THE CASE FOR "SUFFICIENT SCIENCE":

South African Poultry Association v The Minister of Agriculture, Forestry and Fisheries Case Number: 39597/2016 (21/9/2016) (Gauteng Division, Pretoria)

1 Introduction

This discussion examines the role of the "sufficient science" requirement as the basis of a phytosanitary measure as postulated by the World Trade Organisation (hereinafter, "the WTO") Agreement on the Application of Sanitary and Phytosanitary Measures (hereinafter "the SPS"), in South African law through the avenue of the decision of the court in *South African Poultry Association v The Minister of Agriculture, Forestry and Fisheries* (Case Number: 39597/2016 (21/9/2016) (Gauteng Division, Pretoria) hereinafter "*SAPA*"). This case was prompted by the Minister of Agriculture, Forestry and Fisheries' promulgation of new regulations on permissible brine limits for individual chicken portions. These new regulations were promulgated in response to concerns that some chicken producers had used excessive amounts of brine, which compromised the quality of the chicken consumed by consumers. The new regulations capped the permissible brine limit on chicken at 15%. Consequently, the South African Poultry Association then approached the High Court challenging, inter alia, the lawfulness of the permissible brine limit as stipulated in the new regulations on the grounds that there was no scientific basis for the brine limits; and in the alternative, that the scientific basis relied on for the determination of the brining limits was fundamentally flawed. To this end, this paper argues that the court misdirected itself by failing to determine that the newly minted brine limit on poultry meat in South Africa constitutes a "phytosanitary measure" in the manner contemplated by the SPS. Secondly, the court flouted its obligation under the Constitution to ensure that the evaluation of the new brine regulations is in line with South Africa's international obligations under the SPS and the instruments of the Codex Alimentarius Commission. On the back of this finding, the paper argues that the brine limit was incorrectly held to be valid because it was established in the absence of "sufficient science" thereby contravening Article 2.2, Article 5.1 and Article 5.2 of the SPS. Thirdly, the court neglected to examine whether the new brine limit was rationally connected to its risk assessments as required by Article 5.1 of the SPS. This finding invariably means that the new brine limit is presumed not to be based on scientific principles and to be maintained without sufficient scientific evidence. In the alternative, it is argued that the scientific process followed by the respondent could be seen as an exception to the "sufficient science" rule if the respondent argues that they pursued a precautionary approach in good faith, as a responsible government faced with a situation plagued by scientific uncertainty and a clear and imminent threat to public

health and safety. Lastly, this paper argues that the court correctly held that the process followed by the respondent in establishing the views of the scientific community is in line with the SPS. It must be borne in mind that the discussion to follow is focused on the approach the court should have followed according to the SPS and it is not, an enquiry on whether the decision of the court is correct under the precepts of administrative law in South Africa.

2 The facts

Most of the raw frozen poultry products in the form of whole birds, portions and individually quick frozen (IQF) products produced in South Africa are injected with brine (*SAPA* par 13). A majority of the bigger producers ensured that the process of brine injection is conducted in a controlled manner that improves the natural flavour and texture of the product (*SAPA* par 13). Unfortunately, unscrupulous producers had been abusing the process of injecting poultry products solely to maximize financial gain (*SAPA* par 13). Unofficial reports indicated that some poultry is extended by up to 40% resulting in a product with diminished quality, high thawing and cooking losses (*SAPA* par 13). The respondent, the Minister of Agriculture, Forestry and Fisheries (hereinafter "the Minister"), then saw it fit to examine the possibility of some form of regulation to prevent unfair competition and to protect consumers from being exploited (*SAPA* par 11−13). In response, the applicant, the South African Poultry Association, requested that all regulatory bodies be duly notified of the processes employed by the industry, both locally and internationally (*SAPA* par 14). The respondent then commenced with the process of "consultation" with the relevant stakeholders in the chicken industry including the applicant, the South African Poultry Association (*SAPA* par 13−16). This process of "consultation" culminated in the promulgation of new Regulations on permissible brine limits on 22 April 2016 (*SAPA* par 3). As a result, of the new Regulations, the permissible brine limit was capped at 15%. Prior to the advent of these Regulations, there was no brining limit imposed in respect of the individual chicken portions (*SAPA* par 3). These Regulations came into effect on 22 October 2016, affording the relevant producers six months to adjust their processes (*SAPA* par 3).

The applicant, then sought an order reviewing and setting aside the Regulations Regarding Control over the Sale of Poultry Meat made by the Minister, in terms of the Agricultural Products Standards Act (119 of 1990; hereinafter "the Act") as published under Government Notice R471 in Government Gazette 39944 of 22 April 2016 (hereinafter "the Regulations"; *SAPA* par 1). In the alternative, an order was sought reviewing and setting aside Regulation 5 and the Annexure to the Regulations that established the brine limit for poultry at 15% (*SAPA* par 1).

3 The legal question

The applicant was not opposed to the regulation of brining and the imposition of a maximum brining limit for chicken portions (*SAPA* par 4). However, the applicant argued that the Minister acted unlawfully when

making the Regulations that impose a new brining limit of 15% (*SAPA* par 4). Consequently, the only legal question to be examined in this discussion is the lawfulness of the permissible brine limit as stipulated in the Regulations on the grounds that there was no scientific basis for the brine limits; and in the alternative, that the scientific basis relied on for the determination of the brining limits was fundamentally flawed. These are the only grounds that are the subject of this discussion because they encapsulate the "sufficient science" requirement as postulated in the SPS. This assessment of the decision in *SAPA* will be conducted through an analysis of WTO case law, the SPS and the instruments of the Codex Alimentarius Commission (hereinafter "CAC" or "Codex").

