensure effective operation and to minimise their potential product contamination.

Waste management and disposal

Containers for use within the plant and skips/compactors are both important elements in the management of waste. Management should also support the concept of “reduce/reuse/recycle” in the management of all waste materials.

There should be a documented programme for the management and disposal of all organic and inorganic hatchery waste material and appropriate licences/permits should be in place.

Hatcheries should have procedures in place to prevent waste material coming in contact with product.

The plant cleaning schedule should include all waste areas.

Waste containers should be clearly designated and identified according the type of waste to be disposed in them. Waste containers should be available at appropriate locations.

Skips/compactors should be covered at all times except when being filled and be located as far as practicable from the “Clean” area. Skips/compactors should be sited on a concrete surface to ensure that any leakage is contained and disposed of safely. Skips/compactors should be emptied according to a documented schedule, and spillages should be cleaned up immediately.

Discarded wrapping, packaging and other refuse should be placed in designated bins or skips/compactors so that it does not compromise the hygiene of the premises and does not provide a habitat for pests and vermin.

Where excess or non-conforming food material is being disposed of for the purpose of use in animal feedstuff, the hatchery should comply with the regulatory requirements for disposal.

Personnel hygiene

Hatcheries will be aware of their management responsibility to ensure that all aspects of personnel hygiene are addressed and to ensure compliance with the specific requirements of this VC Guide. Every person working in a hatchery will be aware of the importance of maintaining a high degree of personal cleanliness.

Hygiene: General

A documented hygiene plan should be in place and should be communicated clearly to all personnel.

A documented training programme for staff should be in place.

Training records should be available to demonstrate that all operatives have been trained in the hygiene plan.

Medical records

Participating hatcheries should have a procedure in place to ensure that no person that is likely to be a carrier of, or suffering from, a disease likely to be transmitted through eggs or chicks, or that has infected wounds, skin infections, sores or diarrhoea, is permitted to handle eggs or chicks in any capacity.

The procedure should ensure that any person so affected, who is likely to come into contact with eggs or chicks, immediately reports the illness or symptoms, and if possible, their causes, to the hatchery manager or supervisor.

During induction training, all personnel should be made aware of their personal responsibility that, where they are taking medication that has the potential to affect their capability to discharge their duties, this should be notified to management.

A visitor/contractor medical questionnaire should be completed by every person who enters the hatchery.

First aid

At least one member of staff in both the clean and the dirty areas should be trained in first aid procedures, and fully stocked first aid kits should be available to treat minor injuries in both of these areas.

All cuts and grazes on exposed skin should be completely covered after treatment by an appropriately coloured waterproof dressing (preferably blue). They should be company issued and monitored.

Personal hygiene

Hands should be washed with unperfumed soap immediately after using a sanitary convenience. Perfume/ aftershave should not be worn. False nails are not permitted, and fingernails should be kept short, clean and unvarnished. No loose jewellery, except plain wedding rings and sleeper ear-rings, may be worn by personnel working in the production area. No rings or studs to be worn in exposed parts of the body.

All head hair, including facial hair, should be contained (e.g. by means of a snood, mop cap or other covering) to prevent contamination of product.

Cuts, sores and grazes should be completely covered after treatment with a distinctively coloured waterproof dressing and which is supplied by the company.

Personnel clothing and locker rooms

All personnel (operatives) working within the hatchery should be provided with suitable colour-coded protective clothing, suitable headgear and footwear. Clean appropriate protective clothing should be available at all times and re-issued as required. Used and unused protective clothing should be segregated to prevent contamination.

Protective clothing should be removed before using the toilets or canteen facilities and should not be worn outside.

Facilities (including individual lockers) should be provided to ensure the separation of personal and protective clothing. Specific facilities should be in place that provide for the hygienic handling of used or contaminated clothing. A scheduled laundering of all protective clothing should be in place.

Where work clothing is laundered on-site, the wash cycle should exceed 80°C operating temperature.

All persons (including visitors/contract workers/service personnel) entering production areas of the plant should wash hands and wear protective clothing provided. Notices to this effect should be posted in appropriate areas.

Staff facilities

Smoking, eating and drinking should only be permitted in designated areas and there should be clear signs to this effect.

All personnel facilities (canteens, locker-rooms, toilets, restrooms) should be included in the sanitation programme and be maintained in a clean condition.

All toilets, including office toilets, should be clean and adequately ventilated and toilets should not lead directly into the clean or dirty areas.

Odourless liquid soaps and sanitising liquids should be provided and be dispensed from wall mounted units. Paper towel dispensers and a bin for used paper towels should be provided in every wash area. The use of air driers is not permitted in production areas. Advisory signs should be clearly displayed in all toilet areas indicating that hands should be washed after the use of the facilities. The signs should also instruct on how to wash hands correctly.

Environmental and effluent treatment

Any effluent treatment plant, where present, should be operated in accordance with the relevant licences. The disposal of effluent should be carried out in accordance with the relevant licences.

Section 6:

Sustainability criteria

Sustainable agriculture as defined by the Sustainable Agriculture Initiative Platform (SAI) is “the efficient production of safe, high quality agricultural products, in a way that protects & improves the natural environment, the social & economic conditions of farmers, their employees & local communities & safeguards the health and welfare of all farmed species.”

The criteria contained in the breeder rearer, breeder layer, broiler grower & hatchery previously listed are designed to ensure best practice in the breeding, hatching & production of chicken. These criteria while specifically grouped according to traceability, food safety, hygiene, health and safety and welfare etc., have an overarching sustainability relevance as defined.

Breeder rearer: Records to be maintained (by crop):

- a) Empty period (in days)
- b) Total inputs during THP: chemicals, energy (heating and ventilation), water etc
- c) Quantity (in weight), type & source of litter used during the crop
- d) No. of day-olds placed
- e) Mortality rate %
- f) No. of pullets supplied
- g) Average weight of the chicks at day-old
- h) Average daily live-weight gain during the rearing period
- i) Age of the pullets at end
- j) Feeds supplied during the life of the crop
- k) Use of chemicals for hygiene throughout the life of the crop
- l) Animal remedies used
- m) Manure storage period, spreading & application method
- n) Quantity of manure produced
- o) Water consumed
- p) Energy consumption (ventilation, lighting and heat use) during the rearing period (with records maintained of the type of heat source used: e.g. oil, gas, electricity etc.)
- q) Weight of females and males at transfer.

Breeder layer: Records to be maintained (by flock):

- a) Empty period (in days)
- b) Total inputs during THP: chemicals, heating, water, etc.
- c) Quantity (weight), type & source of the litter used during the crop
- d) Number a& average weight of the pullets & roosters placed
- e) Feeds supplied during the life of the flock.

- f) Use of chemicals for hygiene.
- g) Overall use of animal remedies used & rodenticides (product type and quantity)
- h) Manure stored, period of storage, spreading dates and application methods
- i) Overall hatching egg production per day and/or week throughout the life of the flock (egg production chart)
- j) % of class B eggs
- k) Water usage per week
- l) Mortality rate
- m) Average weight & no. of spent hens departing
- n) Energy consumption (ventilation and heat use)
- o) Spent hens/roosters kill data (age at slaughter, distance to abattoir, total carcass weight)
- p) Quantity (weight) of manure produced

Broiler producer: Records to be maintained (by crop):

- a) Empty period when the house is not stocked (in days)
- b) Total inputs during THP: chemicals, heating, water, etc.
- c) Quantity (in weight), type and source of the litter used during the crop
- d) Number and average weight of the birds delivered to the processing facility
- e) Feeds supplied during the life of the crop.
- f) Use of chemicals for hygiene.
- g) Overall use of rodenticides (quantity and brand) throughout the life of the flock
- h) Overall use of animal remedies used (product type and quantity) throughout the life of the crop
- i) Quantity of manure produced and/or collected, along with spreading dates and application methods.
- j) Overall mortality per day throughout the life of the crop.
- k) Water use per week.
- l) Average weight per number of birds shipped
- m) Energy consumption (ventilation and heat use)
- n) Quantity (weight) of manure produced

Free range: Measures to consider

- o) Record of time spent by the birds outdoors.
- p) Carry out soil testing for pH, P and K to ensure that pH balance and fertility on the range are maintained at optimum levels.
- q) Monitor field conditions to minimise soil erosion, poaching, compaction or leaching of waterways.
- r) Where possible, incorporate clover into grassland swards to aid nitrogen (N) fixation.

All farm participants: Measures to consider (as relevant):

- a) Obtain and understand up-to-date technical information relating to the enterprise through obtaining farming publications, membership of a farming union, participation in a formal discussion group, attendance at events of interest to farming, attendance at animal health

information meetings, attendance at co-op advisory meetings, etc. Establish and maintain access to qualified advisors.

- b) Conduct an on-going review of the operation of the unit to identify opportunities for improvement (e.g. participation in industry initiatives), and to accommodate future developments in conjunction with a qualified advisor.
- c) Participate in existing environmental development and protection scheme(s).
- d) Assess and undertake actions to ensure that existing habitats within the farm boundaries are responsibly maintained and enhanced (i.e. areas that are undisturbed by daily farming practices, such as woodland, glens, scrub areas, hedges, field margins, ponds, water courses and ditches). Add or remove hedgerows when required and consider tree planting.
- e) Review water consumption and develop procedures to minimise water use. Identify and monitor of potential sources of water loss and monitor these (examples could include water supply pipes, as well as potential leaks from taps, drinkers and nozzles). Collect rainwater for use in yard or house washing (but only when treated with an approved chemical).
- f) Identify the ways in which the farm/hatchery and/or personnel contribute to the local community.
- g) Review heating options and consider using more efficient heating systems. Review the ventilation systems and consider measures to recover heat from the ventilation process. Conduct an evaluation of the energy consumption of equipment (e.g. motors), installations (e.g. heating systems) and buildings. Develop other energy efficient measures or strategies.

Hatcheries: Monthly records to be retained:

- a) Electricity usage for the hatching process and related operations (e.g. heating, handling, laboratory, refrigeration, lighting)
- b) Fuel usage for vehicles in collection and delivery
- c) Mileages incurred in collection and delivery
- d) Fuels used for heating
- e) Quantity of eggs (kg and number) received for hatching
- f) Quantities of eggs (kg and number) hatched/number of chicks hatched
- g) Quantities of eggs sold for food (Grade B) (breaking).
- h) Quantities and types of packaging (kg) used in the packaging of day-olds (where applicable)
- i) Quantities and types of packaging (kg) disposed of
 - As waste (where packaging is otherwise unusable)
 - Recycled (where packaging is not reused by hatchery)
- j) Packaging type and source as follows:
 - Types of packaging used in the hatchery
 - Packaging used from sustainable sources.
 - What % of packaging is coming from sustainable sources?
- k) Volumes of water usage
- l) Effluent COD and BOD average, for the hatching process only
- m) Quantity and type of refrigerant gas used for replacement or top-up (for chill rooms only)

Part 2:

Broiler meat processing

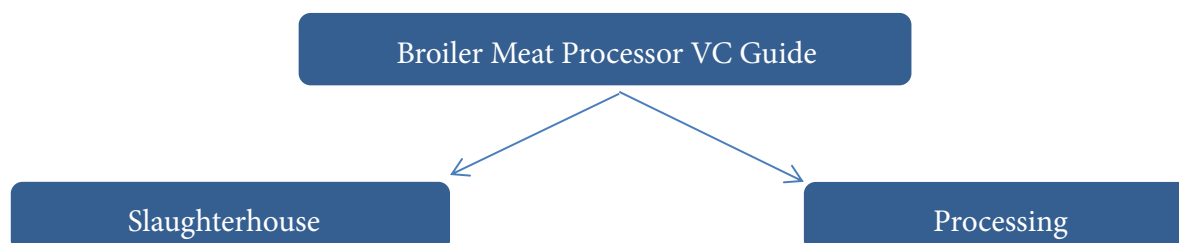


Figure 3: Broiler meat processing

Please Note: The Guide on Sustainable Broiler Value Chain incorporates substantial quality assurance and sustainability criteria that could be used at a later date to create a separate, stand-alone document.

Processor/slaughterhouse requirements

The processor/slaughterhouse requirements involve the chicken processor working in partnership with broiler producers supplier to ensure best practice in chicken production and processing. The primary objectives of this VC Guide are:

- To set out the requirements for best practice in chicken meat slaughtering and processing
- To provide a uniform mechanism for recording and monitoring chicken meat processing with a view to achieving continual improvement in VC Guides;
- To underpin the marketing of quality Macedonian chicken meat and chicken meat products.

The chicken slaughterhouse/processor should understand that the responsibilities outlined in the broiler growing VC Guide, as previously listed, relate primarily to the person who manages the house/s on the broiler growing site, i.e. producers/grower. However, the processor may also wish to have responsibility with regard to specific requirements e.g. sourcing of the day-olds, provision of the feedstuff and deciding when the birds are to be slaughtered etc. For all such requirements, the processor should collaborate with producers to ensure compliance.

Poultry meat

Definitions of meat/meat products referred to in this VC Guide include the following definitions in the EU/MK legislation:

- **Meat Content:** where used to quantify the “meat content” on a label, means meat associated with the skeleton and diaphragm (as per EC 101:2001);

- **Meat:** in legislation this means the edible parts of the animals/birds including blood and offal (as per EC 853:2004, Annex 1, 1.1) **Food Safety Law**⁴.
- **Fresh Meat:** means meat that has not undergone any preserving process other than chilling, freezing or quick-freezing, including meat that is vacuum-wrapped or wrapped in a controlled atmosphere (as per EC 853:2004, Annex 1, 1.10, **Food Safety Law**).

Note: For poultry meat to qualify as fresh meat, the regulation stipulates that no temperatures of $\leq -2^{\circ}\text{C}$ have been used prior to sale.

- **Meat Preparations:** means fresh meat, including meat that has been reduced to fragments, which has had foodstuffs, seasonings or additives added to it or which has undergone processes insufficient to modify the internal muscle fibre structure of the meat and thus to eliminate the characteristics of fresh meat (as per EC 853:2004, Annex 1, 1.15) **Food Safety Law**.
- **Minced Meat:** means boned meat that has been minced into fragments and contains less than 1% salt (as per EC 853:2004, Annex 1, 1.13) **Food Safety Law**.
- **Comminuted Meat:** means boned meat where the particle size has been reduced by means other than mincing;
- **Offal:** Offal means fresh meat other than that of the carcass, including viscera and blood (as per EC 853:2004, Annex 1, 1.11) **Food Safety Law**;
- **Mechanically Separated Meat:** or “MSM” means the product obtained by removing meat from flesh-bearing bones after boning or from poultry carcasses, using mechanical means resulting in the loss or modification of the muscle fibre structure (as per EC 853:2004, Annex 1, 1.14) **Food Safety Law**.

Cautionary notes

Although every effort has been made to ensure the accuracy of this VC Guide, FAO cannot accept any responsibility for errors or omissions.

FAO is not liable for any loss, potential loss or estimated loss of earnings (by Processors) resulting from compliance with any criteria of this VC Guide or in regard to the consequences of being found to be in breach of critical or other legal requirements.

All references to legislation in the text of this VC Guide are given on an “as amended” basis.

Note: Text that appears in open “**Bold**” indicates criteria that if breached, could cause a food safety or animal welfare issue either immediately or later in the Value Chain. It also indicates a food or animal welfare regulatory requirement.

Management responsibility

Policies and registration

The policies (quality, food safety management, hygiene, allergen, health and safety) should be approved by senior management and prominently displayed on the premises. All staff should be aware of these policies.

⁴ **Food Safety Law** (Official Gazette of RM. no. 157/10; 53/11; 1/12; 164/13; 187/13; 43/14; 72/15; 84/15; 129/15; 213/15; 39/16; 64/18;).

Ensure that these policies are communicated, understood and implemented by all staff and employee.
Ensure that these policies are regularly reviewed for suitability and effectiveness.

The Processor management should have documentation showing that it is registered with their domestic regulatory body.

Quality

Processors should have a quality policy, which includes a commitment to the objectives of the applicable VC Guide and to complying with all current regulatory and customer requirements.

Ensure that the quality policy includes a commitment to continuous improvement, and to provide appropriate information, training, resources and equipment for all employees.

Food safety management

Processors should have a food safety management policy, which includes a commitment to complying with all regulatory and customer requirements for current food safety.

Hygiene policy

Management should have a hygiene policy which includes policies regarding visitors and contractors.

Allergen Policy

Where allergens are handled in the plant, the processor should have an allergen policy that addresses the following at a minimum:

The policy should define how risks associated with allergen use (including details of all processes and process inputs and products that could be affected) are controlled.

The policy should define the controls to be implemented to prevent potential cross contamination of other process inputs and products in all areas. Personnel coming into contact with allergenic foods should be trained in the handling and segregation of these foods.

Health and safety

Processors should have a health and safety policy and be able to demonstrate that this policy has been communicated to all personnel on-site (employees, contractors, visitors, etc.).

Ethical operation

Processors should have documented ethical operation and trading policies and documented policies on employment (permanent and temporary), minimum wages, working conditions, working hours, equal opportunities, discrimination, resolution of disciplinary issues, etc. Processors should be able to demonstrate that these policies were communicated to all employees.

Quality and welfare policy statements

Processors should have quality and welfare policies that include a commitment to the objectives of the VC Guide and to complying with all current welfare, regulatory and customer requirements.

The quality and welfare policies should be approved by senior management and be prominently displayed on the premises (example in [Appendix 18 - Welfare in the workplace](#)).

All staff should be aware of the location of the quality and welfare policies.

The quality and welfare policies should include a commitment to continuous improvement, safety in the workplace, and to the provision of appropriate information, training and equipment for all employees.

The quality and welfare policies should be communicated, understood and implemented by all staff and employees.

The quality and welfare policies should be regularly reviewed for suitability and effectiveness.

Organisation

An organisation chart should be available showing individual responsibilities and the reporting structure of the company.

The commitment of senior management to the effective implementation of the requirements of this VC Guide should be clearly demonstrated and communicated.

The responsibilities of key personnel should be documented particularly in the areas of welfare, hygiene, GMP, health and safety and contingency planning.

Management should be able to demonstrate an adequate level of technical support with appropriate qualifications and other resources for the effective implementation of the VC Guide.

Management should define the person(s) with responsibility for:

- Ensuring compliance with regulatory requirements and compliance with the requirements of this VC Guide,
- Non-conforming product management,
- Corrective and preventive action management,
- Welfare (who ideally should be independent of the production function).

Management should define the person(s) responsible for ensuring compliance with the hygiene requirements and should establish an acceptable system to demonstrate that the requirements are met.

Management should ensure that there is sufficient staff cover in place for periods when key staff are absent.

Training records should be maintained for all personnel performing key tasks.

Management

Management responsibility

The commitment of senior management to the effective implementation of the requirements of this VC Guide should be clearly demonstrated and communicated to all staff.