Furthermore, the principles and guidelines of the CAC will be employed in tandem with the SPS, to suggest the approach that the court *in casu* should have followed. This approach finds judicial credence from the WTO Panel Report, *EC Biotech*, where the Panel immediately sought clarification from the Codex on the meaning of the term "additives" as it appears on par 1(b) of Annex A (WTO Panel Report, *European Communities Measures Affecting Approval and Marketing of Biotech Products* DS291, hereinafter "Panel Report, *EC Biotech*", adopted 21 November 2006 par 7.299−7.300). Support for this approach is also gleaned from the fact that South Africa is a member country to the CAC and acceded to it in 1994 (CAC Procedural Manual: Section VI: Membership http://www.fao.org/3/a-i3243e.pdf (accessed 2017-02-02) hereinafter "CAC Procedural Manual" 185). In this regard, the SPS provides that in respect of international standards, guidelines and recommendations for food safety, the standards, guidelines and recommendations established by the CAC relating to *food additives*, veterinary drug and pesticide residues, contaminants, methods of analysis and sampling, and codes and guidelines of hygienic practice, must be complied with (par 3(a) of Annex A of the SPS). In the same vein, Article 3.2 of the SPS emphasizes the role of the CAC by providing that Members may introduce or maintain sanitary or phytosanitary measures, which result in a higher level of sanitary, or phytosanitary protection than would be achieved by measures based on the relevant international standards, guidelines or recommendations, if there is a scientific justification. Article 3.2 must be read with Article 3.4 of the SPS which requires that all Members must play a full part in the CAC, within available resources, in the development and periodic evaluation of standards, guidelines, and recommendations with respect to all facets of sanitary and phytosanitary measures. Building on this approach, the Committee on Sanitary and Phytosanitary Measures (hereinafter "CSPM"), which is the body responsible for the implementation of the SPS, is required to maintain a close relationship with the CAC with the object of acquiring the best available scientific and technical advice for the administration of the SPS and in order to avoid the unnecessary duplication of effort (art 12.3 of the SPS). These provisions immediately establish the CAC and the CSPM as co-administrators of the SPS in respect of additives and saddle it with the responsibility for developing international standards and guidelines on food safety and ensuring that the best available scientific

and technical advice is made available in the implementation of the SPS. The role of the SPS will be elaborated upon later in the discussion.

4 Evaluation of the court's findings and reasoning

4 1 Is "brine" a "food additive"?

With this broad approach in mind, "brine" is defined as a solution of sodium chloride in water where the solution is used for curing, flavouring or preserving the foodstuff (see *SAPA* par 3; s 1 of the Foodstuffs, Cosmetics, and Disinfectants Act Regulations Relating to the Labelling and the Advertising of Foodstuffs; see also Codex General Standard Food Additives CODEX STAN 192−1995 33). Brining entails the immersing of poultry in a brine solution or the injection of poultry with brine (*SAPA* par 3). A "brine based mixture" denotes a brine solution to which only permitted phosphate salts and permitted food additives may have been added and which is used for, *inter alia*, tenderizing, flavouring and preserving of poultry meat (s 2 of the Regulations Regarding Control over the Sale of Poultry Meat: Amendment). This triggers the question as to whether "brine" constitutes a "food additive".

In South Africa, a "food additive" is defined as a "supplement or any other substance as authorised by the regulations published under the Foodstuffs, Cosmetics and Disinfectants Act (54 of 1972), which may be added to a foodstuff to effect its keeping quality, consistency, colour, taste, flavour, smell or other technical property (these substances include but is not limited to acids, bases, salts, preservatives, antioxidants, anti-caking agents, colourants, flavourings, emulsifiers, stabilisers, and thickeners)" (s 2(b) of the Regulations Regarding Control over Sale of Poultry Meat: Amendment). The Codex defines a "food additive" as "any substance not normally consumed as a food by itself and not usually used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result, (directly or indirectly) in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods" (see par 3 of CAC Procedural Manual Section 1: Basic texts and definitions−Definitions for the purposes of the Codex Alimentarius). It has been held that the starting point on the definition of "additives" is the Codex although it has been found in the same vein that the Codex definition is not conclusive of the meaning of term as it appears in par 1(b) of Annex A of the SPS (Panel Report, *EC Biotech* par 7.300). Thus the Panel held that the text of par (1)(b) of Annex A requires a "broad approach" that simply refers to "additives" in foods (Panel Report, *EC Biotech* par 7.300). Thus, under the Codex, "brine" would constitute a "food additive" simply by virtue of the fact that it affects the characteristics of chicken such as flavour and taste.

A peek at other WTO Members and comparable jurisdictions like the European Community and the United States of America (hereinafter "USA") yields favourable findings for the notion that brine constitutes a "food

additive". The USA Food and Drug Administration (hereinafter "the FDA") provides that "additives" are used to ensure the preservation of food safety and freshness (FDA "Food, Ingredients, and Colours" https://www.fda.gov/food/ingredientspackaginglabeling/foodadditives ingredients/ucm094211.htm (accessed 2017-02-05) 1). The FDA further provides that additives take many forms such as preservatives and flavour enhancers (FDA https://www.fda.gov/food/ingredientspackaginglabeling/ foodadditives ingredients/ucm094211.htm 2). In the same vein, the European Community's definition of "food additive" mimics the CAC (art 3.2(a) of the Regulation (EC) No 1333/2008). Thus, the definition of "brine" in South Africa encapsulates the salient elements of "food additives" as contemplated by the FDA and the European Community. The reasoning of the WTO Appellate Body entrenches this approach, which has held that a scientific evaluation may convey the views of the majority of the scientific community or a divergent opinion of a respected source (WTO Appellate Body Report, *United States Continued Suspension of Obligations in the EC Hormones Dispute,* WT/DS320/AB/R, adopted 4 November 2008, par 529−530).

For purposes of this discussion, it can then be argued that on the basis of the new Regulations, WTO case law, the SPS, the Codex General Standard on Food Additives CODEX STAN 192−1995 and the prevailing opinion of the majority of the relevant scientific community in the form of the European Community and the FDA, "brine" in South Africa constitutes a "food additive" because it directly affects the quality and taste of the chicken. This finding is endorsed further by the reasoning of the Panel in *EC Biotech*, under circumstances similar to those in *SAPA* (see Panel Report, *EC Biotech* par 7.304).

4 2 Does the brine limit constitute a "phytosanitary measure"?

Naturally, this means that the next enquiry is whether the new Regulations on brine limits constitute a "phytosanitary measure" as postulated by the SPS. The SPS is the authoritative text of the WTO that spells out the requirements for all sanitary and phytosanitary measures that may, directly or indirectly, affect international trade (Vinti "Peeling the Orange: A Critical Assessment of the Legality of the European Union Phytosanitary Regime against Citrus Produce from South Africa" 2016 *Obiter* 449 456). As a point of departure, South Africa is a member of the World Trade Organisation, (see *International Trade Administration Commission v SCAW South Africa (Pty) Ltd* 2012 (4) SA 618 (CC) par 2, hereinafter "*SCAW"*). Parliament ratified South Africa's membership of the WTO on 2 December 1994 (*SCAW* par 25). The Marrakesh Agreement Establishing the WTO (WTO Agreement) was approved by Parliament on 6 April 1995 (*Progress Office Machines v SARS* 2008 (2) SA 13 (SCA) par 6, hereinafter "*Progress Office Machines*"; *SCAW* par 25). It is common cause that the SPS is one of the Multilateral Agreements on Trade in Goods contained in Annex 1A of the WTO Agreement and, as such, is an integral part of the WTO Agreement, that is binding on South Africa (WTO Appellate Body Report, *US Subsidies on Upland Cotton*, WT/DS267/AB/R, adopted 20 June 2008, par 549−550;

WTO Appellate Body Report, *United States Standards for Reformulated and Conventional Gasoline*, DS2 23, DSR 1996:I, 3, adopted 20 May 1996, 21; and WTO Appellate Body Report, *India Patent Protection for Pharmaceutical and Agricultural Chemical Products*, DS50, adopted on 16 January 1998, par 45). This means then that the SPS is part of South African law (see ss 231−233 of the Constitution).

To this end, clearly the SPS regards legislation aimed at safeguarding human health from risk arising from *inter alia*, *food additives* in food and feedstuffs, as constituting a "phytosanitary measure" (par 1(b) of Annex A of the SPS). Furthermore, according to Article 1.1 of the SPS, two requirements need to be fulfilled for the SPS to apply: (i) the impugned measure must be a sanitary or phytosanitary measure; and (ii) the impugned measure may, directly or indirectly, affect international trade (WTO Panel Report*, EC Measures Concerning Meat and Meat Products (Hormones) (Canada),* WT/DS48/R/CAN, adopted 13 February 1998, par 8.39). In this regard, the salient elements of the first requirement of Article 1.1 of the SPS, is that the said measure must: (a) be applied to protect human life or health; (b) from risks arising out of additives in foods or foodstuffs. It is common cause that brine poses a health risk to human life and health in the manner contemplated by Article 1.1 of the SPS. This is evinced by the court's acceptance of the submissions of the Heart and Stroke Foundation which had conveyed its concerns about the salt levels in respect of consumers' health issues (*SAPA* par 20). Significantly, the Heart and Stroke Foundation's concerns were also shared by the respondent who viewed the issue of brine limits as a food safety issue, hence it had requested the Agricultural Research Council (hereinafter "ARC") to investigate the health risk of excessive brine in chicken (*SAPA* par 3 and par 21). This finding is endorsed by the reasoning of the Panel in *EC Biotech* (Panel Report, *EC Biotech* par 7.299 – 7.301). Peel opines that this is the "broad approach" of the Panel in *EC Biotech,* which endorsed the notion that in the event that a reasonable causal nexus can be established or postulated to link a product with a certain health or environmental risk, it can be argued that an instrument seeking to reduce that risk is potentially an SPS measure (Peel "A GMO by Any Other Name... Might Be an SPS Risk! Implications of Expanding the Scope of the WTO Sanitary and Phytosanitary Measures Agreement" 2007 17 *The European Journal of International Law* 1009 1022−1023). It has already been established that brine constitutes a "food additive"' in the manner contemplated by the SPS and that, the brine limit is legislation that is aimed at protecting the health and safety of consumers. Thus, it can be argued that the new brine limit constitutes a "phytosanitary measure".

It has also been held that par 1 of Annex A of the SPS indicates that for the purposes of determining whether a particular measure constitutes an "SPS measure", regard must be had to such elements as the object of the measure, its legal complexion and its nature (WTO Panel Report, *EC Biotech* par 7.149). The new brine limit fulfils the requirements of Annex A in that its primary purpose is directly related to food safety in order to protect human health or life and it operates in the form of "regulations" (see second paragraph of Annex A (1) to the SPS). Therefore, since the brine limit complies with the requirements of Article 1.1 and par (1)(b) of Annex A, it

means that the SPS is applicable. Thus, it is clear that the new brine limit constitutes a "phytosanitary measure".

On the second requirement of Article 1.1 of the SPS, it is required that the said measure may or may not directly or directly affect international trade (See WTO Panel Report, *EC Measures Concerning Meat and Meat Products (Hormones) (United States)*, WT/DS26/R/USA, adopted 13 February 1998, par 8.23). In this respect, it was accepted by the court that it is imperative that some form of legislation be promulgated to halt unfair competition and to protect consumers from being duped (*SAPA* par 13). This viewpoint was reiterated by the Legal Metrology who submitted that brining levels should be restricted to minimal levels because consumers could be deceived since the chicken was sold by mass (*SAPA* par 20). This is further validated by the submissions of the 5th Intervener in the matter, the National Consumer Union, who requested that no brine should be added to chicken (*SAPA* par 20). This means that the new brine limit would directly affect trade.

However it is unnecessary for one to prove that the SPS measure has a clear effect on trade (Panel Report, *EC Biotech* par 7.435). Article 1.1 only requires that the SPS measure *may*, directly or indirectly, affect international trade (Panel Report, *EC Biotech,* par 7.435). To the contrary, it has also been held even if a measure is within the ambit of the definition of a phytosanitary measure as postulated in par 1 of Annex A of the SPS read with Article 1.1 of the SPS, such measure still needs to be a measure that directly or indirectly affects international trade to fall within the scope of the SPS Agreement (WTO Panel Report, *United States Certain Measures Affecting Imports of Poultry from China*, hereinafter *"US Poultry (China)*", WT/DS392/R, adopted 25 October 2010, par 7.87). It is submitted that the approach of the Panel in *US Poultry (China)* lacks a textual basis and introduces a more onerous burden than the SPS. Such an approach of unwarranted judicial activism attempts to subvert the purport of Article 1.1 of the SPS. Overall, it can then be argued that since the new brine limit is a phytosanitary measure that directly affects trade, it means that the SPS is applicable.