Management should be able to demonstrate that an adequate level of technical support with appropriate qualifications and other resources exists for the effective implementation of the VC Guide.

An organisation chart should be maintained showing the reporting structure. Responsibilities of key personnel should be documented.

Management should define the person(s) with responsibility for:

- Food safety management (who ideally should be independent of the production function)
- Quality control
- Non-conforming process input or product management
- Corrective and preventive action management
- Internal auditing
- Training.

Note: See also requirements below under management representative.

The processor should identify the management and supervisory staff with responsibilities for the identification, segregation and traceability of quality assured product.

The processor should establish an acceptable management system to demonstrate that all requirements of this VC Guide are being met.

A documented plan should be in place that ensures continuity of supply in unplanned events.

A documented system should be in place that ensures that unplanned absences of key staff are managed so as not to affect product quality or safety.

Where product is being packed under contract for another organisation or is being packed by another organisation on behalf of the processor, management should demonstrate that all controls as specified in this VC Guide are observed and verified.

Management representative

The Processor should officially identify in writing, the management representative who, irrespective of other responsibilities, has operational responsibility for ensuring that the requirements of this VC Guide are met.

Management review

Management, which should include senior management, should meet at least once each year with a clearly defined agenda to:

- Review the complete quality system for improvements opportunities;
- Ensure that all aspects of the quality system as specified in this VC Guide remain suitable and effective, and that preventive or corrective actions are assigned, documented and implemented;
- Review all quality system data (including performance against previous management review targets and objectives, data from audit reports, corrective and preventive action, training, customer complaints, customer satisfaction surveys, quality control, process and non-conformance, key performance indicators, etc.) to verify the suitability and effectiveness of all quality systems;
- Set out quality improvement objectives and key performance indicators for the next year;

- Establish and assign responsibility for implementing the required actions improvements within a defined time scale.

Minutes of this meeting should be retained.

Quality system

Quality documentation

The quality system should consist of documentation that details the Processor's response to each requirement of this VC Guide and that includes, or references related operational documents, procedures and plans.

The quality system documentation (such as procedures, work instructions, specifications, etc.) should be accessible so that each employee clearly understands his/her role and responsibilities in the operation of the processes.

Quality control plan (QCP)

Processors should document (such as by flow diagram) all the steps of each process from intake to final product dispatch.

The Processor should have documented procedures that cover all stages of the preparation and processing of all products and that define how each process (including slaughter, cutting, boning, wrapping/packaging, weighing, labelling, metal detection, curing, brine makeup etc.) is managed to ensure the quality and safety of the food product throughout the process.

The procedures should be supported by documentation (e.g. work instructions) that defines how each stage of each process is to be conducted and the equipment to be used at each stage.

For each process, the documentation should include the following:

- A detailed description of each of the process steps including those steps where rework may arise or be dealt with
- The control measures applicable to each step in the process
- The responsibility and frequency for monitoring at each step (where relevant) in the process
- The tests/checks that should be performed to verify that the limits for each step are not exceeded
- The corrective action to be taken if a non-conformance occurs at any step
- Identification of the responsibilities, procedures and records applicable for each step in the process.

The quality control plan (QCP) should be verified at a at least annually or whenever a change that could affect the process is implemented. The data should be monitored, and trends analysed so that appropriate preventive or corrective actions can be taken and documented.

Evidence should be available to demonstrate that the QCP is actively supported by senior management.

Shelf life

A documented shelf life test procedure and schedule that takes into account predictable conditions of processing, storage and use should be in operation for all products and the results maintained.

Document and data control

Note: It is recommended that the requirements for document and data control as outlined in ISO 9001:2008 or ISO 22000:2005 should be adopted.

All documents and data (including relevant external documentation such as this VC Guide, Customer and Regulatory documentation) whether electronic or paper based that relate to the requirements of this VC Guide should be managed and controlled as part of the quality management system. At a minimum, the Processor should ensure that:

- A master list of documents and procedures exists identifying the current revisions status
- Only current issues of all documents are available for use
- All documents are authorised
- A procedure for issue of new documents, or amending existing documents, or removal of obsolete documents, is in place and is effective
- Applicable documents of external origin are identified and effectively controlled
- Data is reviewed and signed off by an authorised person
- Data is managed to ensure that it is available as required and stored/backed up to prevent accidental loss.

This VC Guide is subject to document control and where amendments are issued by FAO, it is the responsibility of the Processor to ensure that their VC Guide is correctly updated.

There should be control of the process for generation of new labels, issue of labels to production, removal of unused labels postproduction, and the personnel involved should have received training on in-company label controls, and relevant labelling legislation.

Records

All records specified in this VC Guide should be kept up to date at all times and should be available for inspection if required. All records should be controlled (e.g. by signing and dating) and should be maintained at a secure and easily accessible location for a minimum period of three years unless otherwise specified in legislation (e.g. for SRM or Category 1 waste) and where corrections are made, these should be authorised. All records should be reviewed and co-signed/authorised according to a schedule, by the person responsible for the area or team as set out in management responsibility in this VC Guide. Records should be available for at least the last year and should be complete and without gaps unless there is a valid explanation.

Improvement plans

Processors should carry out an analysis of current and future market requirements including those of a regulatory nature. (Note: This can be included in the management review).

Ensure that management and key operational staff have received an appreciation of the tools and techniques of total quality management/continuous improvement.

Reference information

Ensure that up-to-date information is maintained on all developments relevant to the operation of the VC Guide. Ensure that a list of all current relevant Regulatory documents defining regulations for processors is maintained for easy use and reference.

Training

Processors should carry out a review at least annually to identify the training needs of all staff and to verify the effectiveness of the training given. A documented schedule of training should be available. All personnel coming into contact with food (including maintenance staff) should receive an induction training before they commence work and also should receive on-going food hygiene training according to a documented schedule. Staff who are operating or monitoring any control point (QA/CCP/PRP) should also receive training in the application of HACCP principles and food safety according to a documented schedule. Processors should provide training on traceability and reconciliation processes as required to key staff involved in these processes. Records of all such training should be maintained. Training records should include:

- Details of the course provided;
- Evidence of the trainer's competence (i.e. having attended a formal training programme, having external certification as a trainer);
- Evidence of the effectiveness of the training provided.
- Note: Training requirements are also set out in other sections of the VC Guide.

Hygiene pre-requisites and HACCP based procedures

The regulations require that all Processors comply with EC 178: 2002, EC 852: 2004 and EC853: 2004 / Food Safety Law, which specify, among other things, that all Food Businesses implement a quality system based on HACCP principles. Processors could consult other Standards (including ISO 22000: 2005 which proposes a 12-step approach) and industry guidelines in the development of their HACCP based systems.

In addition, all processors are required to demonstrate compliance with Commission Regulation EC 2073: 2005, Book of Rules (Official Gazette of RM. no. 100/13, 145/14, 37/17 and 173/18), to Microbiological Criteria for Foodstuffs on microbiological testing⁵. This incorporates a requirement to have a continuum of satisfactory results over the prescribed period.

General

The Processor should have a food safety management (FSM) plan based on HACCP principles which shows how product/process safety is ensured through control and prevention.

The FSM plan should be developed by a team that has at least one member who has received formal training in HACCP principles and all team meetings should be documented.

⁵ Book of Rules (Official Gazette of RM. no. 100/13, 145/14, 37/17 and 173/18), to Microbiological Criteria for Foodstuffs on microbiological testing

The FSM plan should be coordinated with and complement the Quality Assurance Control plan and should be amended where a significant change in any of the processes takes place.

Pre-requisite programme (PRP)

Documentation should be available that demonstrates that the essential “Pre-requisite” requirements for a food operating environment have been adequately addressed for all aspects, including the following:

- i. Building construction and layout including zoning (physical separation of activities to prevent potential food contamination);
- ii. Plant and equipment including installation, commissioning, cleaning and on-going
- iii. maintenance and preventive maintenance;
- iv. Workspace and employee facilities layout and organisation;
- v. Services including electrical, water (including ice and steam), ventilation, air, and other utilities;
- vi. Waste and sewage handling;
- vii. Management and control of purchased/received materials;
- viii. Prevention of cross contamination via process inputs, products, contact surfaces, equipment;
- ix. Cleaning and sanitising for equipment and facilities;
- x. Pest control;
- xi. Personal hygiene;
- xii. Storage, distribution and transport.

Food safety management plan

A full description of each product produced on-site should be available (e.g. on a product data sheet) including the following information:

- i. Composition;
- ii. Origin of ingredients/inputs;
- iii. Physical or chemical structure (e.g. water activity, pH etc.);
- iv. Treatment and processing (e.g. heating, freezing, salting);
- v. Packaging (e.g. modified atmosphere, vacuum);
- vi. Storage and distribution conditions (e.g. with specified temperatures);
- vii. Preservation characteristics;
- viii. Durability and required shelf-life, instructions for use and intended use.

A hazard analysis should be carried out that includes a detailed identification and description of the food hazards (chemical, microbiological and physical/foreign bodies) that could arise at each process step and the risks that these represent.

The control points/steps that are deemed to be critical control points (CCP) or pre-requisite control points (PRP) should be identified in the FSM plan. The limits that should be met to ensure control of each CCP/PRP should be clearly established. A process for monitoring each CCP/PRP should be in place stating responsibility, methodology and frequency to ensure that control is maintained. The corrective action to be taken where a non-conformance occurs at any CCP/PRP should be defined. The FSM plan should be verified/tested annually at a minimum to confirm that it remains effective for the processes. As part of this verification/testing process, microbiological data (based on the criteria as set out in the regulation EC 2073/2005) Book of Rules on Microbiological Criteria for Foodstuffs on microbiological testing, should be available and considered. The verification process should be documented and scheduled and

responsibility for its implementation should be assigned. The schedule for the verification/testing process should be based on the established risks and the microbiological history of the product. The FSM plan should be actively supported by senior management.

Internal auditing

Processors should establish documented procedures for the scheduling, planning and the implementation of internal audits to verify internal compliance with the requirements of the VC Guide and the effectiveness of the quality system, records and procedures.

All corrective and preventive actions defined in these audits should be assigned and tracked until completed by the target completion dates. The records of such audits should be available for inspection. Internal auditors should have received training in the requirements of the VC Guide.

Internal auditors should be independent of the activity being audited and should have received formal auditing skills training.

Process management

Customer contract requirements

Product and process design and development

Processors should be able to demonstrate that relevant regulatory and customer requirements incorporating HACCP principles have been taken into account in the formulation and design of new products and processes.

Customer list and specifications

Processors should maintain an up to date list of all customers to whom product is being supplied.

Processors should be able to demonstrate that customer requirements (including specifications, performance data, etc.) are being met.

A current documented specification should be maintained and available for each product supplied to each customer. All such specifications should be signed by both parties. There should be a procedure to ensure that contracts (either formal or informal commitments to supply products, or a sales contract or other agreement) are reviewed to determine that all requirements including documentation can be met prior to acceptance.

Inputs

General

Processors should maintain a list of suppliers that have been approved to supply process inputs or services that could affect product quality or safety. A procedure of approving suppliers prior to purchasing process inputs that are incorporated into or come in contact with the product should be in place, the process

should include an appropriate risk assessment and should define appropriate controls. All approved supplier lists should be reviewed at defined intervals to maintain accuracy of the information and this review should include a risk assessment analysis. All process inputs that could affect product quality or safety should be checked and approved before use and a record of these approvals should be maintained. Documented checks on the hygiene and condition of delivery vehicle and the delivered contents should be made including the following:

- Packaging integrity and pallet condition;
- Absence of pest infestation;
- Date, lot/batch coding;
- Temperature, pH, other internally specified measurements;
- Process input inspections demonstrating compliance with the agreed specification which should include quality standards acceptable in industry;
- Quality assurance status and the documentation establishing this.

The storage of all process inputs and other materials that could affect product quality or safety should be managed in a way that ensures continuing fitness for purpose. All process inputs and other materials should be stored (on-site or off-site) and used in a manner that prevents chemical, physical or microbiological contamination of product.

Bone-in and boneless meat supplies

Where supplies of bone-in or boneless meats are purchased for processing in the plant, the following requirements apply:

All consignments of meats or other process inputs should be examined on delivery and records maintained demonstrating:

- Compliance with a written specification;
- Freedom from visible contamination or foreign bodies;
- Protection from damage and cross contamination;
- Compliance with chill-chain temperatures.

Water/steam/ice

All water, steam or ice (that can come in contact with the food) should be potable. The Processor should have a procedure in place to verify that the water supplied within the plant meets the regulatory physico-chemical parameters.

A sample of water should be tested at least monthly (for compliance with the microbiological parameters as set out below at least, and also as determined through a risk assessment) and the results retained. The samples should be taken from multiple sites by trained personnel.

At a minimum, the water should comply with the following microbiological criteria:

- E. coli 0 / 100 ml (ISO method 9308-1 or equivalent);
- Enterococci 0 / 100 ml (ISO method 7899-2 or equivalent).

If there is a failure to meet these requirements, corrective measures should be taken, and an alternative compliant supply should be used immediately where necessary. The original supply may be reused when it has been demonstrated to be compliant.

In the event that the source of the water is changed at any time, the new source should be tested for compliance and approved before use. Where the water supply is derived from well(s), the well-head(s) should be designed and the area around the well-head(s) maintained to prevent contamination of the water. Non-potable water is not permitted in the plant except where dedicated pipes are used, and the non-potable water pipes are clearly distinguished from potable pipes to prevent inadvertent use as a potable water supply.

Where chemical water treatment systems are installed (e.g. chlorine, chlorine dioxide, etc.) the dosing system should incorporate an alarm device and should be capable of treating the water to the manufacturer's specification in terms of concentration and contact time, and the effectiveness of the treatment system should be demonstrated through records of measurement of residual treatment chemical in treated water at least daily or as determined through a risk assessment.

Where alternative disinfection systems are used (e.g. UV treatment, ozonation, membrane filtration, etc.) these should be designed so that operators can easily determine that they are operating effectively and the effectiveness of the treatment system should be demonstrated through records of measurement of the water at least daily or as determined through a risk assessment. There should be a water distribution system map or drawing, showing source, storage, hot and cold distribution in the plant, and the locations of sampling points. A programme should be in place to prevent organic matter build up in tanks; the frequency of cleaning should be based on a risk assessment and recorded. Water tanks should be kept covered. Storage tanks should conform to the following specification:

- Manufactured from inert material;
- Covered and fitted with an inspection hatch;
- Water inlet at the top of the tank (to prevent sediment disturbance);
- Water outlet at the bottom of the tank;
- Fitted with screened vent pipes.

Detergents, sanitising materials and packaging

The processor should have on file current certificates of suitability for use (in meat processing), for all packaging/wrapping materials that could come in contact with food, including soaps, detergents, marking inks, lubricants and packaging/wrapping materials, casings, etc. Documentation should be available to demonstrate that all packaging/wrapping materials that come into contact with the food are in compliance with the relevant EU regulations. All such materials and chemicals should be stored in a manner that permits control of their use. All such materials should be inspected on delivery to ensure their suitability for use in the plant (correct labelling, integrity of packaging, correct specification, etc.). Documentation should be available that demonstrates that the materials used in packaging/wrapping (that are intended to come into contact with food) are traceable at all stages of production.

Animal receipts and transport

Records should be available to demonstrate that relevant on-farm monitoring (e.g. salmonella testing) was taken into account in the scheduling of slaughter processes.

Bird transport

Processors should maintain a list of approved live bird hauliers (that are not the producer's own transport) together with relevant data (including licences/registrations/approvals etc.).

Processors should inspect all transport vehicles using a checklist on a planned basis.

A record of every delivery of animals/birds for slaughter to the factory should be maintained showing at a minimum:

- Delivery truck registration number;
- Haulier and/or driver name;
- Number of birds in the delivery;
- Identification of the birds in the delivery (registration number/grower name/address) including other relevant information on category, age, etc. that forms the basis of labelling claims or to meet customer specifications;
- Time of collection and delivery;
- Delivery information that will allow traceability of animals, birds to source farms.

Facilities to clean and disinfect animal transport should be provided on-site and the use of the facility by the haulier should be monitored to ensure this is conducted prior to leaving the site; the facility should include an appropriately located, clearly identified designated vehicle washing area, with an adequate water supply, a supply of approved disinfectant and an appropriate means of applying the disinfectant.

Bird receipts

All bird deliveries should be inspected prior to slaughter for cleanliness and where required, appropriate corrective action taken in accordance with the processor's policy on cleanliness.

A documented check should be carried out on all incoming birds in accordance with the QCP (see above), and the FSM plan (see above).

As part of the process for receipt of birds, a food chain information document should be available and completed.

Processors should have a documented and effective residue testing programme in place that complies with the requirements of the National Residue Monitoring Programme (including detection of chemotherapeutics) that has been devised in conjunction with the official veterinarian and included in the quality control/FSM plans and a record of this maintained.

The processor should maintain a record of the incidences of presentation of birds in an unsatisfactory state as set out below and these cases should be brought to the attention of both the official veterinarian and producers in question so that corrective action can be taken. Unsatisfactory state of animals includes the following:

- Lack of fitness to travel; fractures or other obvious significant injuries; severe lameness, recumbent birds;
- For Poultry: injuries, hock burn, foot pad dermatitis, breast blisters, high mortalities, other issues of food safety or animal welfare (these should be communicated back to the broiler producer as part of their kill summary).

Processors should provide suitable facilities for conducting the ante-mortem inspection.

Animal welfare

Slaughter welfare general

Processors that carry out slaughtering should have at least one formally trained animal welfare officer responsible for ensuring that animal welfare standards are maintained.

The lairage should be included in the plant cleaning programme.

Processors should comply with the requirements of the regulations relating to the protection of animals in slaughter i.e. (EC) No 1099/2009, which came into effect on 1st January 2013 **Animal Welfare and Protection Law**⁶ (Official Gazette of RM. no. 149/14; 149/15; 53/16).

Processors should ensure that the persons carrying out specified slaughtering activities holds a current licence/permit/certificate of competency for this activity.

General bird welfare and lairage

Lairage and slaughter staff should be able to demonstrate competence and compassion in their handling of animals and measures should be in place for the avoidance of stress including physical or auditory stress of the animals. Effective measures should be taken to ensure that the hygienic condition of animals hide and skin (or plumage of birds) is protected while in the lairage. A record should be available to demonstrate that appropriate training in animal handling was provided to all lairage staff by a qualified/trained animal welfare officer. Lairage and poultry intake areas should be included in the plant cleaning and sanitation programme. Staff member(s) with defined responsibility for lairage management/operation should be available to oversee the unloading and the subsequent passage of birds through the lairage to the point of stunning and slaughter.

The lairage should be covered to provide protection for the animals/birds from inclement weather conditions and adequately ventilated. Note: field lairage is not permitted under the VC Guide.

The walls and floors should be constructed with easily cleanable material, free of sharp edges that could cause injury and the floors should be maintained in a non-slip condition.