4 3 Is there a need for "sufficient scientific basis" for a brine limit?

The finding that the SPS is applicable to the new brine limit necessitates an enquiry into whether the brine limit complies with the rest of requirements of the SPS. The applicant contended that the new brine limit was unlawful because it lacked a scientific basis (*SAPA* par 4). Prior to the promulgation of the new Regulations on 22 April 2016, there was no brining limit imposed on individual chicken portions (*SAPA* par 3). As a general rule, poultry portions may contain food additives in the amounts permissible in terms of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No. 54 of 1972; s 5 of Regulations Regarding Control over the Sale of Poultry Meat: Amendment). In the case of individual portions which are treated with a formulated solution, the mass increase of the individual portions as a result of such treatment must not exceed 15% : Provided that : (i), subject to the

provisions of regulation 4(2), the combined percentage of the absorbed moisture and formulated solution shall not exceed 15%; and (ii) the concentration of the phosphate and food additives in the formulated solution in the final treated poultry meat shall be within the permissible levels prescribed by the Foodstuffs, Cosmetics and Disinfectants Act (54 of 1972; s 5 of the Regulations Regarding Control over the Sale of Poultry Meat: Amendment). In simple terms, the new Regulations imposed a brine limit of 15%.

However, the court *in casu* made the decision oblivious of the fact that the new Regulations on brine limits constitute a "phytosanitary measure". In this respect, the court held that the Minister's decision to cap the brine levels at a 15% cap does not invariably mean that his decision is arbitrary, irrational or unreasonable unless a court can find that the decision is irrational (*SAPA* par 17). Thus according to the court, the only issue under consideration was whether or not the cap eventually imposed by the Minister, was reasonably capable of achieving the Department of Agriculture, Forestry and Fisheries' (hereinafter "DAFF") stated objective, namely to safeguard consumer interest (*SAPA* par 19). This means that the court misconstrued its obligation to resolve the dispute from a holistic perspective by neglecting to assess the validity of the new Regulations from both a domestic and international perspective. This is an obligation that arises out of the Constitution which provides that when interpreting any legislation, every court must prefer any reasonable interpretation of the legislation that is consistent with international law over any alternative interpretation that is inconsistent with international law (s 233 of the Constitution of the Republic of South Africa, 1996, hereinafter "the Constitution). The court in *SAPA*, only pursued the narrow approach of assessing the brine limit within the obvious purview of administrative law in South Africa and thus abdicated the court's duty under the Constitution, to assess whether the new brine limit is in conformity with international law (see *Progress Office Machines* par 6*; Association of Meat Importers v ITAC* 2013 4 All SA 253 (SCA) par 61; *International Trade Administration Commission v SCAW South Africa (Pty) Ltd supra* par 43; see also Vinti "A Spring without Water: The Conundrum of Anti-Dumping Duties in South African Law" 2016 19 *PER/PELJ* 14).

In essence, the applicant contended that the Minister would have had "discretion to impose a particular limit after a scientific process had been followed" (*SAPA* par 19). At this juncture, it is submitted that the applicant misconstrued or was unaware of the import of the "sufficient science" threshold of the SPS because it challenged the lawfulness of the new brine limit on the lower threshold of simply, whether the brine limit is borne out of a "scientific process". The court immediately rejected the submission that the Minister has a duty to impose an optimal brining level (*SAPA* par 19). According to the court, it is patently clear that internationally, there is no consensus even amongst well-qualified scientists on the appropriate brine limit (*SAPA* par 19). Thus, the court in *SAPA* reasoned that the determination of brine levels is an imprecise science, and neither the Act, nor the Regulations contemplated in this regard, demand such a precise scientific basis (*SAPA* par 23). Ultimately, the court held that according to South African law, "there needs to be no absolutely correct scientific basis for the brine limits, and indeed it seems to be common cause upon a proper

analysis that such cannot be scientifically determined as if it were the speed of light" (*SAPA* par 27). It is submitted that the court's reasoning in this regard constitutes a flagrant violation of Article 2.2; Article 5.1 and Article 5.2 of the SPS; WTO case law and the instruments of the CAC.

Article 2.2 of the SPS provides that Members must ensure that any sanitary or phytosanitary instrument is implemented only to the extent necessary to protect human, animal or plant life or health and is based on scientific principles and sufficient scientific evidence, except as provided for in paragraph 7 of Article 5. Within the ambit of Article 2.2 of the SPS, "scientific" means that the evidence in question must be evidence that is acquired through scientific means, excluding on the same score, information not collected through a scientific method (WTO Appellate Body Report*, Japan Measures Affecting the Importation of Apples,* hereinafter "Appellate Body Report, *Japan Apples*", DS245, adopted 10 December 2003, par 8.92–8.93). "Sufficiency" denotes the existence of an adequate relationship between the SPS measure and the scientific evidence (WTO Appellate Body Report, *Japan Measures Affecting Agricultural Products,* WT/DS76/AB/R, hereinafter "Appellate Body Report, *Japan Agricultural*", adopted 19 March 1999, par 73). It has been held that the context of the word "sufficient" or, more generally, the phrase "maintained without sufficient scientific evidence" in Article 2.2, includes Article 5.1 as well as Articles 3.3 and 5.7 of the SPS (Appellate Body Report, *Japan Agricultural* par 74). In essence, Article 2.2 excludes not only inadequately substantiated information but also such things as an unproven hypothesis (Appellate Body Report, *Japan Apples* par 8.92–8.93). It follows then that Article 2.2 informs Article 5.1 of the SPS: the elements that define the basic obligation set out in Article 2.2 give meaning to Article 5.1 (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, WT/DS26/29, adopted 13 February 1998, fn 12, par 180). Thus, Article 2.2 invalidates phytosanitary measures such as the new brine limit, which are based on "inexact science".