All drains should have a secure grid to prevent injury to animals and/or staff members. Lighting should be available for inspection at convenient points, but birds should not be exposed to continuous bright artificial light.

Poultry welfare/Lairage welfare

Documentation should be maintained that demonstrates that the catching teams are supervised by a trained animal welfare operator and that the catching team personnel have been trained in the following:

- Correct catching techniques;
- Acceptable densities for birds in transit relevant to weather conditions and bird size;
- Protection of birds from inclement weather conditions, excessive heat or excessive cold while in transit, or while awaiting veterinary inspection on arrival at the slaughterhouse/processing plant.

⁶ Animal Welfare and Protection Law (Official Gazette of RM. no. 149/14; 149/15; 53/16)

Poultry slaughter process

Poultry intake

Intake of birds should be managed (e.g. through batching, lot identification, etc.) in a manner that allows the batch to be traced throughout the slaughter process. Birds should be unloaded with care in a calm unhurried manner. The birds should be visually checked for mortality, general condition, and to confirm that the bird welfare requirements at catching were observed and recorded: exceptions should be noted and reported to producers and the competent authority as relevant. Only birds that have been inspected and passed the ante-mortem inspection can be processed for slaughter and evidence of this should be maintained. Birds should be maintained in low intensity or blue lighting prior to hang-on. Hang-on should be conducted to minimise stress for the birds. There should be a procedure to prevent undersized birds being placed on the line.

The maximum of two collections should only take place to any production house during the crop cycle

Poultry stunning

Birds at the post-stunning stage should be monitored on an on-going basis for signs of revival and corrective action implemented as required.

A documented procedure should be in place that sets out the actions that should be taken in the event the interval between hang-on and stunning exceeds 3 minutes (e.g. in the event of line breakdown).

Following hang-on and prior to stunning, the birds should be maintained in low intensity or blue lighting environment. All birds should be stunned using a stunning methodology that has been approved by the competent authority.

Killing/evisceration of poultry

The killing equipment should be monitored, maintained and operated to ensure that killing is effective and carried out to minimise stress on the birds. The plucking and evisceration equipment should be monitored, maintained and operated so as to minimise contamination of carcasses. The effectiveness of killing should be monitored through a visual inspection that includes checks for signs of bird revival and missed cuts on the bleeding line. The scalding/plucking system should be monitored to ensure effective plucking and to ensure carcass contamination is minimised (through e.g. water temperature, adjustment of equipment for de-feathering, etc.). Carcasses should be inspected for quality (including food in the crop), faecal contamination, effectiveness of evisceration, catcher and machine damage and this information should be communicated to the relevant parties.

Note: For ritual slaughter of poultry it is described in **Animal Welfare and Protection Law** and in Book of Rules of the Manner of Animal Treatment in Time of Slaughter⁷ (Official Gazette of RM. no. 163/2010)

Please refer to:

[www.europarl.europa.eu/RegData/bibliotheque/briefing/2012/120375/LDM_BRI\(2012\)120375_REV2_EN.pdf](http://www.europarl.europa.eu/RegData/bibliotheque/briefing/2012/120375/LDM_BRI(2012)120375_REV2_EN.pdf)

⁷ Book of Rules of the Manner of Animal Treatment in Time of Slaughter (Official Gazette of RM. no. 163/2010)

Chilling regimes

Chills should have functioning refrigeration systems that ensure an even airflow and records should be maintained demonstrating that the temperatures are maintained as required. The cooling process used should comply with the processor's own and / or the customers' documented specifications. The carcass has reached 7°C or less (e.g. in the deep round). Carcasses should be cooled in a manner that ensures absence of cold or hot shortening and records of the achievement of customer specified cooling/pH targets/ requirements should be maintained. Chicken chilling should be carried out according to a documented plan and in a manner that minimises risk to food safety or quality requirements.

Cutting and boning

Carcasses entering the boning hall should have a deep muscle temperature of 4°C unless there is an alternative documented procedure agreed with the competent authority.

There should be documented procedure for the following activities and records maintained demonstrating that inspections are carried out against these parameters:

- Visual inspection of product entering the boning hall to verify absence of contamination, correct labelling;
- Effective removal of carcass labels;
- Visual inspection of the condition of tables, tabletops, conveying equipment trays and mechanical boning equipment.

Records should demonstrate that a batch coding process is in place that ensures that, where the product is to be marketed under the VC Guide, the batch only contains Macedonian VC Guide product. Boning activity should be performed in a hygienic manner to minimise contamination of product, should be based on documented procedures, and should comply with documented in-house or customer product specifications. There should be a documented procedure for operation and maintenance of vac-pack machine and dip tanks and related ancillary equipment. Records of checks conducted should be available to demonstrate:

- The inspection for and identification and rework of leakers prior to boxing;
- The accuracy of traceability to carton tray;
- Accuracy of tare weights including the amendments required when changing packaging supplier;
- Compliance with pack/retail pack label requirements.

Special requirements for value added meat products

Mince, comminuted meat and processed foods

These requirements are not included in VC Guide at present. If a sustainable quality assurance standard were to be developed at later stage, these requirements would need to be added with regards to limited meat content & logo rules.

Inspection and testing

General

Processors should document the procedures used for all inspection and testing as detailed in the quality/hazard control plan and maintain records of the test data. Processors should carry out testing that meets the minimum requirements for product set out in **Error! Reference source not found.** Where the Processor operates a laboratory, the competence of the laboratory staff should be demonstrated (e.g. through training records, certifications, ring tests, etc.). The suitability, effectiveness and accuracy of the test methods should be demonstrated (e.g. by reference to industry norms or other standard test methodologies and by laboratory test validation).

Where testing (of meat and meat products) on regulatory parameters is outsourced, the processor should use approved laboratories (where specified by the competent authority) that are also independently accredited to ISO 17025 for the specific parameter.

Ensure that where testing of a non-regulatory nature (e.g. customer specified) is outsourced, laboratories that are ISO 17025 accredited for the specific test are used.

All measurement systems should be capable of complying with regulatory requirements in terms of accuracy. Data from other tests (such as microbiological results when available) should be analysed for trends and to indicate the appropriate corrective action.

Bacteriological testing

Sampling and testing should be done in accordance with recognised methods.

Microbiological test data should demonstrate compliance with the parameters as prescribed in Regulation EC/2073/2005 /Book of Rules to Microbiological Criteria for Foodstuffs on microbiological testing. In the event that the levels are exceeded, Processors should take effective corrective action. If bacteriological tests are carried out in the plant laboratory, laboratory personnel should be suitably qualified and competent in microbiological methods and the test equipment should be suitable.

Residue testing

The Processor should have a residue testing programme and schedule in place for birds from eligible flocks that complies with the national residues monitoring programme. Evidence demonstrating that this programme is in operation and is effective should be maintained.

The Processor should be able to demonstrate that in the event that a carcass fails a residue test, any actions required by the official veterinarian were undertaken. Where customers require specific residue tests, these should be documented, and results maintained.

Note: Testing the microbiological levels of products using the aerobic colony count (ACC) or total viable count (TVC) method is outlined in EC/2073/2005 /Book of Rules to Microbiological Criteria for Foodstuffs on microbiological testing.

Final product release

All products should be inspected and released for dispatch according to a documented inspection procedure (including any specific tests required by customers). All product that is released by the Processor should be accompanied by a dispatch document/certificate status.

Metal detection

Unless otherwise agreed (and where size permits), all product arising from cutting or further processing should be passed through a metal detector and a record of failures maintained. Corrective action arising from the failures should be fully documented. Metal detectors should be set for optimum sensitivity for the product consistent with requirements and incorporate an alarm to signify the presence of metals (ferrous, non-ferrous, stainless steel). A schedule of testing of the effectiveness of the metal detection system should be in place and a corrective action procedure should be documented to deal with failures of the metal detection equipment.

Positive release

Personnel with the responsibility and authority for final product approval and release should be identified in the procedure and the approval/release documentation. This inspection should ensure that all product:

- is free from visible contamination before dispatch,
- meets internal and customer requirements for quality and safety,
- for all products, the inspection should ensure full compliance with the labelling regulations.

All products should be positively released based on either physical examination and test results and/or where laboratory results are not yet available, based on the history of compliance. Records should be available to demonstrate that, prior to boning or dispatch, carcasses have been checked according to a checklist that includes at a minimum: carcass temperature (sample based) is 4°C or less.

Records should be available to demonstrate that, prior to dispatch, all products (including vacuum-packed products, bone-in joints and deboned product) have been checked according to a plan that includes at a minimum:

- Vacuum packs seals are airtight where applicable;
- That cartons and trays, where used, are undamaged;
- That product was passed through a metal detector.

Product identification/traceability, reconciliation and recall

Production codes

As prescribed in:

- Rulebook on conditions of placing on market of poultry and fertile eggs (Official Gazette of R.M. 18/2014.
- Rulebook for labelling the food (Official Gazette of R.M. 54/2002.
- Rulebook for labelling concerning the storage used for identification of poultry meat and their definitions (Official Gazette of R.M. 35/2011.)

Identification and traceability

Processors should have in place a documented product identification and traceability procedure/system. The procedure/system should permit full traceability at all stages of all processes and along the supply chain from an original VC Guide participating broiler grower(s) of origin to the customer.

Product marketed should be clearly marked with processor identification and traceability codes. The traceability system in place should permit a reconciliation to be carried out that clearly demonstrates that only product originating from a Macedonian (Broiler VC Guide) participating broiler grower that was processed by a participating Macedonian (Broiler VC Guide) processor, was sold as Macedonian (VC Guide) approved product. The traceability system should also permit a reconciliation to be carried out that demonstrates clearly that product that was not produced or sourced from a participating Macedonian (Broiler VC Guide) approved growing site/processor was prevented from being incorporated into products sold as Macedonian (Broiler VC Guide) approved.

Where product claims are made on the product label, documentary evidence supporting the detail of the claim should be available (e.g. species/breed, reduced salt, farm source) and MAFWE approval for the voluntary labelling claims should be available. The evidence should be reviewed annually and documented.

Reconciliation

Reconciliation should be conducted and made available including data on the following:

- Opening stock;
- Detailed purchases and receipts by item, supplier and date;
- Stock used in production processes (taking account of yields and waste);
- Sales by item and by customer (for quality assured product);
- Closing stock.

The coding system, used to identify participating VC Guide product status, should be clearly documented at all stages of the process.

Product recall

Processors should document and establish an effective product recall procedure. The recall procedure should include a provision to initially contact the regulatory authorities (FVA, MAFWE, etc.) prior to initiating a food safety related product recall. Documentation should be maintained to demonstrate that the recall procedure was tested annually for effectiveness.

Handling, storage, dispatch and transport

Processors should be able to demonstrate that the temperature of product at all stages in the chill chain ensures that the safety and quality of the food is not compromised. The following table sets out the target temperatures for storage, handling and transport of eligible products, but the Processor may adopt other target temperatures based on a documented risk assessment, customer specified requirement or by arrangement with the official veterinarian:

Finished Product Temperature Requirement (Product) °C

Chilled Bone-in	0 to 4°C
Chilled Vac-Pack / MAP Meat	0 to 2°C
Offal	0 to 2°C
Frozen Meat	< -18°C all meats
Mince	< 2°C
Chilled Food ingredients	-1 to 4°C
Defrosting foods	< 10°C

Handling Area/Room Temperature Requirement (Area) °C

Production Processing Rooms Settings - Ambient temperature of < 12°C and capable of maintaining product at the specified temperatures.

Dispatch/Transport Temperature Requirement (Vehicle) °C

Transit Temperature Settings:

Chilled < 4°C

Transit Temperature Settings:

Frozen: < -18°C

Note: the definition of fresh poultry meat in the regulations stipulates that no temperatures of $\leq -2^{\circ}\text{C}$ have been used prior to sale.

All temperature-controlled areas (including rented/leased storage) facilities should be constantly monitored (and ideally alarmed) and a permanent record available of the temperatures demonstrating that the equipment/facility meets the necessary storage temperatures. There should be a procedure for monitoring and recording product temperature in these areas. There should be a procedure for defining and documenting the corrective action taken to address temperature non-conformances observed or recorded by these recording systems.

Storage

Product intended to be marketed under a specific scheme, it should be clearly identifiable in storage (e.g. by segregation, clear labelling, etc.) and product lots/batches should not be mixed with other non-assured product (e.g. on pallets, etc.). All product (including in-process product, ingredients, packaging products, etc.) should be stored to ensure it is protected from damage or contamination.

Dispatch and transport

Note: It is the responsibility of both the processor and the transporter to ensure that the cold chain is maintained during loading and transport (including in rented/leased storage facilities) and is appropriate to the product.

There should be a procedure for checking products at dispatch to verify compliance with this VC Guide and with customer requirements. The checks should include the following on a sample basis:

- Packaging integrity & pallet condition;
- Date coding, lot/batch coding, logo use and/or other label requirements;
- Temperature and other specified measurements (including weight/tare);
- Compliance with customer specifications.

All transport vehicles should be inspected prior to loading to ensure they are clean, free from odour taints, waterproof and undamaged; that door seals and air circulation ducts are intact; and that the refrigeration unit is working properly. Containers should be checked to ensure that they are pre-cooled prior to loading. Records should be maintained to demonstrate the effectiveness of temperature control appropriate to the product at all stages during transit. A contingency plan should be in place to deal with refrigerated delivery breakdown malfunction.

Control of non-conforming product

There should be a documented procedure that ensures that product/material at any stage that does not conform to requirements, is prevented from unintended use or release. The procedure should provide for clear identification, adequate segregation and final disposition of the nonconforming product and records including details of the quantities involved of such disposition should be maintained. Where non-conforming product arises that requires the process to be stopped, the process can only be resumed where this is authorised by responsible personnel. Incidents with a potential to cause a food safety hazard (e.g. failure of the metal detection system) should be recorded and reported in writing to the person responsible. The disposition should only be conducted in a manner that permits full traceability and should only be authorised by the person(s) specified previously. Disposition can include:

- Reworking to meet the specification / customer requirements (e.g. by trimming);
- Acceptance with or without reworking by agreed concession from the customer;
- Regarding (including where necessary relabelling) for alternative use to which it fully conforms (i.e. so that it meets an alternative specification fully);
- Rejection and destruction.

Ensure that in the event of a breakdown in the quality or HACCP based controls, a review of the relevant procedure(s) is conducted immediately, and appropriate corrective actions taken.

Internal audits

Processors should establish documented procedures for the scheduling, planning and the implementation of internal audits to verify internal compliance with the requirements of the VC Guide and the effectiveness of the Quality System, records and procedures. This should be completed for all requirements of this section of the VC Guide at least on an annual basis.

(Note: see responsibility for reporting critical non-compliances in management responsibility in above). All corrective and preventive actions defined in these audits should be assigned and tracked through the corrective/preventive action system until completed by the target completion dates.

The records of such audits should be available for inspection. Internal auditors should have received training in the requirements of the standard. Ensure that internal auditors are independent of the activity being audited and have received formal training in auditing skills.

Control of inspection, measuring and test equipment

A register of all inspection, measuring and test equipment should be maintained which includes:

- Identity/location
- Equipment operation range and use range
- Current use/purpose of the equipment
- Tolerance of equipment and required accuracy
- Calibration frequency and responsibility
- Calibration method or reference
- Operational checking (e.g. start-up checks for functionality) to ensure continuing accuracy.

Records of all calibrations carried out with traceability to national standards should be maintained.

When a device is found to be out of calibration, an assessment of the validity of previous inspection results, the likely impacts and the appropriate corrective and preventive actions should be carried out and recorded.

Corrective and preventive action and customer complaints

Corrective and preventive action

There should be documented and effective procedures for corrective and preventive action management. Corrective and preventive actions required should be assigned and tracked and their priorities appropriately identified (e.g. by means of defined time scales for completion).

Customer complaints

Processors should establish an effective procedure for evaluating and handling of customer complaints, including those of a regulatory nature. The procedures should clearly outline responsibilities for logging, tracking and closing off complaints in conjunction with the complainant.

The complaint log and related correspondence should be maintained and be available for inspection. Where customer complaints relate to a food safety issue and this is verified by the processor, the official veterinarian should be notified.

General facilities

Plant and facilities

Site security and visitors

Processors should ensure the site security is maintained to prevent possible product contamination. Management should document how visitors and contractors are managed to minimise risk to product.

Process flow and laboratories

Process flow and traffic should be arranged to prevent product contamination. The laboratory should not open directly to the processing areas and access to the laboratory should be controlled. Ensure that on-site laboratories are located and operated to prevent product contamination.

Plant and facility checks

A programme for verifying the effectiveness of the measures required under this VC Processor Guide (all sections) for plant and facilities should be documented and scheduled checks should be recorded.

Cleaning and sanitation

Processors should document and implement a comprehensive plant, facilities and equipment (including processing equipment) cleaning and sanitation programme. This programme should cover all food contact surfaces and the exterior and interior of the plant including at a minimum: walls, floors, windows, drains, machines, equipment (e.g. knives, sterilisers, trays) food contact surfaces (e.g. conveyors), facilities, and ancillary structures including ventilation ducts, stores and the lairage.

Processors should adopt a “clean as you go approach” throughout the operation and should document, monitor and record the cleaning activities and should define the methods of cleaning and sanitising, the responsible personnel, the frequency with which each item or group of items is cleaned and the materials used. A designated person should verify the effectiveness of cleaning prior to allowing production to commence in areas where product is handled or packed.

Where cleaning is done by a subcontractor, a contract with full cleaning specification should be in place. Records verifying the effectiveness of the cleaning programme (such as microbial swabbing or rapid hygiene tests) should be maintained.

Pest control

Processors should implement a documented pest control programme and all baiting materials should be certified by the manufacturer as appropriate for the particular use. An annual review of the programme should be conducted to establish its suitability and effectiveness. Where baiting supplies are stored on-site, the store should be kept locked and the baiting materials segregated in the store so as not to compromise other materials. All bait stations and electronic fly killers should be secured, numbered and clearly indicated on a site map. Inspections for pest control should be made and recorded (minimum 8 visits per year) by an independent contractor.

All air vents and air intake points (including windows, doors, ceilings, etc.) in areas where product is handled should be covered with 1.2-mm screens/meshes to prevent pest ingress.

There should be a multi-level baiting system such as:

- First line of defence: perimeter with bait points at 6-8 m intervals along the entire perimeter
- Second line of defence: along factory external wall
- Third line of defence: internally - where there is a risk of rodent ingress.

There should be a programme and records for the inspection of electronic fly killing (EFK) units and for replacement of the light tubes.

EFK Units should be located away from food processing areas and from packaging equipment or packaging operations.

EFK Units should not be located close to or above exposed meat or food preparation areas.

All areas of the premises should be managed to minimise the occurrence of harbourages/habitats for pests.