The applicability of Articles 2.2 and 5.1, on the one hand, and of Article 5.7, on the other hand, will hinge on the adequacy of the scientific evidence (WTO Appellate Body Report, *Canada Continued Suspension of Obligations in the EC Hormones Dispute,* hereinafter "Appellate Body Report, *Canada Suspension",* DS321, adopted 14 November 2008, par 674). As an amplifier to the "sufficient science" requirement, Article 5.1 of the SPS requires that Members must ensure that their sanitary or phytosanitary measures are based on an assessment, as appropriate to the circumstances, of the risks to human, animal or plant life or health, with a due consideration of risk assessment techniques generated by the relevant international organisations. Article 5.1, which must always be read with Article 2.2 of the SPS, requires that the results of the risk assessment must justify the SPS measure at stake (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 193). A risk assessment is the "evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences; or the evaluation of the potential for adverse effects on human or animal health

arising from the presence of additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs" (par 4 of Annex A of the SPS). In essence, risk assessment should be based on all available scientific data (par 20 of CAC Procedural Manual: Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius). In a risk assessment, Members must accord due consideration to *inter alia*, available scientific evidence; relevant processes and production methods; relevant inspection, sampling and testing methods; the prevalence of specific pests; the existence of pest- or disease-free areas; relevant ecological and environmental conditions (art 5.2 of the SPS).

More specific to food additives, a risk assessment is seen as a two-step process that must identify the negative effects on human health caused by the presence of the additives and if any such negative effects exist, evaluate the risk of occurrence of such effects (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 183). Furthermore, a risk assessment should be conducted in accordance with the Statements of Principle Relating to the Role of Food Safety Risk Assessment and should incorporate the four steps of the risk assessment that is, hazard identification, hazard characterization, exposure assessment and risk characterization (par 19 of CAC Procedural Manual: Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius; see also CAC Procedural Manual: Definitions of Risk Analysis terms related to Food Safety). This Food Safety Risk Assessment should be soundly based on science, should incorporate the aforementioned four steps of the risk assessment process, and should be recorded in a transparent manner (par 2 of CAC Procedural Manual: The Statements of Principles relating to the role of Food Safety Risk Assessment 1997). To this end, the food standards, guidelines and other recommendations of Codex Alimentarius must be based on the principle of sound scientific analysis and evidence, involving a thorough analysis of all relevant information so that the standards guarantee the quality and safety of the food supply (par 1 of CAC Procedural Manual: Statements of Principle Concerning the Role of Science in the Codex Decision-Making Process and the Extent to which other Factors are taken into Account). Consequently, it is abundantly clear that "sufficient science", as a general rule, must be the basis of all phytosanitary measures.

It can then be seen that the requirement that the SPS instrument be "based on" a risk assessment is a fundamental obligation to ensure that there must be a rational relationship between the instrument and the risk assessment (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 193). If a measure is not based on a risk assessment as required in Articles 5.1 and 5.2 of the SPS, this measure is regarded as not being based on scientific principles and is sustained without sufficient scientific evidence (*US Poultry (China)*, par 7.201). In this way, the nub of a risk assessment is that the scientific evidence, which is being evaluated, must support the conclusions of the risk assessment (WTO Panel Report, *Japan Measures Affecting the Importation of Apples: Recourse to Article 21.5 of the DSU by the United States (Article 21.5 − US),* WT/DS245/RW, par 8.129). In other words, there must be a causal nexus between the new brine limit and its risk

assessment(s). Therefore, any SPS measure, such as the new brine limit, must be predicated on a risk assessment, which, in turn, must be based on sufficient scientific evidence (WTO Panel Report, *Australia Measures affecting the importation of Apples from New Zealand,* hereinafter "Panel Report, *Australia Apples",* adopted 17 December 2010, WT/DS367/R, par 7.214). On this score, the court's dismissal of the "science" requirement should have been fatal to the case of the respondent because the court misconceived its obligation under the SPS, WTO case law and the aforementioned instruments of the CAC. In making its decision oblivious of the SPS, the court was, in fact, rejecting the "sufficient science" requirement of Article 2.2 and Article 5.1 of the SPS and on that ground alone, the applicant's challenge on the lawfulness of the new brine limit should have succeeded (see *SAPA* par 27.1).In this way, the court also failed to honour its obligation to properly assess the veracity of findings of the risk assessments conducted by the ARC, the Legal Metrology and the Heart and Stroke Foundation. In the same vein, the court's decision to disregard the causal nexus requirement in Article 5.1 of the SPS means that the court neglected its duty to assess whether there is a rational relationship between the new brine limit and its risk assessment(s) (see *SAPA* par 23).

It is also imperative to take into consideration, that the risk that is to be in a risk assessment under Article 5.1 "is not only risk ascertainable in a science laboratory operating under strictly controlled conditions, but also risk in human societies as they actually exist, in other words, the actual potential for adverse effects on human health in the real world where people live and work and die" (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 187). It has been opined that this finding is difficult to decipher since scientific evidence normally occurs in laboratories aimed at producing useful results to the world (Matsushita, Schoenbaum and Mavroidis *The World Trade Organization: Law, Practice and Policy* 2ed (2006) 511−512). The respondent was well aware of this risk hence it regarded high brine levels in chicken as a threat to consumer safety and submitted that it had requested the ARC to conduct a research on brine injection of chicken meat, whose preliminary results found that a risk to consumers existed (*SAPA* par 2).

Furthermore, the conduct of the unscrupulous producers in South Africa who injected excessive amounts of brine in chicken contravenes the Codex General Standard on Food Additives in two respects: first, the use of food additives is justified only when such use has an advantage, does not present an significant health risk to consumers, does not deceive the consumer, and serves one or more of the technological functions set out by Codex and the needs set out from (a) through (d) and only where these objectives cannot be achieved by other means that are economically and technologically practicable (par 3.2 of the Preamble of the Codex General Standard on Food Additives); second, all food additives must be used under conditions of good manufacturing practice, which include *inter alia*, that the quantity of the additive added to food must be restricted to the lowest possible level necessary to achieve its desired objective (par 3.3(a) of the Preamble of the Codex General Standard on Food Additives). It was common cause *in casu* that brine posed a significant health risk and some of the manufacturers misled consumers on the brine quantity. In response, the respondent could

argue that a Member, which follows a precautionary approach, and which conducts a risk assessment which identifies unpredictability or restrictions, would be justified in applying: (i) the SPS measure despite the fact that another Member may decide not to impose the SPS measure on the basis of the same risk assessment, or (ii) the SPS measure, which is more stringent than the SPS measure applied by another Member to address the same risk (Panel Report, *EC Biotech* par 7.3065). However, even if a Member follows a precautionary approach, its SPS measures must be based on a risk assessment as required by Article 5.1 (Panel Report, *EC Biotech* par 7.3065). It has been opined that a precautionary approach will contravene trade rules if an evaluation of the prospective risks to human health has in fact been conducted (Feris "The EC Biotech Case and its Implications for Measures affecting Genetically Modified Organisms" 2007 *Stell LR* 118 131). It follows then that the court misdirected itself when it disregarded the "sufficient science" threshold in the assessment of the validity of the new brine limit because this meant that the court did not discharge its duty to verify the causal nexus between the brine limits and the risk assessments.

The court also held that upon proper evaluation, that such brine limits cannot be scientifically determined with precision (*SAPA* par 27.1). In this respect, the Appellate Body has explained that the relevant scientific evidence will be considered insufficient "if the body of available scientific evidence does not allow, in quantitative or qualitative terms, the performance of an adequate assessment of risks as required under Article 5.1 and as defined in Annex A to the SPS" (Appellate Body Report, *Japan Apples* par 179). This implies that the respondent in *SAPA* proceeded based on scientific uncertainty. It follows then that the brine limit should have been found to be unlawful because it lacked a "sufficient scientific" basis as required by Article 2.2 of the SPS.

It has been suggested that scientific evidence is not stripped of its scientific nature by virtue of the fact it is inconclusive as to the existence of a risk, and that risk assessment is not tantamount to guaranteeing the production of sufficient scientific evidence (Vecchione "Is It Possible to Provide Evidence of Insufficient Evidence? The Precautionary Principle at the WTO" 2012 13 *Chicago Journal of International Law* 153 163−164). This notion would lend itself to the court's finding that legislation in South Africa in this regard does not require an "exact scientific conclusion" (*SAPA* par 23). In this respect, this discussion has shown that the court's ambivalent acceptance of "inexact science" as the basis of the new brine limit is not tantamount to "sufficient science" as required by Article 2.2. However, Vecchione argued that science, if conclusive and temporarily uncontroverted, affords a legal advantage to the litigant who is adducing it and, conversely, imposes a huge burden on the litigant who intends to provide a case to the contrary (Vecchione 2012 13 *Chicago Journal of International Law* 165−166). It is then submitted that this is the inherent nature of scientific knowledge and these are its legal implications when adduced in a tribunal (Vecchione 2012 13 *Chicago Journal of International Law* 166). This situation would then risk automatically recasting scientific standards of proof into legal standards of proof (Vecchione 2012 13 *Chicago Journal of International Law* 166). It is opined therefore, that if "science" denotes only comprehensive scientific knowledge based on risk

assessment, then there could not be any contrary legal evidence, let alone any based on a case of "insufficient scientific evidence" (Vecchione 2012 13 *Chicago Journal of International Law* 166).

It is submitted that Vecchione misconstrues the import of the meaning of the term "sufficiency", as postulated by the Appellate Body. The Appellate Body has held that the question in terms of "sufficient science" does not relate to the completeness of evidence tendered to the tribunal, but in fact, "sufficiency" refers to the existence of an "adequate relationship" between the phytosanitary measure and the scientific evidence (see Appellate Body Report, *Japan Agricultural* par 73). "Sufficiency" does not imply that such evidence must be absolute or that they may not be evidence that implies to the contrary, all that must be proved is that the probability of the harm to human health or life is "likely" (see WTO Appellate Body Report, *Australia Measures Affecting the Importation of Salmon*, hereinafter "Appellate Body Report, *Australia Salmon*", adopted 6 November 1998, par 123). It is also submitted that in light of the evident and egregious risk food additives may pose to human life or health, the risk of "translating scientific standards of proof into legal standards" is supplanted by the most sacrosanct and inalienable, right to life, which justifies the higher onus. In any event, the party making the allegation only has to establish a *prima facie* case which is one which, in the absence of a proper challenge by the defending party, requires a panel, as a matter of law, to rule in favour of the aggrieved party presenting the *prima facie* case" (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 104; Appellate Body Report, *Japan Apples* par 159). In *US – Wool Shirts and Blouses*, the Appellate Body held that ultimately, the nature and scope of evidence required to establish a *prima facie* case "will necessarily vary from measure to measure, provision to provision, and case to case" (WTO Appellate Body Report, *Measures Affecting Imports of Woven Wool Shirts and Blouses from India*, adopted 23 May 1997, p. 14, DSR 1997: I 323 335). It is submitted that in light of the risk brine poses to human health, the "sufficient science" threshold of the SPS is the most appropriate standard the respondent should comply within all instances. It is eminently clear that the court in *SAPA* rejected the notion of "science", let alone "sufficient science", as the basis for the new brine limit.

It was also held that the Minister had the right to determine the 15% limit as a "compromise after having considered the views of at least 20 stakeholders" (*SAPA* par 20). The court *in casu* then held that the scientific basis relied upon by the Department was "generally of such a nature as to have enabled the Department and ultimately the Minister to have determined a limit of brine on the basis of compromise and reasonableness" (*SAPA* par 27). In this regard, the Appellate Body has held that the mere existence of differing views by experts in the relevant area may imply the existence of scientific uncertainty (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 194). On the other hand, the divergence of views may imply an approximately even balance of scientific opinion, which could imply in itself, a state of scientific uncertainty (WTO Appellate Body Report *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 194). Therefore, since

the new brine limit was the product of "compromise", it could be argued that the brine limit was based on scientific uncertainty.