Maintenance

A preventive maintenance programme for essential plant and equipment affecting product quality/safety should be documented and implemented. Maintenance schedules and procedures outlining the maintenance checks required should be documented. All internal maintenance staff should receive training in hygiene. All external maintenance personnel should be made aware of the company hygiene regulations prior to commencing work. Maintenance procedures should indicate the precautions taken to ensure that the product is not contaminated in any way by the maintenance activity whether carried out by own or contracted staff (e.g. remove debris, clean and ventilate production area post-maintenance). A record of maintenance activities should be maintained.

There should be procedure to approve equipment for re-use after maintenance is complete.

Implement a system for accountability for tools used and equipment parts removed during maintenance.

Environmental hygiene

Breakables

Wooden structures, pallets and fittings are not permitted in any food production area where product is open/unpacked. A glass/hard plastics policy and written procedures for handling glass/hard plastics breakages in all process and storage areas should be in place. Where glass/hard plastics are present a glass/hard plastics register should be maintained. A detailed procedure should be documented and implemented for the management of incidences involving breakables and materials that can shatter including metals, plastics, wood, packaging materials, calculators, phones, electronic equipment displays, etc. This should include:

- i. Stopping production;
- ii. Restriction of movement through the affected area;
- iii. Quarantine of affected materials;
- iv. Report to management;

- v. Clean up of breakage and disposal/cleaning of cleaning equipment;
- vi. Safe removal of breakage material from area with reconciliation of pieces where feasible;
- vii. Repair or replacement of damaged item;
- viii. The checking of protective clothing and footwear and changing if necessary;
- ix. Completion of an incident log and sign off that production can restart, by a person with designated responsibility;
- x. A sample of breakage material should be retained in a safe manner;
- xi. Documentation of the corrective/preventive action taken to address the issue and to prevent a reoccurrence.

Exterior, structure and grounds

A perimeter fence, wall, or other suitable physical demarcation should be in place to control access to the grounds. Equipment, pallets and other materials stored in the factory grounds should be stored neatly and in clearly defined areas. Any unused buildings, service buildings etc. should be maintained in good repair and free from debris and secured against unauthorised access. There should be a clearance of 1 metre wide around the factory to avoid rodent infestation. Exterior finish of the premises should be maintained in sound presentable condition (i.e. no flaking paint or broken plaster).

Roofs, valleys and gutters should be maintained in good repair and free from debris and weeds. A schedule should be in place for tidying and organising the exterior areas.

Interiors: General

All pipes, pipe work, lagging, electrical cables etc. should be clean, secure and properly constructed. All internal areas in contact with food should be on the plant cleaning programme. Documentation should be available to demonstrate that all food contact materials (including conveyor belts, preparation utensils and vessels, tables, etc.) comply with the legislation on materials in contact with food.

Entry to production

A procedure should be in place to ensure good hygiene practices at entry and exit from all production areas and to prevent the wearing of protective clothing outside food handling areas. Wash-hand basins and footwear cleaning facilities should be provided at all entry points to production areas. Taps should be knee, foot, arm, or electronically operated. Paper towel dispensers and receptacles should be in place. Hand sanitising solutions or sanitising liquid odourless soap should be provided at each hand washing point. Water should be provided at a temperature that facilitates thorough hand washing. Where footbaths are provided, these should be located outside production areas and be designed to ensure adequate contact with footwear and allow footwear to drain after use. A procedure should be in place to ensure that the disinfecting solution remains at working strength at all times (e.g. through the use of a chemical feed regulator).

Interior walls (processing and product storage areas)

Wall surfaces should be designed and constructed to be durable, smooth, light coloured, easily cleaned and impermeable to liquids. They should be maintained in a clean condition free from cobwebs and moulds, etc. Junctions and joints should be smooth and impervious. Wall-to-floor junctions should be

sealed. Ledges and sills should be kept free from dust, dirt or other miscellaneous items. Walls and wall openings/conduits should be well maintained, e.g. no flaking paint or plaster, no damaged or missing tiles, all tile cracks sealed or grouted.

Ceilings and overheads

Ceilings should be designed and constructed to be of sufficient height, smooth, light coloured and easily cleaned. All joints should be sealed and impermeable. Ceilings should be maintained in good repair, clean and be free of condensation. False or cavity ceilings should have access to the void above to enable cleaning and inspection. Girders and overhead pipework and structures should be clean, free from rust, dust, mould growth, flaking paint and other extraneous material. Skylights are undesirable, but where present, they should be treated as breakables, and should be clean and, if they can be opened, should be fitted with fly screens.

Floors

Floors should be constructed of durable, non-slip, water resistant material and be maintained in good condition (i.e. no holes or cracks). Floors should be kept clean and free from the accumulation of water or debris especially in corners or in areas hidden by machinery. Rubber mats or plastic meshes, where used, should be easily removed and cleaned as part of the plant cleaning programme.

Drainage

Drainage should be such as to prevent risk of contamination and should include water-sealed U bends to prevent gas reflux. All floors should be managed (e.g. sloped towards the drainage channels) so that stagnant pools of liquid are prevented. Drainage channels that cross personnel working areas and passageways should be covered with removable covers for cleaning accessibility. Fat, debris traps and grids should be fitted to all drains. Ensure that drainage from on-site laboratories is designed to exit the building before joining up with other waste systems. Manholes are not permitted in the premises in areas where food is handled.

Doors

Doors and door jambs should be constructed of durable impermeable material, be tight fitting and of smooth easily cleaned finish. Glass should not be used in doors opening into storage or production areas; other clear shatterproof material may be used. All external and internal doors (excluding emergency doors) leading from non-process into process areas should be self-closing or otherwise screened to prevent pest ingress. It should be possible to open all chill and freezer doors from both sides.

Windows

Exterior windows in production areas for new buildings should be at least 2 metres above ground and, if they can be opened, should be fitted with suitable and effective fly-screens. They should be constructed of shatterproof material or, if made of glass or hard plastic, should be laminated to prevent shattering.

Windows, window frames etc. should be tight fitting, maintained in good condition, free from cracks, moulds, flaking paint etc. and should be kept clean.

Lighting

Lighting in production areas should be designed to be permanently fixed, easily cleaned, and should be protected by shatterproof covering. Lighting should be adequate at all times for the particular operation and should be of a type that does not distort colour where decisions are taken on the basis of colour.

Knives, sterilisers, hoses and other equipment

There should be a procedure in place to ensure that knife and equipment sterilisers are effective, and checks should be made according to a defined schedule to verify this. Sterilisers should be easily accessible in all areas where knives or similar utensils are used. Aprons, where used, should be subjected to frequent cleaning in designated wash cabinets designed to minimise the risk of cross contamination. Hoses should be maintained in a clean and tidy condition and should always be kept off the floor when not in use. Knife, blade, scissors and needle controls should be in place that specify.

- Only company issued, identified and registered knives, blades and scissors may be used;
- No snap blade knives should be used;
- Knives, blades and scissors should only be used for the task for which they were designed;
- Equipment should be accounted for and the condition checked and recorded at a minimum at the start and end of production;
- In the event of equipment breakage or loss, all parts should be accounted for and the incident logged, and corrective/preventive action should be taken to prevent re-occurrence.

There should be a procedure in place for the management and control of other items of equipment (including tools, machine components/parts, injection equipment, specialised cleaning equipment and utensils) that ensures that they do not cause cross-contamination of production areas, other equipment or product.

Extraction and ventilation

All processes which emit steam or vapours should be effectively hooded and fitted with suitable extraction equipment to prevent condensation. Suitable ventilation should be available in all process areas where steam or water vapour arises to prevent condensation. Vents from drains, sewers and rainwater drainpipes should not be located within the plant.

Cleaning materials and storage

All cleaning equipment and materials, chemicals and other substances likely to contaminate product should be stored in a lockable, secure place (ideally with appropriate bunding) away from production. All chemicals including cleaning chemicals should be segregated in storage to prevent mixing of incompatible materials. Adequate safety and protective clothing, footwear and apparatus should be available when handling such substances.

Effluent treatment

Data should be available that demonstrates that any effluent treatment plant is operated in accordance with the relevant licences. Disposal of effluent should be carried out in accordance with the relevant licences. Where an effluent treatment plant exists on-site, it is placed as far as possible downwind and away from the plant air intake points.

Food trays

Facilities incorporating adequate ventilation should be provided for the washing and sanitising of food trays. There should be separate areas for the storage of soiled trays, the washing of soiled trays and the storage of clean trays which prevent tray cross contamination from other trays or from the environment.

Waste disposal general

Specified risk materials and animal by-products

The Processor should have in place a specific SRM protocol as required by MAFWE/FVA and as agreed with the official veterinarian. There should be a documented programme for the management and disposal of all animal by-products that is agreed with the official veterinarian.

Waste management general

There should be a documented programme for the management of all waste material. Waste materials should be controlled in the production area and should be controlled pending collection/disposal and the frequency of collection/disposal should be designed to prevent risk to the product.

Processors should have procedures to prevent waste material coming into contact with fresh meat or carcasses which have been passed fit for human consumption. The plant cleaning programme should include all waste handling/storage areas to minimise odours and fly infestations.

Waste containers (Internal)

The following requirements apply for containers for use in food processing and handling areas internally (i.e. within the plant). They should be: Clearly identified so that they cannot be mistaken for food use containers. Clearly designated according the type of waste (separate waste containers for SRM) to be disposed in them, available at appropriate locations and emptied and cleaned according to the plant cleaning programme.

Waste skips / Receptacles (External)

The following requirements apply for waste collection skips/receptacles. They should be: Covered at all times except when being filled and be located as far as practicable from the “Clean” area, sited on a concrete surface that ensures that any leakage is contained and disposed of safely and emptied and cleaned according to a documented schedule.

Condemned materials

Adequate facilities for the identification and safe handling of condemned materials should be provided. The arrangements for the handling, control and disposal of condemned materials should be agreed with the official veterinarian. Where condemned or inedible material or other wastes are removed through conveyors or chutes, these should be constructed and installed in such a way as to avoid any risk of contamination of fresh meat. Enclosed chutes should be equipped with suitable access points to facilitate inspection and sanitation.

Waste collector approval

Processors should have a documented system for ensuring that only officially approved waste hauliers are used and this should include clear criteria for the vehicles to be used.

Other waste material

Discarded wrapping, packaging and other refuse including kitchen/canteen waste should be placed in designated bins or skips so that it does not compromise the hygiene of the premises and does not provide a habitat for pests and vermin.

Personnel hygiene

General

An operational hygiene management system including personnel hygiene should be established and communicated clearly to all personnel. In toilet areas, hand washing and sanitising facilities should be provided at each hand washing point and clearly identified. Hand-washing instructions should be posted adjacent to each wash station in these areas. Paper towel dispensers and used towel disposal facilities should be in place.

Medical records

All personnel handling food product should have been approved on the basis of a pre-employment assessment conducted by a doctor or public health professional. Processors should have a procedure in place to ensure that no person that is likely to be a carrier of or suffering from a disease likely to be transmitted through food or that has infected wounds, skin infections, sores or diarrhoea is permitted to handle food or enter any food-handling area in any capacity. The procedure should ensure that any person so affected who is likely to come into contact with food immediately reports the illness or symptoms, and if possible, their causes, to designated personnel that have received documented training in managing this issue.

Personnel should be made aware of their responsibility to notify management of any infectious disease or condition they may be suffering from or have been in contact with that could adversely affect the safety of the product.

Note: The most effective preventive measure that can be taken to prevent food contamination is effective and thorough training of all staff. The findings should be imputed in report that could be taken into consideration in designing the hygiene training for food handlers and in defining the conditions under which employees may continue to handle food.

First aid

At least one member of staff should be trained in first aid procedures, and fully stocked first aid kits should be available at all times during operation to treat minor injuries. The number of trained first personnel and first aid kits that should be available during operations should be determined through a documented risk assessment.

Personal hygiene

Fingernails should be kept short, clean and unvarnished. No visible jewellery, except plain wedding rings may be worn by personnel working in the production area. All head hair, including facial hair should be contained (e.g. by means of a snood, mop cap or other covering) to prevent contamination of product. Cuts, sores and grazes should be completely covered after treatment with a distinctively coloured waterproof dressing incorporating a metal detectable strip and which is supplied by the company. Operators lifting large meat pieces (e.g. quarter, part quarter) should also wear a protective neck shield.

Personnel clothing and locker rooms

Protective clothing

All personnel (food operatives) working within the plant (i.e. in direct contact with exposed product) should be provided with suitable protective clothing (that covers all street clothing), and headgear and footwear appropriate to the area of work. Personnel working in the lairage, or handling animals, should be provided with clothing suitable for the handling of animals (e.g. dark coloured) and separate designated footwear. Clothing and footwear worn by personnel working in the lairage or handling live animals should be clearly distinguishable and maintained separately from that worn by food operatives. Protective clothing and footwear worn in the process area (i.e. in direct contact with exposed product) should not be worn outside the area. Clean protective clothing and footwear should be issued daily or more frequently if required. Facilities (including individual lockers) should be provided that ensures the separation of street (civilian) and in-plant protective clothing and footwear. Specific arrangements should be in place that provide for the hygienic handling of used or contaminated clothing and footwear so as to prevent cross contamination. A scheduled laundering of all protective clothing should be in place. Where work clothing is laundered on-site, data should be available to demonstrate that the wash cycle achieves adequate sanitisation (e.g. exceeds 80°C operating temperature or equivalent).

Washing

All persons entering production areas of the plant should wash hands and sanitise their protective footwear. Notices to this effect should be posted in appropriate areas.

Personnel facilities including canteens

Smoking, eating and drinking should only be permitted in designated areas and there should be clear signs to this effect. All personnel facilities (canteens, locker-rooms, toilets, restrooms) should be included in the plant sanitation programme and maintained in a clean condition. Canteens should be operated so as to ensure separation of high and low risk workers to prevent cross-contamination (e.g. separation of people working in lairage and production areas in the canteen).

Toilet facilities

All toilets used by personnel involved in handling food should be clean, ventilated, should not lead directly into food processing or storage areas, the doors should be self-closing and all cleaning equipment should be maintained and stored so as not to contaminate the process areas.

There should be at least one toilet and one hand-basin per 15 male and 10 per female employees.

Facilities for hand washing should be in place, equipped with odourless liquid soaps and sanitisers dispensed from wall mounted units. Paper towel dispensers and a bin for used paper towels should be provided in every wash area. The use of air driers is not permitted in food production areas. Hygiene notices should be clearly displayed in all toilet areas indicating that hands should be washed after the use of the facilities. Factory issue protective clothing and footwear should be removed before entering toilets, canteen/rest areas, smoking areas and offices (outside production areas).

Washing facilities in production

In slaughter halls, all operatives should have direct access to hand-washing facilities at their workstations. In boning halls, all operatives should have access to hand-washing facilities close to their individual work areas accessed through a hygiene lobby.

Sustainability criteria for processor

the criteria contained in the processor part of the VC Guide previously listed are designed to ensure best practice in the breeding, hatching & production of chicken. These criteria while specifically grouped according to traceability, food safety, hygiene, health and safety and welfare etc., have an overarching sustainability relevance as defined.

Below are the records that should be maintained for the purpose of measuring/calculating sustainability and include some general farm criteria:

Monthly records to be retained

- a. Electricity usage for the processing process and related operations (e.g. heating, handling, laboratory, refrigeration, lighting)
- b. Fuel usage for vehicles in collection and delivery
- c. Mileages incurred in collection and delivery
- d. Fuels used for heating

- e. Quantity of birds (kgs and number) received for processing
- f. Quantities of chicken meat processed (kgs)
- g. Quantities of by-product for rendering
- h. Quantities and types of packaging (kg) used in the packaging of day-olds (where applicable)
- i. Quantities and types of packaging (kg) disposed of
 - As waste (where packaging is otherwise unusable)
 - Recycled (where packaging is not reused by hatchery)
- j. Packaging type and source as follows:
 - Types of packaging used in the processing factory
 - Packaging used from sustainable sources.
 - What % of packaging is coming from sustainable sources?
- k. Volumes of water usage
- l. Effluent COD and BOD average, for the hatching process only
- m. Quantity and type of refrigerant gas used for replacement or top-up (for chill rooms only)

Part 3:

Costings and investments

Costings

Poultry production, processing or hatching is a business activity where assets (resources) are necessary. The assets, or resources, are considered as entries in the production or production **inputs**. These include feed, energy, labour costs, etc. As a result of the use of the inputs, **outputs** are received (e.g. meat, eggs, manure).

Inputs and outputs can be expressed in **physical and value indicators**. The physical or natural indicators are quantitative, while the values are a monetary expression. Using natural indicators, the quantities of used inputs and the quantities of products received are measured and compared. Costs and income are further expressed in monetary value.

From the aspect of the agricultural holding performance and profitability measurement analysis, it is necessary to **keep records** of the value and quantity of the used inputs and obtained outputs, in order to obtain a complete picture and to have grounds for making the right decisions.

Record keeping is a vital part for every actor in the poultry value chain. Income and costs must be factored in, so to assess if the business venture is sustainable or not. Records usually show the state-of-affairs, weaknesses and strengths of the business, and serve as basis for future planning.

Apart for making financial decisions, keeping records is important when making feeding decisions (e.g. number of feed rations, types of feed), assessing the productivity (e.g. yield, performance, benchmarking), and serve as a basis for bank credits etc.

Records should be kept simple, accurate, with a consistent structure, no repetition and include all the necessary information. In broad terms, records can be grouped into: **management and production records** (data related to the management issues, e.g. labour data, veterinary visits and vaccinations, feed details, flock balance, price trends etc.) and **financial records** (financial statements of the poultry venture, financial recording of the farm assets and liabilities, income, cost and cash flow) and **production records**.

Costs in poultry production, processing or hatching

The value of the used resources for securing inputs in production, processing or hatching as well as other monetary expenses incurred in order to obtain products or realise services, are called costs.

In general, any agricultural production includes the following basic cost elements:

- **Material costs** - refer to the value of the consumed materials, i.e. raw materials (animal feed, fuel and lubricant, etc.).
- **Depreciation costs** - include the transferred value of the used fixed assets (basic crop, buildings, equipment, etc.)
- **Labour costs** - refer to the monetary compensation for the engaged workers for the work performed and for the achieved performance.

In addition to the basic cost elements, other costs should also be recorded, such as interest on invested funds, insurance premiums, contributions etc.

Types of costs

There are many types of **cost classifications**, depending on the type of costs, place of origin, driver of the cost, purpose, etc. Apart from the basic division of costs by natural types (expenditures for consumables, depreciation of fixed assets, salaries, interests and services), in practice, especially in the preparation of analytical budget calculations, the most common divisions of costs are those identified by certain products and activities (direct and indirect costs), and those according to their response to the change in the volume of production (variable and fixed costs).

Direct and indirect costs

The essential difference between direct costs and indirect costs is that only direct costs can be apportioned by the way they are identified with specific products, services, or activities.