In response, the respondent could argue that a prudent and representative government may act in good faith on the basis of what, at a given time, may be a contrary opinion emanating from qualified and respected sources (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 194). By itself, this does not invariably imply the absence of an adequate relationship between the SPS measure and the risk assessment, especially where the risk in question poses a threat to life and is regarded as constituting a "clear and imminent threat to public health and safety" (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 194). The ascertainment of the presence or absence of that relationship can only be conducted on a case to case basis, after due consideration of all factors having a bearing on the issue of potential adverse health effects (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 194). It can then be said that the court's acceptance of the respondent's process of "compromise and reasonableness" is correct in law because it reflects a precautionary approach embarked on in good faith by a responsible government faced with a situation plagued by scientific uncertainty and a clear and imminent threat to public health and safety.

It is then submitted that Article 5.7 of the SPS was the only avenue that was available to the respondent. Article 5.7 of the SPS provides inter alia, that in cases where there is insufficient scientific evidence, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organisations as well as from sanitary or phytosanitary measures applied by other Members. Thus, Article 5.7 operates as a qualified exception from the duty under Article 2.2 not to maintain SPS measures without sufficient scientific evidence (Appellate Body Report *Japan Agricultural* par 80). If the relevant scientific evidence is inadequate to conduct a risk assessment, a Member may take a provisional SPS measure as provided for by Article 5.7, but that Member must comply with the requirements of that provision (Appellate Body Report, *Canada Suspension,* par 674). Reading Article 5.7 as a qualified right rather than an exception implies that if an impugned SPS measure was adopted and is maintained consistently within the cumulative requirements of Article 5.7, the situation is "as provided for in paragraph 7 of Article 5", and the obligation to maintain SPS measures without sufficient scientific evidence is not applicable to the impugned measure (Panel Report, *EC Biotech,* par 7.2974). Thus, Article 5.7 could have been available to the respondent because the court held that the respondent was not required to wait until a "scientifically proven or arrived at percentage indicating the optimal level was presented to it" (*SAPA* par 23). However, this finding exceeds the ambit of Article 5.7 in that the court implies that there was no obligation on the respondent to establish a brine limit based on science nor was there an obligation to wait until such scientific justification was found. Thus, the court discards "science" as the basis of a phytosanitary measure. This reasoning has far-reaching implications for the implementation of phytosanitary measures in South Africa. This is because it endorses *carte*

blanche behaviour by the investigating authority. This is even more disappointing because the court made this decision oblivious of the safety valves created by Article 5.7 to prevent abuse by unscrupulous governments. First, Article 5.7 provides that the said measure must be a provisional measure as envisaged in Article 5.7. The new brine limit is clearly not a provisional measure. Second, Article 5.7 requires that in such circumstances, Members must seek to acquire the supplemental information required for a more objective evaluation of risk (Appellate Body Report, *Japan Agricultural,* par 89). Lastly, it is required that Members must review the sanitary or phytosanitary measure within a reasonable period of time (Appellate Body Report, *Japan Agricultural,* par 89). The Appellate Body has added, "whenever one of these four requirements is not met, the measure at issue is inconsistent with Article 5.7" (Appellate Body Report, *Japan Agricultural,* par 89). The court in *SAPA* was not alert to these constraints.

In any event, the mere fact that there exist, unknown and unpredictable elements, does not entitle one to disregard the requirements of Articles 5.1, 5.2 and 5.3, read together with paragraph 4 of Annex A, for a risk assessment (WTO Appellate Body Report, *Australia Measures Affecting Importation of Salmon,* hereinafter "WTO Appellate Body Report, *Australia Salmon"*, WT/DS18/AB/R par 130). Article 5.2 simply requires that "in the assessment of risk, Members shall take into account available scientific evidence" (WTO Appellate Body Report, *Australia Salmon*, par 130). Therefore, it is clear that the new brine limit would hopelessly fail the test of Article 5.7. It must be noted that the fact that a particular measure, in this instance, the new brine limit, is found to be maintained without sufficient scientific evidence, may not necessarily respond to the separate question, under Article 5.7, of whether the situation is one where "relevant scientific evidence" is insufficient (See WTO Panel Report, *Japan Measures Affecting the Importation of Apples*, par 8.215).

A close reading of the court's approach to the ground of "science" shows an ambivalent attitude, albeit inadvertently, that vacillates between a complete disregard, and a tentative commitment to the role of "science" as the basis for a phytosanitary measure in South Arica (see *SAPA* par 23−27). The *ratio decidendi* of the court rejects the "sufficient science" threshold of Article 2.2 of the SPS, in favour of the ambiguous and generic threshold of simply, a "scientific process". Overall, it can then be seen that the court's reasoning and findings strike at the heart of Article 2.2; Article 5.1; Article 5.2 and Article 5.7 of the SPS and the various instruments of the CAC as well as WTO case law. This is because the SPS and the CAC explicitly require that "sufficient science" must be the basis of the SPS measure and that a risk assessment appropriate to food additives is a prerequisite to a new law or regulations on brine limit. In this way, the SPS and the CAC require that there must a rational relationship between the brine limit and the risk assessment(s). Therefore, the court's rejection of the "sufficient science" threshold of an SPS endangers the health and safety of consumers, promotes impunity and eviscerates the essence of the SPS.

4 4 Was the scientific basis for the new brine limit fundamentally flawed?

Having found that the court incorrectly held that there needs to be no absolutely correct scientific basis for the new brine limit, the assessment of the applicant's alternative challenge on the lawfulness of the new brine limit on the basis that the scientific basis relied on for the determination of the brining limits was fundamentally flawed, would be for the most part, redundant. It is not clear in the judgment what the applicant meant by this alternative ground. It is suggested in this paper that to allege that the scientific basis for the new brine limit is fundamentally flawed speaks to both the substantive elements, that is, the scientific basis for the brine limit and the procedural elements to be followed in the determination of the scientific basis of the permissible brine limit. Support for this approach is found in the WTO Panel Report, *Japan Measures Affecting the Importation of Apples: Recourse to Article 21.5 of the DSU by the United States (Article 21.5 – US) (hereafter, Japan Apples: Recourse to Article 21.5),* where it was held that the examination of whether there exists a risk assessment appropriate to the circumstances encapsulates procedural and substantive elements (*Japan Apples: Recourse to Article 21.5* par 8.129). The discussion on the substantive elements does not merit further discussion because it has already been examined on the first ground of whether there is a "sufficient scientific" basis for the brine limit. This only leaves for consideration, an enquiry into whether the scientific basis for the determination of the brining limits was fundamentally flawed on procedural grounds.