Much of the indirect costs are considered as part of the overheads of the farm or production, which occur even if a certain product or activity is not created (which by their nature identifies them as fixed costs).

Examples of direct costs are direct materials, direct labour (permanent or seasonal), interest, commission, etc. Examples of indirect costs are wages for production management, quality control costs, insurance and depreciation.

Variable and fixed costs

The amount of costs incurred depends to a large extent on the realised production volumes, that is, the quantity of finished products obtained. The production volume can be increased as a result of increasing production capacity or by intensifying the production.

Variable costs differ with the change in the volume of production. The variable costs are usually short-term costs, i.e. they are realised within a period of less than one year. A basic requirement for occurrence of variable costs is to have production. If there is no production, there are no variable costs. Variable costs are easily allocated to individual production lines. Example of variable costs in poultry production are feed, labour, packaging, hygiene products, etc.

Fixed costs are long-term costs that in total value remain on the same level regardless of the change in the production volume. Additionally, fixed costs do not depend on minor changes in the production line or intensity of production. Fixed costs include depreciation, equipment and machinery maintenance, housing of machinery, telephone costs, permanent labour, interest on invested funds, etc. Rent also falls into fixed costs, because the whole amount should be paid, regardless whether the production is ongoing, the quantities produced and the production intensity.

It is very important to keep fixed costs at the minimum level, i.e. to use the production capacity to the fullest extent, in order to have lower average costs.

Total costs

The sum of direct and indirect costs, as well as the variable and fixed costs, give the total cost of the agricultural holding (farm).

$$\text{Direct costs} + \text{Indirect costs} = \text{Total costs}$$

or

$$\text{Variable costs} + \text{Fixed costs} = \text{Total costs}$$

Figure 4: Total costs

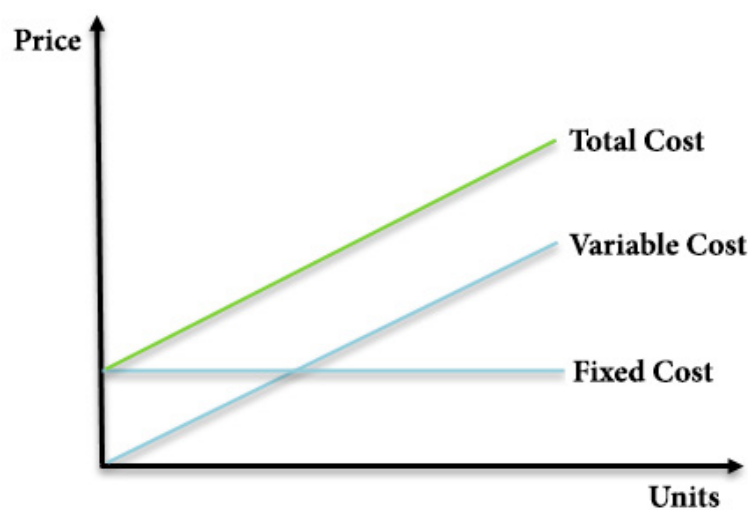


Figure 5: Total costs (variable and fixed costs)

Analytical budgets as a method for determining the cost of production

Composing enterprise budgets is a procedure for determining the costs of production. Budgeting is the basic method for determining the cost of individual production lines (agricultural enterprises) and allows cost control and control of the production economics, as well as grounds for benchmarking and decision-making.

Types of budgets

There are several budget types which can be used depending on the needs and decision-making phase. According to the time when the budget is made, there are:

- **Planning budget** - made before the start of the production process, based on the determined production technology, necessary resources and producer's experience.

- **Corrected budget** - adjustments are made to planning budgets during production, in order to remove or correct some changed or unreal items from the budget.
- **Final budget** - prepared at the end of the year/cycle, after the completion of the production process, summarising all the actual expenses and incomes.

Compiling an analytical budget for calculating the cost of production

The procedure for compiling an analytical budget includes the following steps:

Calculation of the value of production and determining total income

The market value of production refers to the total yield calculated at market price. The total income refers to the quantity sold and is obtained by multiplying the quantity by unit capacity and the market price. It is important to note that the farm can also earn additional income, not only based on the production and sales of poultry products, but also from other revenues such as subsidies.

Determining the actual production costs

The level of production costs depends on the applied technology, as well as the achieved performance in various operations. For simpler and more accurate calculations, the grouping of costs is required, for example, as variable and fixed, or direct and indirect costs.

Determining the gross margin

Gross margin is the difference between the total production income minus the variable costs.

Determining the net margin (financial result)

The financial result is obtained as the difference between the calculated value of production and the total production costs. If the value of production is higher than the cost, the farm made a profit; vice versa, if the production value is less than the production costs incurred, the farm has made a loss.

Determining the cost of production

The budget enables calculation of the cost of production, when the total costs are divided by the number of units produced.

Determining the performance measures

The analytical budget enables calculation of various performance indicators, which indicate whether the production is cost-effective and profitable.

Useful indicators of economic performance

Profitability depends on many factors, the most important being the combination of inputs, feed conversion ratio, hatching eggs produced, hatchability, meat yield, prices of inputs and outputs, technology applied, etc.

The most commonly used indicators of economic efficiency and production performance are:

- **Cost-effectiveness** - the degree of useful/beneficial effect of spending production factors. The production is economical and cost-effective when consuming fewer production factors for a given production volume.
The coefficient of cost-effectiveness is calculated as the ratio between the value of production and the production costs. It is considered that the production is cost-effective if a coefficient greater than 1 is obtained.
- **Profitability rate** - relation between financial result and market value of production. Production is considered profitable only if a positive financial result is achieved. Often, the rate is also called a profit margin and is expressed as a percentage.
- **Profitability thresholds** - the break-even point at which producers have neither profit nor loss, i.e. the total cost of production is equal to the total revenue. The **sales price threshold** is calculated as the ratio between the cost of production and the yield.
Conversely, the **yield threshold** is calculated as the ratio between the cost of production and the market price, thus obtaining the minimum level of returns to cover the costs.
- **Labour productivity** - this indicator is expressed in hours or days. It determines the relationship between the quantity of engaged labour and the time it takes to achieve a certain production norm.

Template for analytical budget for calculation of cost of production is given in [Appendix 20 – Template for cost calculation](#). Link to the Excel tool for cost calculation is available at <http://www.fznh.ukim.edu.mk/broiler>.

Sensitivity analysis

When compiling the planning budgets, part of the items, especially prices, are based on the current market conditions. During production, however, there may be a change in some of the prices, but also the amount of some inputs as a result of applied practices. In this sense, a useful management tool is sensitivity analysis, which can help assess the response of the cost and the financial result to certain changes in the planned quantities and prices. The ultimate goal is to calculate the impact of individual changes on the marginal effect.

A template for sensitivity analysis is given in [Appendix 21 – Example template for sensitivity analysis](#).

Investments and finance in broiler production, hatching and processing

There are different incentives for the investor to undertake investments, among which, starting-up a new business, introduction of new products, intensification of production, introduction of innovations, adopting green production regimes, assuring quality, etc., but the final incentive is profit-driven. Investor allocate money in expectation for future benefits (returns on investment) with the main goal of maximizing his/her welfare.

Investment and financial decisions go hand-in-hand together. Investment decisions are about choosing the optimal investment alternative, and financial decisions are about choosing the optimal capital structure.

The proposed guide shall be used only for investments in the long-term fixed assets or expenditures whose amount is significant, such as constructing a new production plant, purchasing or replacing machinery and equipment, etc. This guide is not recommended for smaller investments.

Note: The key aspects of the investment and financing processes are covered in this section that should be considered by each potential investor before start-up of the processes. The appendices offer more information and examples on the issues, such as a ready template of capital budgeting for a broiler farm, available financial sources, etc. These are just for rough orientation in business planning and are subject to constant changes so they should be carefully considered in future planning processes.

Start-up business planning

Investor in a business start-up, should bring different decisions for his/her future business. Here are some basic steps to be considered:

1. Develop an idea for a business
2. Define a business model
3. Define related investment(s)
4. Choose among alternative investments
5. Move to executive phase

These steps are presented in a simplistic manner. Their order may vary, and each step can be repeated a number of times.

Business model innovation

A business model is conceptual structure of a business that supports viability of a product or company. It simply depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.

A new business in development must have a business model, but also established businesses have to revisit and update their business models.

Once the investor develops idea on the start-up business or needs to revisit the existing ones, the business planning process may start. Defining a business model is essential process for the investor since it describes the rationale of how an organisation creates, delivers, and captures value.

There are different business planning tools available so to assist in defining and shaping the business model structure, but here we suggest the Business Model Canvass (more information on its manual is provided in Osterwald 2014, and a template is enclosed in [Appendix 22 – Example template of investment financial appraisal](#)).

The business model tools enable brainstorming in a structured manner with the aim to develop a business model we are pleased with. Deriving a business model is an iterative process.

What the investor should bear in mind when planning the business is that the business model can be driven from different incentives. It can be customer-driven, Resources-driven, offer-driven, finance-driven and multiple-epicentre driven.

After the business model is defined, a more comprehensive analysis is required so to support the investment decision-making process.

Investment decision-making process

Investment decision-making is necessary so to bring decisions about investing. Investing means allocating money in goods that are not consumed today but are used in future to create wealth. If the purchased asset does not produce future returns, it is not considered as an investment.

The investment usually is not just one asset, but may include multiple capital expenditures, such as construction of the plant, purchase of the equipment, entry of the day old chicks, etc.

Making investment decisions is not an easy task. When considering investing, there are several decision-making steps to be considered:

1. Develop an idea for a particular investment
2. Recognise possible and acceptable conditions for realization of the investment
3. Assess the costs and revenues related with the investment
4. Identify available and adequate financial sources
5. Define the methods and criteria for investment appraisal
6. Bring the investment decision.

Preparing a business plan

A business plan is a formal written document containing all stages in investment decision making, containing business goals, methods on how to reach these goals and the time frame for attaining these goals.

It describes the investment and the business and provide projections on expected costs and revenues from the investment so to finally decide whether to accept or reject the investment.

Written business plans are often required to obtain bank loans or grants.

If an investor has an investment idea, he/she should first decide whether to invest or not, or to choose an alternative investment. After decision on what to invest, business plan should be prepared.

Writing down a business plan means describing the following sections:

1. Executive summary
2. Market aspects of the investment
3. Description of the planned investment
4. Time schedule of the investment
5. Analysis of the location
6. Investment financial analysis (example is provided in Appendix 16.2.2)
7. Conclusions

Each section is described below.

What to include at the beginning of the business plan?

- Data on the investment
- Short description of the investment
- The decision criteria used in each capital budgeting method

What to include in the summary of a business plan?

- The concise title, i.e. “Construction of a Slaughterhouse/Processing plant”; “Construction of a hatchery”; “Purchase of an equipment”; “Replacement of equipment”, etc.
- Decision results derived from the investment appraisal methods

The summary is best to be written after completing writing the entire business plan.

What to include in the investment market aspect?

- Description of the products and services related to the investment
- Description of the sale markets and input supplies markets

This section shall answer the following questions:

- What kind of product will be obtained with the investment?
- How the sale will be organised?
- Which are necessary inputs?
- Who will supply the inputs, raw materials and/or services?
- What are the necessary input volumes and prices?

What to include in the description of the planned investment?

- Description of technological processes
- Description of investment in construction facilities, mechanization, equipment, etc.
- Description of other expenditures, related with writing down the business plan, preparing the technical documentation, etc.
- Plan and costs for labour

This section shall answer following questions:

- What kind of technological process of production is concerned?
- Which construction activities are planned?
- What kind of investments (mechanisation, equipment, computers and software) are planned?
- Which costs related with services from third parties for preparation of a business plan, technical documentation, etc. are planned?
- What is the schedule and price for the labour?

What to include in the time schedule of the investment?

A time plan (on a monthly basis) of all activities related to the planned investment, such as:

- The date of the investment installation (i.e. installation of equipment)
- The date of putting the investment in operation (i.e. regular use of the equipment)
- The date of the start of each production cycle (i.e. entry of the day old chicks)

What to include in the site analysis?

- Description of the exact location where the investment activity will take place (i.e. the location of the broiler farm, hatching facility, or processing facility)
- Description of the existing infrastructure (road networks, electricity, water, etc.)
- Explanation of the local development benefits from the investment

- Brief description of the advantages of the selected investment (only if it is a new investment facility)

What to include in the investment's financial analysis?

Investment analysis is also referred to as capital budgeting, and includes the following:

- The liquidity analysis (i.e. the ability to cover current costs)
- The expected expenditures for:
 - Fixed assets (buildings, equipment, etc.)
 - Other assets tightly related with investment (day old chicks, etc.)
 - Current assets related with the investment (feed, vaccines, veterinary services, etc.)
 - Other costs related with the investment (labour, accountancy services, etc.)
 - Loan repayment plan (date of the first annuity, loan amount, repayment period, grace period, interest rate, repayment dynamics, etc.)
- The expected revenues (i.e. expected income structure from the planned production)
- The projected cash flows
- The capital budgeting
- Investment sensitivity analysis

What to include in the conclusion of the written document?

- The results obtained from the applied investment appraisal methods i.e. the payback period, the net present value and the internal rate of return
- The justification on whether to undertake the planned investment
- The arguments for the requested support on the planned investment (only if the purpose of the business plan is for grant requesting)

Capital budgeting

Capital budgeting, also referred to as investment analysis, is extremely useful for evaluating the potential profitability of a new business investment. It is the final step in the investment decision-making process.

Capital budgeting is a tool for maximizing the investor's future profits. It can be performed with various software tools that are available. It can be also done manually, but the process requires deep knowledge and broad experience.

Capital budgeting usually involves the calculation of each investment project's future accounting profit by period, the cash flow by period, the present value of cash flows after considering time value of money, evaluation of the project with the capital budgeting methods, assessment of risk, and various other factors.

The results obtained from capital budgeting methods (the payback period, net present value and internal rate of return), also referred to as investment appraisal methods, indicate whether to accept or reject the planned investment.

Capital budgeting is an essential part of the business plan document. An example for capital budgeting i.e. financial analysis, is provided in [Appendix 22 – Example template of investment financial appraisal](#).

The capital budgeting process consists of the following steps:

- Project identification and generation (generate investment proposal)

- Project screening and evaluation (select correct criteria to judge desirability of the investment, and estimate cash inflow and outflow along with the uncertainties and risks associated)
- Project selection (make approval of the investment proposal based on selection criteria and screening process, and compare with different alternatives, if any)
- Project implementation (the phase when money is spent and thus proposal is implemented)

Capital budgeting methods

The final output in capital budgeting decision-making is to bring a decision whether to accept or reject the proposed investment.

Although there are many different capital budgeting methods, the most utilised are:

- The payback period (PB): the number of years that are needed to make the cumulative cash flows from the first year after which the investment will return
- The net present value (NPV): it expresses the future cash flows in a present value with the discount rate
- The internal rate (IRR): it is the rate of growth a project is expected to generate, it represents the average annual rate of return, i.e. the discount rate which, when applied to the projects' cash flows, produces a zero net present value

The rule of thumb in capital budgeting decisions

The basic rule of thumb is as follows:

Accept the investment if:	Reject the investment if:
PB > minimal acceptable period for investment payback	PB < minimal acceptable period for investment payback
NPV \geq 0	NPV < 0
IRR > discount rate/cost of capital	IRR < discount rate/cost of capital

Sometimes the investor has to deal with mutually-exclusive projects, referring to a set of projects out of which only one project can be selected for investment. Under these circumstances, the decision rules are:

Accept that investment with:	Reject that investment with:
Shorter payback period	Larger payback period
Larger net present value	Shorter net present value
Larger internal rate of return	Shorter internal rate of return

Other times the investor has to deal with capital rationing, referring to the situation where the investor has more acceptable investments requiring a greater amount of finance than that is available with the firm. Ranking of the investment project is employed on the basis of some predetermined criterion such as the rate of return. The project with the highest return is ranked first and the acceptable projects are ranked thereafter. Linear programming methods are used as well so to find the optimal investment portfolio.

Break even analysis

Enterprise budgets are useful for performing break even analysis. The break even point refers to the revenues necessary to cover total costs (fixed and variable costs) during a specified period of time:

Break even point = total revenues ÷ total costs

The break even point refers to the point in which total cost and total revenue are equal.

Investment sensitivity analysis

Sensitivity analysis is a calculation procedure that predicts the effects of changes of input data. The most common investment application of sensitivity analysis involves adjusting the discount rate or other streams of cash flows.

Use sensitivity analysis to estimate the effects of different variables on investment returns. The practical benefit of using this analysis for your investment decisions would be to assess risks and potential error.

Factors affecting capital budgeting

The investor should be aware of the number of factors affecting capital budgeting, among which:

Availability of funds	Management decisions	Working capital
Lending terms of financial institutions	Accounting methods	Capital return
Structure of capital	Taxation policy	Need of the project
Available support to investments	Government policy	Economic value of the project

Finalisation of capital budgeting

The investor should check some final points before the capital budgeting is finalised, and make sure the following:

- Right and realistic information is used
- Right stakeholders are included
- Optimal financing decisions are brought
- Right tools and projections are used
- Right criteria for investment appraisal are set
- Quality written document is provided

Submitting the business plan for a loan or grant

If the purpose of the business plan was to obtain bank loans or grants, the investor should make sure to minimise the risk of having hard conversations with officers in financial institutions and financial support agency. Banks are facing pressure not to put (lend) money into a bad investment and financial support agency is facing pressure to choose among the best projects to support.

Creditworthiness is assessed in several stages. To bring a final decision, lenders or grant providers will look at the following:

1. Whether the idea for investment is good
2. Whether the idea is developed into a good investment project
3. Whether the investor believes in the investment
4. Whether the investor has a good business plan and a quality written document
5. Whether all required supporting documents are submitted without any omissions
6. Whether the investor has a good credit history

Sources of finance

Financing decisions are about choosing from different financial sources and to create an optimal capital structure of the organisation. It is about how much debt vs. equity is used to finance business and investment activities.

Equity is the investor's own (internal) funds that have been put in the business, as well as the retained earnings from the operating activities. Debt is referred payment that is owed in future, or simply it is borrowed money from external sources. Debt (loan) is when the equity is not enough to finance the operating and investment activities.

Debt may be created by using different financial sources, but the most common one is the commercial loan. An investor may save cash flow and increase the value of the business by using a loan. That is, interest payments on debts are a tax-deductible expense, taking on debt creates a tax shield. A tax shield is the reduction in income taxes that results from taking an allowable deduction from taxable income.