In this regard, it is required that effective communication and consultation with all interested parties should be guaranteed throughout the risk analysis (par 7 CAC Procedural Manual: Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius). To this end, the court correctly held that a comprehensive view of the five-year consultation process leads to the finding that a fair process was followed (*SAPA* par 15). The events preceding the publication of the new Regulations in 2016 indicated that the respondent pursued an extensive consultation process *SAPA* par 15). However, the Appellate Body has held that in respect of risks to human life or health, risk assessment entails a scientific evaluation of data and factual studies; "it is not a policy exercise involving social value judgments made by political bodies" (WTO Panel Report, *EC Measures Concerning Meat and Meat Products (Hormones) (United States)*, par 8.94). Therefore, the procedure followed by the Minister could have been found to be a "policy exercise" and not, a risk assessment. The respondent could counter this argument by asserting that the research reports of the various experts in the matter reports do not form part of the Respondent's formal risk assessment nor represent South Africa's official government policy (See WTO Panel Report, *Australia Measures Affecting Importation of Salmon,* hereinafter "Panel Report, *Australia Salmon"*, WT/DS18/R adopted 6 November 1998 par 8.136). However, if they constitute relevant available scientific information, a court is obliged to assess this evidence (Panel Report, *Australia Salmon* par 8.136). In the process of evaluation, a Panel is only concerned with the scientific and technical details of these reports and studies but not their administrative status irrespective of whether they are

official government reports or not (Panel Report, *Australia Salmon* par 8.136). The scientific weight to be accorded to the report does not depend on whether or not this evidence is part of official government policy (WTO Panel Report, *Australia Salmon* par 8.137). Therefore, the risk assessments submitted in court could be found to constitute risk assessments of the respondent irrespective of their administrative status.

Furthermore, the CAC Statements of Principles relating to the role Food Safety Risk Assessment provides that there must be a functional separation of risk assessment and risk management while recognizing that some interactions are essential for a pragmatic approach (par 4). This separation of risk assessment and risk management, is required to guarantee the scientific integrity of the risk assessment, to avoid uncertainty over the functions to be carried out by risk assessors and risk managers and to reduce any conflict of interest (par 9 of the CAC Procedural Manual: Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius). In this way, it can be argued that the court correctly held that the South African Poultry Association regarded the process as unfair simply because it was not afforded the latitude to "co-direct the process and forgot that it was part of the "regulated" and not the "regulator" (*SAPA* par 15). As a result, the court correctly held that the submission that the procedure which preceded the promulgation of the new Regulations was procedurally unfair and flawed, lacked merit (*SAPA* par 16).

In addition, Article 5.1 does not require that a Member that adopts a sanitary measure should have conducted its own risk assessment (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 190). The SPS measure could be based on a risk assessment conducted out by another Member, or an international organisation (WTO Appellate Body Report, *European Communities Measures Concerning Meat and Meat Products (Hormones)*, par 190).In this way, it can be argued that the procedure followed by the respondent was correct because it proceeded on the basis of risk assessments conducted by itself and by other institutions.

Finally, the 6 months period of adaptation given to producers between the date of promulgation and the date the regulations came into effect on 22 October 2016, complies with the import of Annex B of the SPS (see *SAPA* par 3). Annex B of the SPS provides that Members must allow a reasonable period between publication and entry into force of phytosanitary regulation to allow the relevant industry the time to adapt their products and methods of production (par 2 of Annex B: Transparency of Sanitary and Phytosanitary Regulations). In this way, it can be seen that the process followed by the respondent complies with the transparency and consultation requirements of the SPS.

5 Conclusion

This discussion has established that the court in *SAPA* misdirected itself in various respects. Firstly, the court failed to determine that the new brine limit constitutes a "phytosanitary measure" in the manner contemplated by the SPS. Secondly, the court misdirected itself when it held that there needs to

be no absolutely correct scientific basis for the new brine limit. This finding contravenes Article 2.2; Article 5.1 and Article 5.2 of the SPS; WTO case law and the various instruments of the CAC, which contrary to the court's reasoning, require that the SPS measure must be based on "sufficient science". As a result, the court has inadvertently created the generic, "scientific process" test, which lowers the "sufficient science" threshold of Article 2.2 of the SPS. Thirdly, the court misconstrued its obligation under the SPS by neglecting to assess whether the new brine limit is rationally connected to the conclusions of a duly conducted risk assessment as required by Article 5.1 and Article 5.2 of the SPS. This means that the new brine limit is not based on scientific principles and based on scientific uncertainty. These findings are borne out of the court's failure to take into consideration, South Africa's mandate under the Constitution to ensure compliance with its international obligations under the SPS and the CAC. Thus, the import of this judgment has far-reaching implications for the administration of phytosanitary measures pertaining to food additives in South Africa. In the alternative, it is found that the scientific process followed by the respondent could be regarded as an exception to the "sufficient science" rule, if the respondent argues that they pursued a precautionary approach in good faith, as a responsible government, in the face of scientific uncertainty and a clear and imminent threat to public health and safety.

The only silver lining in the judgment is that the court did hold, correctly, that the correct procedure was followed in ascertaining the views of the scientific community through a fair consultation process in line with South Africa's obligations under the SPS and the instruments of the CAC. It is disappointing that the courts continue to have a blind spot for South Africa's obligations under the SPS. This naivety is carried over to the newly drafted Plant Health (Phytosanitary) Bill, which still does not cater for phytosanitary measures pertaining to food additives as postulated in the SPS (see s 1 of the Plant Health (Phytosanitary) Bill). It is suggested that the Plant Health (Phytosanitary) Bill should address this lacunae with a view to catering for phytosanitary measures pertaining to food additives in order to prevent the proliferation of the incorrect precedent set in *South African Poultry Association v The Minister of Agriculture, Forestry and Fisheries*.

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