Loans and other financial products offer

Currently available financial sources and products in agriculture:

Financial institution	Type of service
Commercial banks	<ul style="list-style-type: none"> • Loans (short-term and long-term) • Savings
Savings houses	
Development Bank of North Macedonia	<ul style="list-style-type: none"> • Loans (short-term and long-term) • Export factoring

In order to choose between the products offered by the commercial banks and savings houses, the investor has to know the differences between them, and they are:

Commercial banks	Savings houses
Profit-oriented	Target low-income population
More rigid conditions	More flexible conditions
Lend larger loan amounts	Lend smaller loan amounts
Lower interest rates	Higher interest rates
Do not offer any advices on the business plan	Offer free advices for creating short business plan

Other loans may be available as well, that can be used to finance agricultural services, among which: loans for business start-up and new employments (Employment Service Agency), loans for development of SMEs (commercial banks and the Development Bank of North Macedonia), etc.

Choosing the right financing product

When lending from banks/savings houses or other financial service providers, the investor should pay special attention to:

- Bank loan portfolio
- Loan conditions (i.e. interest rate; repayment modality; repayment period; grace period; collateral, etc.)
- Required documents

For more information, please see the offers from banks and savings houses.

The investor should also look for other available financial services, such as: factoring (factor companies and the Development Bank of North Macedonia), revolving credit (commercial banks), etc.

For more information, please visit the websites of commercial banks and the state bank.

Look for loan supporting mechanisms

In addition, the investor should look for any established credit support mechanisms, such as:

- Opportunities from the Agricultural Credit Discount Fund (ACDF)
- Subsidised interest rates
- Credit guarantee schemes, etc.

For more information, please visit the websites of banks and savings houses, Agency for Financial Support of the Agriculture and Rural Development, USAID guarantee scheme, etc.

Look for support funds in agriculture

The investor should look for different local, national and international funds available so to be able to provide co-financing of the investment, among which some are:

- The Rural Development Programme (a national support programme)
- IPARD II (international support programme)
- Local development funds by municipalities

For more information, please visit the websites of the Agency for Financial Support of the Agriculture and Rural Development, the Ministry of Agriculture, Forestry and Water Economy, municipalities, international support agencies, etc.

Look for other support funds

Other funds may provide support in agriculture, even if it is not in priority target. For instance, the Fund for Innovations and Technology Development provides support to start-up or existing legal entities, including

agricultural ones, for innovations and technology development. The following support instruments are available:

- Support of small and medium enterprises: Instruments for financial support within the pillar 3 of the Economic Growth Plan
- Co-financed Grants for newly established enterprises “Start-up” and “Spin-off”
- Co-financed Grants and Conditional Loans for commercialization of Innovations

For more information, visit the website of the Fund for Innovations and Technology Development.

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Appendices

Appendix 1

Production legislation

- Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 on Official Controls and Other Official Activities Performed to Ensure the Application of Food and Feed Law, Rules on Animal Health and Welfare, Plant Health and Plant Protection Products, Amending Regulations (Refer to Regulation for List of Amendments)
- Regulation (EU) 2016/679 of the European Parliament and of the Council Of 27 April 2016 on the Protection of Natural Persons with regard to the Processing of Personal Data and on the Free Movement of such Data (General Data Protection Regulation)
- European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (S.I. 31 of 2014)
- Animal Health and Welfare
- Environmental Protection Agency (Industrial Emissions) (Licensing) Regulations 2013 (S.I. 137 of 2013)
- European Union (Animal By-Products) Regulations 2014 (S.I. 187 of 2014)
- European hygiene legislation (including (EC) 178: 2002; (EC) 852 and 853 of 2004)
- Council Regulation (EC) No 1099/2009 Of 24 September 2009 on the Protection of Animals at the Time of Killing
- European Communities (Live Poultry & Hatching Eggs) Regulations 2009 (Council Directive 2009/158)
- Council Directive 2007/43/EC of 28 June 2007 Laying Down Minimum Rules for the Protection of Chickens Kept for Meat Production
- Safety, Health and Welfare at Work Act (General Application) Regulations,
- Council Regulation 1/2005/EC on the Protection of Animals During Transport and Related Operations
- Council Directive 2007/43/EC of 28 June 2007 Laying Down Minimum Rules for the Protection of Chickens Kept for Meat Production
- 2004 European Communities (Monitoring of Zoonosis) Regulations 2004
- Regulation (EC) No 2160/2003 of the EC 17 November 2003
- Directive 2003/99/EC of the European Parliament and of the Council of 17 November 2003 on the Monitoring of Zoonosis and Zoonotic Agents, amending Council Decision 90/424/EC and repealing Council Directive 92/117/EC
- Council Directive 93/120/EC Amending Directive 90/539/EC on Animal Health Conditions Governing Intra-Community Trade in and Imports from Third Countries of Poultry and Hatching Eggs.
- Diseases of Animals (Poultry Feed)
- Council Directive 91/628/EC Diseases of Animals

- European Communities (Live Poultry & Hatching Eggs) (Amendment) Regulations 1995 (S.I. No. 45 of 1995) and Council Directive 93/120/EC
- Regulations 1995 S.I. No. 114 of 1995
- Council Directive 98/58/EC of 20 July 1998 Concerning the Protection of Animals Kept for Farming Purposes
- Council Regulations 1906/90 on Certain Marketing Standards for Poultry

Guidelines for best practice in poultry production:

- Salmonella Monitoring Programme: Guidelines for Control of S. Enteritidis & S. Typhimurium
- Best Practice Manual for production of Poultry with Reduced Campylobacter Contamination (CamCon 2015)
- Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry or Pigs Industrial Emissions Directive 2010/75/EU (Integrated Pollution prevention and Control) JOINT RESEARCH CENTRE Institute for Prospective Technological Studies Sustainable Production and Consumption Unit European IPPC Bureau FINAL Draft - August 2015
- European Convention for the Protection of Animals kept for Farming Purposes. European Treaty Series (ETS) No. 087
- FAWAC: Code of Practice for the Welfare of Laying Hens
- Ghent University Biosecurity Scoring for Poultry: www.biocheck.ugent.be/index.php

Appendix 2

House preparation

Prior to undertaking house preparation, a certificate should be available from the field officer that verifies that the terminal hygiene programme was effective.

The content of this certificate should be reviewed to ensure that all possible biosecurity and cleaning measures are set out clearly. These could include (i) inspection of the undersides of equipment; (ii) swabbing and testing of surfaces; and (iii) disinfection of the drinking system and other complex surfaces.

These criteria should be interpreted as relevant to the house type:

- Spread fresh bedding evenly to cover the floor.
- Pre-heat the house gradually, starting a minimum of 24 hours before the birds arrive.
- Keep the temperature of the house stable.
- Provide space heaters or brooders to ensure that there are no extremes of temperature in the house.
- Place independent thermometers around the house, with at least two of them at bird level, in order to monitor uniformity of temperature.
- Provide fresh, clean water to the day-olds/pullets/roosters immediately on their arrival at the house. Starter ration should also be available at this time.
- Use trays and paper to supplement pan or track feeders when receiving day olds.
- Do not place feeders and drinkers directly under a heat source.
- Before the birds arrive, carry out a final house-check to ensure that temperatures are at the correct levels and that there are no water leaks.

A house preparation sheet should be completed before the arrival of each batch of chickens that records the following (at a minimum):

House Preparation Checklist	Restocking Date:
Supplies	
Starter crumb ordered	
Heating fuel supply checked/ordered	
Litter material checked/ordered	
Overalls & shoe covers supply checked/ordered	
Restocking date confirmed	
Foot dip disinfectant supply checked/ordered	
Site	
Site is free from debris	
All vegetation controlled	
Potential rodent cover eliminated	

Concrete aprons clean & disinfected	
Site is clean and tidy	
Site is secure	
House	
House cleaned thoroughly	
House disinfected	
House condition checked and repaired as necessary	
Source of litter recorded (record source here)	
Quantity and depth of litter/shavings recorded	
Brooders or heaters switched on or lit	
Temperature readings taken	
Foot dip placed at entrance doors	
Protective clothing and overshoes made available	
Paper towels and soap made available	
Equipment	
Feeders checked and repaired if necessary	
Drinkers verified to be leak-free	
Water meter reading taken (enter reading here)	
Lighting verified to be even (wattage and number of light points recorded)	
Ventilation system and controls operations checked	
Supplementary Equipment	
Generator	
Alarm system	
Fire extinguishers	
Signed:	Date:
Certified by:	Date:

Appendix 3

Hygiene and welfare for catching teams

It is in the interest of the farm to ensure that these workers operate in a manner that ensures that the welfare of the birds is respected during the catching process.

To ensure efficient loading, good biosecurity practices and the maintenance of bird welfare, the grower should ensure the following practices are in place:

Vehicles

- All vehicles and loading equipment are clean and disinfected before being brought on-site.
- All equipment entering the site are washed clean and disinfected (lorries, trailers, forklifts and modules).
- Use the farm disinfectant to spray the wheels of all vehicles before entering the site.
- Disinfect the forklift before entering and leaving the site.

Personnel

- Catching teams undertake a training programme to ensure they understand the requirements.
- All catchers wear protective clothing and footwear including facemasks & gloves.
- All personnel wash hands thoroughly.
- Disposable or site-dedicated protective overalls, hairnets and footwear are worn.
- Used shoe covers and face masks are placed in a litter bin provided.
- Washable overalls are hung for laundry.
- Personnel wash hands thoroughly on arrival and departure.
- Consumption of food within the poultry house is prohibited.
- All personnel use foot dips before entering poultry houses.
- Ensure that no person that is likely to be a carrier of or suffering from a disease likely to be transmitted or that has infected wounds, skin infections, sores or diarrhoea is permitted to handle birds or to enter the production house.

Operational issues

- Lights are dimmed in the chicken house and curtains used to reduce natural light at doorways.
- Catchers move quietly to minimise stress on the flock.
- Chickens are caught by the shanks to avoid discomfort to the birds.
- Undersized chickens are avoided.
- Care is taken to ensure birds are not placed on their backs in crates.
- Stocking densities per module or crate are modified according to temperature conditions.
- House temperature is reduced by approximately 2 degrees Celsius, one hour prior to catching. This reduces bird movement and should lower bruising.
- Drinkers and feeder lines are raised before catching starts.
- Catching is delayed until the lights are dimmed and the house is darkened sufficiently for catching to proceed without causing undue stress on the flock.
- Care is taken when first opening doors in daylight so as not to frighten the birds.

- After catching is completed at first thinning, lighting is set to full intensity. Temperature is raised to approximately 23 degrees Celsius and the birds remaining are moved evenly over the house. This should give a more even temperature through the house. The lights and temperature should then be dropped back to their normal level.
- Side curtains are used on modules during the winter months.

Recording

- Dispatch details are recorded as specified and a record kept.
- Catching team personnel details are recorded in the site visitor record.

Appendix 4

FSMS/HACCP Plan

A Food Safety Management System (FSMS) is essential to any food producing system and is normally implemented based on the principles of the Hazard Analysis Critical Control Point (HACCP) system. The FSMS is a holistic system of prevention, preparedness and own-check activities to manage food safety and hygiene in a food business and to ensure the safe production of food. When adequately developed and efficiently implemented it provides systematic control of biological, chemical and physical hazards at key stages of production. It is a strategy for prevention rather than detection of safety problems. A Food Safety Management system would require a farm/hatchery to have a coherent hygiene system in place. It should also address inputs, decision points and outputs. A FSMS Plan is unique to each farm or hatchery and should be compiled by a team who would agree a flow diagram for the process.

In a properly developed Food Safety Management System (FSMS) plan (based on HACCP principles), the following elements are incorporated:

- A fully developed pre-requisite control plan is included showing the measures that are in place
- The FSMS Plan shows how product/process safety is ensured through control and prevention
- Producer/Senior Management have committed to the plan
- The plan is put in place by a multidisciplinary team.
- At a minimum, the FSMS Plan includes:
 - i. A detailed description of the products and process steps (e.g. a flow diagram showing all the steps of each process)
 - ii. A detailed description of the hazards (chemical, microbiological and foreign bodies) that could arise at each process step and the risks that these represent
 - iii. Identification of the relevant control points (Pre-Requisite Control Points (PRP) or Critical Control Points (CCP)) in the plan
 - iv. Definition of the limits that should be met to ensure control of each PRP/CCP
 - v. Specification of the monitoring required to ensure that control is maintained at each PRP/CCP
 - vi. Specification of the corrective action to be taken if a non-conformance occurs for each PRP/CCP
 - vii. Identification of the responsibilities, procedures and records applicable for each PRP/CCP.
- An annual verification/testing of the FSMS plan to is undertaken to ensure that it is effective. The FSMS plan is underpinned by the implementation of hygiene barriers, biosecurity measures and personnel hygiene practices at all levels of production. Hazards common to all poultry rearing farms include:
 - i Sourcing of young birds/breeders
 - ii. House status prior to stocking
 - iii. Feed supply, delivery, storage and distribution
 - iv. Water source, storage & distribution
 - v. Loading and transport.

Appendix 5

Emergency procedures

The priorities for site staff are the protection of human life, the avoidance of situations likely to cause injury or harm to staff, and the protection of flock health and welfare.

Each Participant should:

- Carry out a risk assessment on the buildings (farms as FSS/FSRA)
- Document and implement a strategy to deal with each identified risk, including (as relevant):
 - i. Gas leak
 - ii. Fire
 - iii. Power failure
 - iv. Personal injury
 - v. Equipment failure
 - vi. Flock problem
- The strategy should be posted on a noticeboard in a manner that is accessible to all staff. i.e. near exits and at a central location (e.g. canteen).
- The location of safety equipment should be identified and posted so as to be easily accessible.
- The emergency evacuation process should be documented and displayed at a central point showing escape routes.
- A list of emergency telephone numbers should be included (as relevant):

Emergency Services

Doctor
Fire Brigade
Gardaí
Ambulance
Farm/Hatchery Postcode
Directions to this Building

Other Useful Contacts

Safety Officer
Site Manager
Gas Service Centre
Electrical Supplier
Service Engineer
Group Veterinarian
Private Veterinarian
Health and Safety Authority

Key Safety information

Phone (location)
Fire Extinguishers
Gas Shutoff Valve
Water Mains Valve
Electricity Shutoff Switch
Generator
Generator Switchover
First Aid Kit

Appendix 6

Field officer report

Field officers should conduct inspections using the criteria in the VC Guide as relevant to the enterprise of all Participants in a manner that ensures that all criteria in **Bold** are reported at each inspection, and all General criteria are reported at least once on an annual basis.

The field officer should also report on the specific issues listed below.

Farm Name

House Address

House Identification

- Checks
- Week No
- Age of birds mortality
- Vaccinations
- Water consumption
- House climate
- Litter type
- Litter condition
- Bird appearance
- Egg production
- Antibiotic usage (if applicable)
- General hygiene
- Records
- Comments

Appendix 7

Terminal hygiene programme

The following procedure sets out the basic requirements that should be met by any terminal hygiene programme following depopulation.

This applies to the production house, the front/entry area, the exterior of the house, the area in the immediate vicinity, the tools used in the house, and the footwear used.

1. Dry clean

- a) Remove any residual feed from the feeding system and feed bins.
- b) Winch up or remove all feeder and drinker systems. Remove all portable equipment from the house for cleaning.
- c) Remove all litter in a covered vehicle and store away from the site.
- d) Blow down all surface dust from ceilings, rafters, ledges, water pipes, inlets, fan shafts and switches.
- e) Sweep the floor thoroughly and remove all remaining debris to a removal vehicle.
- f) Clean out or blow down bulk bins.
- g) Turn off power to all electrical equipment (unless otherwise advised by the manufacturer).
- h) Check for cracks and breaks and reseal.

2. Wet clean

- a) Wash all surfaces to remove dirt and debris.
- b) Wash ceilings, rafters, ledges, inlets, fan shafts and other surfaces, paying particular attention to the underside of all equipment.
- c) Wash down feed bins and platforms.
- d) Drain the header tank and ensure it is free from debris.
- e) Clean and disinfect water lines and the drinking system as follows to remove all biofilms, and sludge in the water lines and drinking devices inside.
- f) Fill the header tank with water that contains the required amount of approved disinfectant (check for suitability in this). This solution should then be allowed to fill the drinking system and left to stand for a minimum two hours (or as per manufacturer instructions).
- g) Check the outside of all water lines, drinking devices (all surfaces) and remove feed/faeces adhering to the pipelines and drinking devices so that all surfaces are visually clean.
- h) Flush the entire water system thoroughly with clean water.
- i) Attend to all repairs.
- j) Check for the presence of beetles and conduct extra washing/cleaning/disinfestation where present.
- k) After cleaning and disinfection, carry out a thorough visual inspection to verify the effectiveness of the cleaning.

3. Post cleaning checks for maintenance work

- a) Check for cracks in floors, walls or roof and mark for repair and sealing.
- b) Check for openings around pipework/electrical cabling and fill/seal to prevent insects.
- c) Check for presence of beetles and, if found, conduct remedial action (it is recommended that a pest control specialist be involved in this).
- d) Check for sealing of doors and repair.

4. Disinfect house and equipment

- a) Select a suitable broad-spectrum disinfectant and dilute it with clean water. Follow the recommendations from the manufacturers. (Disinfectants are effective only on clean surfaces).
- b) Set the pressure washer or orchard sprayer at a low pressure and saturate all surfaces (house and equipment) for the recommended contact time.
- c) Return disinfected equipment to the disinfected house.

Note: Fumigating, misting or fogging are only effective when carried out in an airtight house. Wear protective clothing and follow product usage instructions. Fumigation with formaldehyde is potentially damaging to health.

- a) Allow surfaces to dry fully.
- b) Check that all equipment is in good working order.
- c) Close the house securely to prevent recontamination.
- d) Put a rodent control programme in place (see 3.15.a).

5. Disinfest

- a) Consider spraying the perimeter of the houses with a suitable insecticide.
- b) Treat the wall-floor junctions of the interior of the houses with a suitable insecticide to eliminate beetles and other insects (insects can transfer Salmonella from one crop to another).

Appendix 8

Flock inspection checklist

Minimum requirement for flock inspection checklist

- House Identification
- Date Housed
- Number of Birds Housed

Daily

- Maximum & minimum temperatures
- Water meter reading
- Lighting – functioning as per programme
- Litter quality
- Mortalities and cause e.g. culls, leg weakness, injuries
- Corrective actions where required

Twice-daily records of:

- Ventilation – functioning as per settings
- Feed lines – charged with feed
- Drinkers – operational
- General flock appearance

Weekly check records of:

- Generator
- Alarms
- Fire extinguishers in place
- Foot dips

Yearly:

- Electrical equipment
- Water test

Breeder flock inspection checklist

Minimum requirements for breeder flock inspection

- House Identification Number
- Date housed
- Number of birds housed
- Ventilation: functioning as per settings: Twice daily
- Drinkers: clean and operational: Twice daily:
- General flock inspection of all birds for health and welfare purposes: Twice daily

- Maximum and minimum house temperatures: Daily
- Feed lines: clean and charged with feed: Daily:
- Nest boxes: open and operational: Daily:
- Water meter reading: Daily
- Lighting: functioning as per programme: Daily
- Litter quality: Daily
- Mortalities and causes (e.g. culls, leg weakness, injuries): Daily
- General flock appearance: Daily
- Corrective actions, where required: Daily
- Generator: functional: Weekly
- Alarms: functional: Weekly
- Fire extinguishers: present and in good condition: Weekly
- Foot dips: present and replenished: Weekly

Annual

- Electrical equipment
- Water test

Appendix 9

Animal health and welfare plan

Areas to be addressed by Producer's Health and Welfare plan and supporting documentation should include the following at a minimum. Documented details as required under all the headings below should be maintained.

Flock health

- Veterinary health plan
- Disease investigation protocol
- Notifiable Disease incidence (including Avian influenza contingency plan)
- Biosecurity on farm
- Sample submission
- Group disease control/vaccination programme and administration requirements
- Management practices to deal with various conditions (e.g. aggression)
- Responsible use of remedies (where used)
- Nominated person capability of administering remedies

Hygiene programme

- Terminal hygiene programme
- Water system sanitation

Zoonotic pathogen control

- Salmonella monitoring
- Water sampling

Welfare parameters

- Assessing lameness in flocks
- Humane culling
- Feather loss assessment
- Environmental measurements

General

- Training of staff
- Beak trimming (Rearing only if conducted at farm level)
- Sourcing of chemicals
- Management of visitors
- Control of catching teams

Appendix 10

Medicine storage

Note: This is a recommendation for the safe storage of animal remedies. It is not intended as a definitive guide to the safe handling and storage of animal remedies and does not replace any applicable statutory requirement.

- The medicine store should be of a sufficient size and strength
- to hold all animal remedies, whether unopened or partially used that may be in stock at any one time.
- Only animal remedies recommended to be stored at room temperature should be kept in the medicine store.
- The medicine store should be located indoors and should be out of reach of children.
- The medicine store should be kept locked at all times. The key should be kept in a safe location. This location should be informed to all relief farm workers.
- The medicine store should contain a clear warning label.
- The medicine store should not be located in direct sunlight or adjacent to any source of heat or cold.
- All spillages should be removed immediately from the medicine store and disposed of in accordance with manufacturers recommendations.

Appendix 11

Chemicals: Safe handling and storage

Guideline

- Purchase only approved chemicals.
- Store in external designated storage facilities, which are labelled and locked, and well away from food. Chemicals may be stored in a washable cabinet or shelf but may also be placed on a clean concrete platform or non-corrosive frame at least 300mm from the floor.
- Ensure that the chemical store is secure storage and dedicated to the storage of chemicals; is constructed to ensure that leakages or spillages are retained within the store (bunded); and where shelving is provided, the shelving is made from non-absorbent materials.
- Put a clearly visible warning sign at the entrance to the store.
- Ensure that facilities are available that include at least:
 - i. a list of key emergency contact numbers displayed near the entrance of the store (e.g. doctor, fire service);
 - ii. facilities for soaking up small spillages or leakages e.g. bucket of sand or peat);
 - iii. recommended protective clothing and equipment (cleaned and properly maintained);
 - iv. calibrated weighing scales and measures for liquids/PPPs.
- Ensure that powdered products are either separated from or stored above liquids.
- Only store products in their original container (see www.pcs.agriculture.gov.ie for advice on storing chemicals).
- Do not transfer chemicals to other storage containers, especially soft drinks bottles or food containers.
- Maintain only minimum stocks of chemicals (to avoid out of date chemicals).
- Read the label before opening the chemical and observe all safety precautions. Use chemicals in accordance with manufacturers' recommendations.
- Wear the correct personal protection equipment for the chemical and operation involved.
- Have a supply of clean water for washing off splashes.
- Wash hands and exposed skin before eating or drinking and shower down after the job is complete.
- Thoroughly rinse all equipment used, and store safely.
- Unused chemicals should be disposed of in a safe manner and so as not to harm the environment.

Chemicals should only be used in a manner that protects hedgerows and waterways and prevents drift and run-off.

- Fertilisers and pesticides should be applied in a manner that:
 - i. avoids non-target areas and crops/pasture by applying at low wind speed conditions;
 - ii. avoids water-logged, steep, cracked, compacted, or frozen ground;
 - iii. takes into account the weather forecast before application;
 - iv. minimises the amount applied by selecting optimum nozzle characteristics.

Chemicals: intended use

Chemicals are designed to have a significant effect. As such, they can be dangerous to use, and can seriously damage the environment if mishandled.

Appendix 12

Heat stress avoidance

To be interpreted as applicable to the enterprise.

Risk times

- May to September (when the birds are 25 days old and more)
- During catching and while crated from May to September
- During first catch all year round

Ensure that:

- Computer-monitored maximum temperature alarm settings are at 3°C above house set temperature
- Fail-safe temperature alarm settings are at 4°C above house set temperature
- The processor is consulted regarding stocking densities for summer months
- Ventilation equipment is sufficient and capable of operating at full capacity

During summer months, once the birds are 25 days old or more, ensure that:

- The birds are frequently observed for signs of heat stress and any necessary action is promptly taken
- The covers are removed from auxiliary fans and the fan thermostats are set to 2°C above the house set temperature
- Weather forecasts are observed for temperature extremes
- On very hot days, the auxiliary fans are used to prevent temperature climb
- Water supply is adequate, and pressures are optimum

During catching, and especially during the first catch, ensure that:

- Birds are observed for signs of stress throughout the catching and loading process, and house temperatures are monitored
- Doors are kept closed to ensure even airflow throughout the house
- Catching is stopped if heat stress is observed, with all fans set to maximum to reduce temperatures quickly

In hot weather, ensure that:

- Bird numbers per crate are reduced
- Trailers are removed to the processor as soon as they are loaded
- Catching is avoided at the hottest times of the day

Appendix 13

Manure management

1. Operation of production house

- Ensure that there are no dead birds in the manure. Where there is a risk of this, the manure cannot be used for land application.
- Operate an effective hygiene programme in the unit to minimise odours.
- Have well-designed house and ventilation system with wash water storage facilities.
- Maintain buildings in good repair, especially guttering and down-pipes.
- Have well-designed feeders and drinkers, so that feed wastage and spoilage are kept to a minimum.
- Minimise waste packaging materials and containers.

2. Manure spreading

Keep records of the date restrictions for applying manure and fertiliser that apply to the area being farmed by you.

- Ensure compliance with the Nitrates Directive when applying manure to the home farm and any other land under your care.
- Where the manure is used on the farm for crop production, ensure that the manure is evaluated for nutrients and ensure that these values are used in calculating nutrient delivery to the crop.
- When cleaning out the house and removing manure and/or emptying liquid manure from the pit, ensure that account is taken of the weather conditions in order to minimise the impact of odour and run-off.
- Transport the poultry manure in covered vehicles.
- Spread the manure more than 200 metres downwind from the nearest poultry house.
- Do not spread poultry manure or wash water on land in use for the production of ready to eat crops or on land to which free-range flocks have access.
- Poultry manure and wash water should be applied to land observing the following “buffer zones”:

Area	Buffer Zone (m)
Hospitals, schools, churches	200
Dwelling houses	100
Lakes and main river channels	20
Small watercourses and field drains	10
Public roads	10
Domestic wells	50
Public water supply (depending on vulnerability)	50-300

3. Conditions to avoid

Avoid spreading manure in the following conditions:

- i. During the period specified for the farm/area.
- ii. On heavy, wet soils, when heavy rain is forecast within 48 hours.
- iii. When the wind direction is towards population centres or 'neighbouring' houses.
- iv. When the risk of causing odour nuisance to the public is greatest, e.g. Sundays or public holidays.
- v. After daylight hours.

4. Documentation/Records.

A record of the spreading activity on the land under the management of Producers should be kept, detailing (at a minimum):

- Date;
- Land area used (as identified on the map);
- Amount of manure spread.

Where the Participant uses a contractor or neighbour to dispose of their litter, then a record should be kept detailing at a minimum:

- Date;
- Quantity (tonnes or gallons);
- Name of contractor or neighbour;
- Destination of load.

5. Manure treatment guidelines

Where a serious disease has occurred in a flock, the manure should be treated with special caution. The following options should be considered in conjunction with the competent authority and veterinarians:

Composting of solid manures is a particularly effective method of controlling microbial pathogens, but for best results the process needs to be actively managed. The manure should be treated as a batch and turned regularly (at least twice within the first 7 days) either with a front-end loader or preferably with a purpose-built compost turner. This should generate high temperatures over a period of time (e.g. above 55°C for 3 days) which are effective in killing pathogens and this temperature should be monitored.

Allow the compost to mature as part of the treatment process. The whole process should last at least 3 months.

Lime treatment of liquid manure (addition of quick lime or slaked lime to raise the pH to 12 for at least 2 hours) is an effective method of inactivating bacterial pathogens. Allow the slurry to mature as part of the batch treatment process for at least 3 months prior to land spreading.

Batch storing solid manures and slurries should be for at least 6 months (i.e. no additions of fresh manure are made to the store during this period) in order to be effective in killing pathogens.

Note: The disposal of poultry manure in the event of an outbreak of either Avian Influenza (AI) or Newcastle disease (ND) is covered by EU legislation i.e. Council Directive 2005/94/EC for AI, and Council Directive 92/66/EC for ND.

Appendix 14

Biosecurity protocol

All personnel that enter the house should understand that both birds and the environment should be protected from cross-contamination.

Cross-contamination, whether accidental or intentional, can have a serious negative effect on the health and welfare of the birds, as well as significantly reducing feed conversion efficiency.

The following biosecurity protocols are in operation on this farm. These apply to ALL personnel, including:

- Maintenance personnel
- Field officers
- Veterinarians
- All regular personnel, including regulatory personnel.

Note: Personnel should comply with this house entry protocol Appendix 14.

1. House Entry protocol

To prevent contamination of the house and to help control the incidence of diseases in the birds (including pathogens, *Campylobacter* and organisms harmful to bird and human health), all personnel entering the house should follow the following protocol for entering the house:

- Create a clean and dirty area in the anteroom of the bird house as follows:
- Immediately close the outer door to exclude flies.
- Remove outer clothing and footwear outside the step-over barrier in the “dirty” area.
- Wash hands (ideally with water premixed to 44°C) outside the step-over barrier in the manner indicated in the instructions, posted beside the hand-washing station.
- Step over the barrier into the “clean” area and put on the protective clothing provided, which should cover all clothing worn outside (note: protective clothing and footwear need only be site-specific for company-controlled duck production sites).
- Put on the house-specific footwear.
- Put on a mob cap to ensure that all head hair is fully covered (ideally snoods would also be used to cover a beard).
- Sanitise hands with the hand sanitiser provided.
- Sanitise the boots in the boot-dip which is maintained free of visible organic matter build-up in the solution and is refreshed at least weekly.
- Only after completing ALL these steps, in the order listed above, may personnel enter the house.

2. House exit protocol

To help control the spread of diseases in the birds (including pathogens, *Campylobacter* and organisms harmful to bird and human health), all personnel exiting the house should follow the following protocol:

- Clean the soles of the boots to remove litter, manure and other material as much as possible (ideally there should be a boot scraper installed)
- Disinfect the boots in the boot dip (maintained as above)

- Remove house-specific footwear
- Remove the house-specific protective clothing
- Remove and dispose of head covering
- Step over the hygiene barrier
- Wash/sanitise hands
- Put on outer clothing and footwear.

3. Visitor control protocol

Visitors that need to enter the house should follow the house entry and house exit protocols as outlined above.

All visitors should complete the visitor record in the visitors' book and declare their commitment to observing all biosecurity measures on the farm, including the biosecurity protocols.

4. Catching staff protocol

All catching staff should be trained in hygienic catching of birds. A current certificate of training in catching should be available for each person in the catching team. The catching team leader should sign the visitors record, declaring his or her commitment to observing the biosecurity protocols.

5. Externally stored litter protocol (poultry producer)

Litter stored outside the house should only be brought into the house in accordance with the following protocol where there are birds in the house: Place the litter at the entrance to the house.

A staff member that has entered the house in accordance with the house entry protocol takes the bale of litter and distributes it inside the house as required.

Once there is sufficient litter brought into the house, the staff members co-operate in closing the door so that there is no contact between the outside and inside of the house.

Appendix 15

Farm sampling and test procedures

1. Introduction

All required sampling should be carried out in accordance with recognised procedures and in accordance with the requirements of this VC Guide.

All procedures outlined in this document are clearly identified either as mandatory (i.e. should be complied with) or as advisable only.

Table 1: Mandatory sampling/ frequencies

Mandatory Sampling/ Frequencies Summary Sample Type	Test	Sampling Frequency	Acceptable Criteria
Boot swabs and/or dust samples	Salmonella	All broiler should be operator sampled within 3 weeks of moving to slaughterhouse In addition, official samples are taken once per annum from 10% of broiler holdings with >5 000 birds	Salmonella enteritidis or salmonella typhimurium not detected
Water	E. coli and Enterococci	Per annum, between May 1st and Sept 30th.	E. coli and Enterococci - absent in 100ml
Feed	A statement that the feed supplier is listed on an approved list of feed mills	Per delivery or for current production	Salmonella not present
Air	Ammonia CO2	Monthly to include a period of peak stocking density	<20 mg/l (ppm) <3 000 mg/l (ppm)

Note: The specific ISO methods for testing and sampling should be used where available and as specified in the VC Guide.

Note: The limits as set out in the criteria specified in the VC Guide apply.

2. Guidelines

1.2. Sampling Procedures

1.2.1 Faecal Sampling (Salmonella)

1.2.2 Dust Sampling (Salmonella)

1.2.3 Water Sampling

1.2.4 Feed Sampling

1.2.5 Environmental Sampling

1.2.1 Faecal sampling

Faecal sampling maybe conducted using pooled faecal sampling or by boot swab sampling.

Pooled faecal samples:

- These are made up of separate samples of fresh faeces each weighing not less than one gram taken at random from a number of sites in the building in which the birds are kept.
- The number of sites from which separate faeces samples are to be taken in order to make pooled samples should be as follows:

Table 2: Faecal sampling

Number of birds kept in a building	Number of faeces samples to be taken in the building or group of buildings
1 – 24	Number equal to number of birds, up to a maximum of 20
25 – 29	20
30 – 39	25
40 – 49	30
50 – 59	35
60 – 89	40
90 – 199	50
200 – 499	55
500 or more	60

Boot swab sampling is done as follows (International recognised method):

- Divide house in two.
- Wear plastic long plastic over-boots on top of wellies.
- Enter house, bringing in hairnet boot covers, Maximum Recovery Diluent (MRD) and gloves.
- Put on gloves.
- Place hairnet boot covers on top of over-boots.
- Pour one vial of MRD on each of the hairnet boot covers to moisten them (one vial for each foot).
- Walk length of house – step on wet droppings.
- Remove the hairnet outer boot covers after first half of house covered.
- Place the hairnet boot covers in a Whirl-Pak bag and ‘whirl’ (twist the top 3-4 times, then fold over the tabs) to close.
- Repeat sampling in second half of house and place covers in a second Whirl-Pak bag before leaving house.
- When sampling is complete step outside house.
- Remove and dump plastic over boots and gloves.

The results of the analysis of all samples should be kept at the farm for 3 years, together with the date and place of sampling, as well as the identification details of the sampled flock. MAFWE officials should inspect the results records from time to time.

Samples should be dispatched for testing on the day of collection to a laboratory accredited under ISO 17025 for the test in question. Samples should be taken on the first 3 days of the week, in order to ensure same-day dispatch and analysis as soon as possible thereafter. The taking of samples at the weekend should be avoided.

1.2.2 Dust sampling

Sample type: Composite dust sample, 25 grams.

To meet the requirements of this VC Guide, sampling should be done monthly, either as a composite dust sample or faecal swab. However, where the pooled faecal sample (as required by the legislation and described above) is due, it (the faecal sample) alone will suffice.

Sampling – general guideline:

- Wash and dry hands on arrival at farm.
- Record name, date, time and vehicle registration number in visitor's book.
- Fill in details i.e. name, address of producer, house code, time and date and samplers name on the label of the sealed sterile sample bag to be used in each poultry house.
- Change into protective clothing (disposable) i.e. coat, boots, headgear, gloves before entering the poultry house.
- After entering the poultry house, put on sterile disposable gloves.
- Open sealed sterile bag and collect, by gloved hand, sample types as described above. Seal the bag before leaving the house. Remove the gloves and dispose in facility provided.
- Record details in duplicate sampling book, i.e. name of farm, address, type of sample and number, size and age of flock, house code, date and time of sample and signature.
- Attach by stapling one copy to sample bag at sealed edge and retain duplicate in book for reference.
- Remove protective clothing and dispose in facility provided.
- When sampling is completed put all sample bags with attached forms into separate plastic self-sealing bag. Attach a label along the sealed edge and staple in 2 – 3 locations. Sign initials and date to this label, so that tampering is self-evident.
- Store safely in tamperproof packaging and dispatch to an approved laboratory on the day of collection in a manner that ensures the integrity of the sample.
- Follow the above procedures for sampling each poultry house.

1.2.2 Dust sampling

Sample type: Composite dust sample, 25 grams.

To meet the requirements of this VC Guide, sampling should be done monthly, either as a composite dust sample or faecal swab. However, where the pooled faecal sample (as required by the legislation and described above) is due, it (the faecal sample) alone will suffice.

Sampling – general guideline:

Wash and dry hands on arrival at farm.

- Record name, date, time and vehicle registration number in the visitors book.

- Fill in details i.e. name, address of Producer, house code, time and date and samplers name on the label of the sealed sterile sample bag to be used in each poultry house.
- Change into protective clothing (disposable) i.e. coat, boots, headgear, gloves before entering the poultry house.
- After entering the poultry house, put on sterile disposable gloves.
- Open sealed sterile bag and collect, by gloved hand, sample types as described above. Seal the bag before leaving the house. Remove the gloves and dispose in facility provided.
- Record details in duplicate sampling book, i.e. name of farm, address, type of sample and number, size and age of flock, house code, date and time of sample and signature.
- Attach by stapling one copy to sample bag at sealed edge and retain duplicate in book for reference.
- Remove protective clothing and dispose in facility provided.
- When sampling is completed put all sample bags with attached forms into separate plastic self-sealing bag. Attach a label along the sealed edge and staple in 2 – 3 locations. Sign initials and date to this label, so that tampering is self-evident.
- Store safely in tamperproof packaging and dispatch to an approved laboratory on the day of collection in a manner that ensures the integrity of the sample.
- Follow the above procedures for sampling each poultry house.

1.2.3 Water sampling

- Samples should be rotated between taps and storage tanks/outlets at production house/site.
- Select a tap that is fed from the service mains and not from a cistern or holding tank.
- When a sample of mains water is to be taken from a tap, any external fittings, such as an anti-splash nozzle or rubber tube should be removed.
- The outside and inside of the tap should be carefully cleaned with particular attention to removal of collections of grease inside the nozzle. The tap should then be turned on full and the water allowed to run to waste for two to three minutes in order to flush the interior of the nozzle and to discharge stagnant water in the service pipe.
- After water run off turn off the tap and dry the outer surface with a clean cloth.
- Sterilise the tap either by a blowlamp, or by soaking a piece of cotton wool in methylated spirit, igniting and holding with a pair of tongs close to the nozzle.
- The bottles should not be opened until required for filling with the water.
- Bottles should not be previously rinsed out before taking the sample.
- In collecting the sample, the bottle should be held near its base with one hand and with the other the cap should be loosened. On no account should the stopper be laid down or allowed to touch anything. Remove cap without touching the rim or its internal surfaces.
- Fill bottles completely and recap.
- Label the bottle with the name and address of the owner, the house identification code, source of supply, date and name of sampler. Specify test requirements.
- Place the bottle in suitably secure packaging supplied by laboratory and seal using tamper-evident seal. Seal should be initialled and sealed.
- Transport to laboratory, holding the temperature below 4°C during a maximum transport time of 6 hours.
- If results are required for legal purposes maintain chain of custody.

Purpose: To monitor E. coli and Enterococci levels in drinking water/water used on the farm.

Sample Type: Sterile water sample (100 ml)

Sample period: Between May 1st and September 30th

Sampling frequency: Minimum yearly, except in the case of high levels of contamination, when the cause should be established, and corrective action taken. The supply should be re-sampled within a month and repeated until satisfactory results are obtained.

Notify the processor and the local authority if the third consecutive sample results are above quality limit.

Use a sterile glass or polypropylene bottle with tamper evident sealing. If chlorine treatment is used on the water supply add a neutraliser to the bottle e.g. sodium azide.

Water sampling guideline

- Samples should be rotated between taps and storage tanks/outlets at production house/site.
- The bottles should not be opened until required for filling with the water.
- Bottles should not be previously rinsed out before taking the sample.
- In collecting the sample, the bottle should be held near its base with one hand and with the other the cap should be loosened. On no account should the stopper be laid down or allowed to touch anything. Remove cap without touching the rim or its internal surfaces.
- Fill bottles completely and recap.
- Label the bottle with the name and address of the owner, the house identification code, source of supply, date and name of sampler. Specify test requirements.
- Place the bottle in suitably secure packaging supplied by laboratory and seal using tamper-evident seal. Seal should be initialled and sealed.
- Transport to laboratory, holding the temperature below 4°C during a maximum transport time of 6 hours.
- If results are required for legal purposes maintain chain of custody.

Sampling from taps guideline

Select a tap that is fed from the service mains and not from a cistern or holding tank.

- When a sample of mains water is to be taken from a tap, any external fittings, such as an anti-splash nozzle or rubber tube should be removed.
- The outside and inside of the tap should be carefully cleaned with particular attention to removal of collections of grease inside the nozzle. The tap should then be turned on full and the water allowed to run to waste for two to three minutes in order to flush the interior of the nozzle and to discharge stagnant water in the service pipe.
- After water run off turn off the tap and dry the outer surface with a clean cloth.
- Sterilise the tap either by a blowlamp, or by soaking a piece of cotton wool in methylated spirit, igniting and holding with a pair of tongs close to the nozzle.

Allow the tap to cool by allowing water to run to waste for a few seconds. Fill the sample bottle from a gentle stream of water, taking care to avoid splashing. Seal label and transfer to laboratory for testing as described under general above.

Feed sampling

- **Sample Type:** Composite meal sample (500 grams)
- **Sample frequency:** One per delivery

- Retain the meal sample provided by the feed supplier. Where the mill is owned by the processor, the meal samples may be maintained by the mill.

Environment sampling

- Ammonia - 20mg/l
- Carbon dioxide – 3 000mg/l

Appendix 16

House specification

Breeder rearer specifications

House No.
Female Bird Numbers
Male Bird Numbers
Fan Capacity Required Provided Fan Capacity per Bird
Fan Capacity (m³ per Hour)
Drinkers Required Provided
Birds per Bell Drinker
Bell Drinkers

or

Birds per Nipple Drinker
Nipple Drinkers
Feeders Required Provided
Feeder Space per Male
Male Feeder Space
Feeder Space per Female
Female Feeder Space
Miscellaneous Required Provided
Total Floor Area m²
Header Tank Capacity
Backup Water Source

Breeder layer specifications

House No.
Female Bird Numbers
Male Bird Numbers
Fan Capacity Required Provided Fan Capacity per Bird
Fan Capacity (m³ per Hour)
Drinkers Required Provided
Birds per Bell Drinker
Bell Drinkers

or

Birds per Nipple Drinker
Nipple Drinkers
Feeders Required Provided
Feeder Space per Male
Male Feeder Space

Feeder Space per Female
Female Feeder Space
Nest Boxes Required Provided
Nest Box Area in m²
Females per m² of Nest Box

or

Number of Nest Boxes
Females per Nest Box
Floor Area Required Provided
Slat Area m²
Scratch Area m²
Total Floor Area m²
Kg per m²
39 kg/m²
Miscellaneous Required Provided
Header Tank Capacity
Backup Water Source

Broiler specifications

House No.
Bird Numbers
Fan Capacity Required Provided Fan Capacity per Bird
3 m³ per kg per Hour
Fan Capacity (m³ per Hour)
General flock inspection of all birds for health and welfare purposes
Drinkers Required/Provided
Birds per Bell Drinker
100 per Bell Drinker
Bell Drinkers

or

Birds per Nipple Drinker
Nipple Drinkers
Feeders Required Provided
Feeder Space per Bird
Feeder Space
Miscellaneous Required Provided
Total Floor Area m²
Kg per m²
39 kg/m²
Header Tank Capacity
Backup Water Source

Appendix 17

Restricted access signage guideline

It is the responsibility of the producers involved (both suppliers and purchasers) to ensure that visitors to the farmyard are controlled and managed, in order that these personnel are aware of their responsibilities regarding health and safety and biosecurity when visiting the farm. This is a key aspect of Food Protection. Closed gates at the entrance to the farmyard, upon which suitable signage is displayed, can help to achieve this.

It is not intended that these guidelines should apply to personnel who visit the farmyard on a regular basis with the permission of the Producer, unless they need to enter the production houses.

The signage ought either to be affixed to the entrance gate or placed in a prominent position in the farmyard, so as to be seen immediately on entry to the site/farmyard by visitors.

The sign should contain the following statements:

- No access beyond this point without permission OR No unauthorised access beyond this point
- A health and safety statement is available on request
- This is a food producing farm – please observe the biosecurity measures OR access to the poultry site is prohibited unless accompanied by the producer.

Note: Please consult local providers for suitable signage.

Appendix 18

Welfare in the workplace

Employers should provide adequate and appropriate welfare facilities for employees while they are at work.

Acceptable working conditions take into account payment for work undertaken and the ability of the worker to balance their commitments to work, family and community. Working hours, employee health and safety, and the potential of employees to fulfil the needs of others within their environments have been considered. The text in the page below contains a sample policy as a guideline to operators/producers who wish to implement a 'welfare in the workplace' policy.

Note: This document is based on the Sustainable Agriculture Initiative (SAI) principles published by the Sustainable Agriculture Initiative (SAI) Platform Working Group on Dairy, which has adopted the Guide to Good Dairy Farming Practice – a joint publication of the International Dairy Federation (IDF) and the Food and Agriculture Organization of the United Nations (FAO), published in January 2004.

Example of a welfare in the workplace policy

1. Wages and benefits received by employees/workers should comply with the minimum required under local and national legislation and are paid according to an agreed schedule.
2. There should be no discrimination of employees on any grounds recognised in the national legislation (e.g. gender, age, race etc.).
3. All employees are equally free to fulfil their religious and cultural needs in their leisure time.
4. All employees should not be subject to threatening or abusive behaviour and should not be allowed to use threatening or abusive behaviour against others.
5. Employees are encouraged to report complaints without fear.
6. All workers (permanent or temporary) are assisted to obtain information regarding their legal rights and obligations, and are issued with a work contract that complies with national and local legislation and that specifies the conditions of work including those related to Health and Safety (see also relevant sections relating to assessment of risks in Sections 3–7).
7. All workers (permanent and temporary) are given a work contract. The work contract ensures that the weekly hours worked are limited (maximum 48 hours), that overtime is voluntary and limited (maximum 12 hours), that work breaks and shift breaks and rest days are agreed, and that access to toilet facilities is available at all times.
8. Work is provided on an equal opportunity basis and pay is based on skill level.
9. The work contract for full time employees is based on the living wage as set out in National and local legislation
10. When promotional opportunities are available, this is offered on a performance basis.
11. The work contract sets out the employee's right to paid leave, holiday pay, sick leave, work related sick pay and parental leave.

12. Wage deductions are clearly set out so as to be clearly understood and are not used as a disciplinary measure.
13. Workers are encouraged to have independent health insurance.
14. Workers have a right to association and to join labour unions and the effective functioning of unions is facilitated.
15. Workers right to collective bargaining is acknowledged.
16. Children under 15 years of age are not allowed to be employed.
17. Language and cultural barriers are taken into account to ensure understanding of signs, instructions, safety procedures and important communications.
18. Workers that are vulnerable (i.e. are under 18 years of age, or have physical or mental disabilities, or are pregnant, or are inexperienced, or are physically unable, or are ill, or have a respiratory difficulty) are not required to handle hazardous chemicals or engage in unsuitable or hazardous work (including working in unhealthy situations, or when alone).
19. Workers from the ages of 15 to 18 are not required to engage in work that is hazardous, or that could jeopardise physical, moral or mental well-being.
20. No bonded or forced labour is allowed.
21. Accidents are recorded and where necessary, communicated to the Health and Safety Authority; prompt medical treatment is made available and corrective action is taken to prevent a recurrence.
22. Where workers are required to handle fuels, chemicals or potentially hazardous materials, medical testing for workers is provided as necessary and training on spill prevention and handling of such materials.
23. Access to safe drinking water is provided for all personnel.
24. Workers' children under 1 years of age are encouraged to attend school.
25. Employees and workers are encouraged and supported to become involved in general educational activities and to undertake training on all aspects of sustainable practices.
26. In so far as it is possible, the activities should contribute to the economic and social benefit of the local community.
27. Access to clean accommodation and cooking facilities is provided to the workers where necessary.

Appendix 19

Processing legislation

- Directive (EC) No 13/2000 of the European Parliament and of the Council of 20 March 2000 on the approximation of the laws of the member states relating to the labelling, presentation and advertising of foodstuffs
- Regulation (EC) No 1760/2000 of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products and repealing Council Regulation (EC) No 820/97
- Regulation (EC) No 178/2002 of The European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
- Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs
- Regulation (EC) 853/2004 Regulation (EC) No 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for on the hygiene of foodstuffs
- Regulation (EC) No 854/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption
- Regulation (EC) No 1935/2004 of the European Parliament and of the Council on materials and articles intended to come into contact with food repealing Directives 80/590/EEC and 89/109/EEC
- Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97
- Commission Regulation (EC) No 2073/2005 of 15 November 2005 on Microbiological Criteria for foodstuffs
- Commission Directive (EC) No 68/2007 amending Annex IIIa to Directive 2000/13/EC as regards certain food ingredients
- Council Regulation (EC) 1099 / 2009 of 24 September 2009 on the protection of animals at the time of killing

Note: Legislation of the Republic of North Macedonia is embedded within the text of Part 2: Broiler Meat Processing.

Appendix 20

Template for cost calculation

Table 3: Template for analytical budget for calculation of cost of production (link to the Excel tool available at www.fzhn.ukim.edu.mk/broiler)

Capacity (e.g. one-day chicks or prod. cycle):

Products	Description	Total production	Unit	Price	Total	Total per chick or cycle	Share (%)
e.g. meat							
e.g. giblets							
e.g. manure							
...							
Total income							

1. Variable costs	Description	Quantity	Unit	Price	Total	Total per chick or cycle	Share (%)
e.g. chicks							
e.g. feed							
e.g. vaccines							
e.g. medications							
e.g. labour							
e.g. electricity							
e.g. cleaning							
e.g. packing							
...							
Total variable costs							
Total income minus variable costs (gross margin)							
Cost of production at variable costs							

2. Fixed costs	Description	Quantity	Unit	Price	Total	Total per chick or cycle	Share (%)
e.g. insurance of fixed assets							
e.g. rents							
e.g. depreciation of fixed assets							
e.g. interest charges on investments							
e.g. taxes							
...							
Total fixed costs							

Total costs (1 + 2)			
Total income minus total costs (net margin)			
Cost of production at total costs			

Appendix 21

Example template for sensitivity analysis

Table 4: Example template for sensitivity analysis

	Gross margin (% of total income)	Cost- effectiveness of production	Profitability rate	Cost of production (MKD/kg)
Planned values				
Increase of feed prices by e.g. 10%				
Decrease of feed prices by e.g. 10%				
Increase of sales prices by e.g. 10%				
Decrease of sales prices by e.g. 10%				
Increase of feed conversion ratio by e.g. 5%				
Decrease of feed conversion ratio by e.g. 5%				

Appendix 22

Example template of investment financial appraisal

Cost and revenue structure

Costs

Fixed (capital) assets

Table 5: Cost for initial investment

Type of investment	MKD	EUR	%
Buildings			
Equipment			
General cost (project, etc.)			
Total			

Tangible and intangible assets

Table 6: Tangible and intangible assets

Required input	MKD	EUR
1. Physical assets		
1.1. Basic assets		
Disinfection		
Rice hull bedding 70 m3		
Day-old chicks		
Labour for entry of the flock		
Vaccines		
Vitamins		
Antibiotics		
Feed		
Loading and transport of chicken		
Slaughtering		
1.2. Supporting services		
Heating		
Veterinary services		
Mechanical cleaning after the end production		

1.3. Other assets		
Electricity		
Total tangible assets		
2. Intangible assets		
Insurance		
Investment maintenance		
Accounting services		
Firm expenses		
Total intangible assets		
Total costs (1+2)		

Investment maintenance costs

Table 7: Investment maintenance costs

Type of investment	Value (MKD)	Premium rate in %	Value (MKD)
Building			
Equipment			
Total			

Labour costs

Table 8: Labour costs

Labour	Monthly net salary (MKD)	Monthly gross salary (MKD)	Annual amount (MKD)
Employee 1			
Employee 2			
Total			

Revenues

Table 9: Example of expected revenue from broiler production

Type of product	Quantity (kg)	Unit price (MKD)	Value (MKD)	Value (EUR)
Whole chicken				
Liver				
Stomach				
Manure				
Subsidies				
Total				

Investment structure

Table 10: Example of investment structure, fixed and current assets

Type of asset	Value (EUR)	Value (MKD)	Structure (%)
Fixed assets			
Current assets			
Total			

Investment financing sources

Table 11: Example of capital structure

Financing sources	Value (MKD)	Value (EUR)	Structure (%)	Interest rate (%)	Repayment period	Grace period
Equity						
Debt						
Total						

Capital budgeting methods for investment appraisal

Traditional (non-discounted cash flow) method

Table 12: Example of Payback Period calculation

Project life (years)	Project's cash flow during economic life (MKD)	Cumulative cash flow (MKD)
0		
1		
2		
3		
...		

Discounted cash flow methods

Net Present value

Table 13: Example of Net Present Value calculation

Year	Cash flow (MKD)	Discount factor, R= 8%	Discounted cash flow (MKD)
0			
1			
2			
3			
4			
5			
Net present value			
Relative net present value			

Internal Rate of Return

Table 14: Example of Internal Rate of Return calculation

Year	Cash flow (MKD)	Discounted factor at R= 36%	Discounted cash flow (MKD)	Discounted factor at R= 37%	Discounted cash flow (MKD)
0					
1					
2					
3					
4					
5					
(+ or -)					

Other investment performance indicators

Static evaluation

Table 15: Investment performance indicators

Indicator	
1. Total income per employee (MKD)	
2. Net profit margin (%)	
3. Gross salary per employee (MKD/year)	
4. Sales revenues to cost ratio	
5. Accounting rate on return (%)	
6. Capital to labour ratio (MKD)	
7. Return on assets (%)	

Break-even point

Table 16: Example of a break-even analysis

Indicator	Structure in %		MKD value	
	Fixed	Variable	Fixed	Variable
Tangible costs				
Insurance costs				
Investment maintenance costs				
Employees costs				
Depreciation				
Interest costs				
Other costs				
Taxes and fringe benefits				
Total costs				
Total income				
Gross profit				
Break-even point				

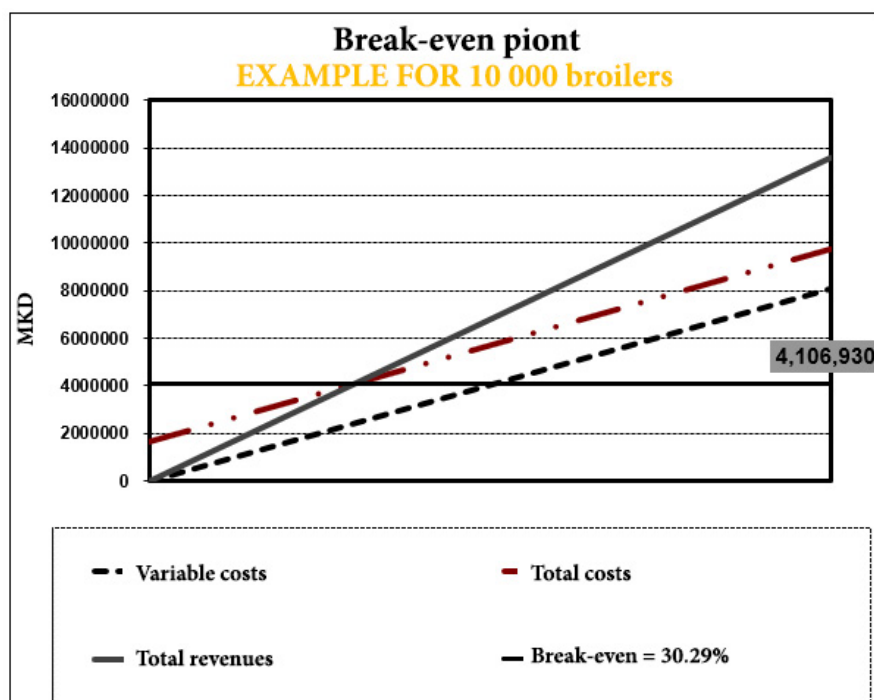


Figure 6: Graphic presentation of break-even point (example of house size 10,000 broilers)

Sensitivity analysis

Table 17: Example for sensitivity analysis (example of house size 10,000 broilers)

1. Sensitivity to changes in the investment	172.61%
2. Sensitivity to changes in sale prices	28.26%
3. Sensitivity to changes in input prices	50.26%

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